

NAACL HLT2010 LOS ANGELES

Human Language Technologies:
11th Annual Conference of the
North American Chapter
of the Association for
Computational Linguistics
1-6 June 2010

Conference Handbook



USC **Viterbi**
School of Engineering



NAACL
HLT2010
LOS ANGELES

Overview

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- BB Biltmore Bowl
- RR Regency Room (beneath Biltmore Bowl)
- CB Crystal Ballroom
- B Bernard's (near Olive St entrance)
- MG Maguire Gardens at the Central Library (5th St and Flower St)



Human Language Technologies:
The 11th Annual Conference
of the North American Chapter
of the Association for
Computational Linguistics

Conference Handbook

1–6 June 2010
Los Angeles, California

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Special Thanks

The local arrangements committee would like to thank the administrative staff in the Intelligent Systems Division at ISI for their help: Kary Lau, Alma Nava, and Peter Zamar.

Tutorials

Tue 9:00–12:30

T4: Distributional Semantic Models

Stefan Evert

Crystal Ballroom

T5: Markov Logic in Natural Language Processing: Theory, Algorithms, and Applications

Hoifung Poon

Gold Room

T7: Recent Advances in Dependency Parsing

Qin Iris Wang and Yue Zhang

Heinsbergen Room

T8: Textual Entailment

Mark Sammons, Idan Szpektor, and V. G. Vinod Vydiswaran

Emerald Room

Tue 2:00–5:30

T1: Computational psycholinguistics: Integrating NLP modeling and experimental psycholinguistics to investigate real-time human language use

Roger Levy, Klinton Bicknell, and Nathaniel Smith

Gold Room

T2: Integer Linear Programming in NLP – Constrained Conditional Models

Ming-Wei Chang, Nicholas Rizzolo, and Dan Roth

Emerald Room

T3: Data-Intensive Text Processing with MapReduce

Jimmy Lin and Chris Dyer

Crystal Ballroom

T6: Noisy Text Analytics

L. Venkata Subramaniam

Heinsbergen Room

Main Conference

Welcome Reception: Tue 6:30–9:00

Crystal Ballroom

At its opening in 1923, the Biltmore Hotel was the largest U.S. hotel west of Chicago and by 1969 was designated a Historic Cultural Landmark by the City of Los Angeles. It was designed in a Spanish-Italian Renaissance style with Beaux Arts influence, meant as a throwback to the Castilian heritage of Los Angeles.



The Crystal Ballroom's ceiling was hand painted in 1922 by Italian artist Giovanni Smeraldi, known for his work in the Vatican and the White House. Smeraldi and his team famously painted the ballroom's colorful, seamless fresco over a period of 7 months, decorating it with figures of Greek and Roman gods, angels, cupids and other mythological creatures. It was meticulously restored in the 1980s by Smeraldi's apprentice, Anthony Heinsbergen. The imported Austrian crystal chandeliers that adorn it are 12 feet in diameter.

The Academy of Motion Picture Arts & Sciences was founded at a luncheon banquet in this room in May 1927, where legend has it that the original sketch of the Oscar statuette was drawn on a Biltmore napkin. It was also in this room that John F. Kennedy and Lyndon B. Johnson held their press conferences during the Democratic National Convention in 1960 which nominated them.

Wednesday, 2 June: Overview

Time	<i>Biltmore Bowl</i>	<i>Crystal Ballroom</i>	<i>Gold Room</i>	<i>Emerald Room</i>	Page
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Keynote: Wed 9:00–10:10

Biltmore Bowl



Steve Renals
University of Edinburgh

Recognition and
Understanding of Meetings

Abstract This talk is about interpreting human communication in meetings using audio, video and other signals. Meetings are an interesting and challenging problem, since the communication in a meeting is conversational and involves multiple speakers and multiple modalities.

This results in significant research problems in signal processing (identify and segregate the different speakers), in speech recognition (recognize spontaneous and overlapped speech), and in meeting interpretation (take account of both individual and group behaviours).

Addressing these problems requires an interdisciplinary effort. In this talk, I'll discuss the capture and annotation of multimodal meeting recordings – resulting in the AMI meeting corpus – and how we have built on this to develop techniques and applications for the recognition, indexing and interpretation of meetings.

Biography Steve Renals is director of the Centre for Speech Technology Research (CSTR) and professor of Speech Technology in the School of Informatics, at the University of Edinburgh. He received a BSc in Chemistry from the University of Sheffield in 1986, an MSc in Artificial Intelligence from the University of Edinburgh in 1987, and a PhD in Speech Recognition and Neural Networks, also from Edinburgh, in 1990. From 1991–92 he was a postdoctoral fellow at the International Computer Science Institute (ICSI), Berkeley, and was then an EPSRC post-doctoral fellow in Information Engineering at the University of Cambridge (1992–94). From 1994–2003 he was a lecturer, then reader, in Computer Science at the University of Sheffield, moving to Edinburgh in 2003. He is an associate editor of ACM Transactions on Speech and Language Processing and IEEE Signal Processing Letters, and a former member of the IEEE Technical Committee on Machine Learning and Signal Processing.

Session Chair: Mary Harper

Long Papers: Wed 10:40–12:20

Parsing I

Biltmore Bowl

Session Chair: Noah Smith

Noisy Genre I

Crystal Ballroom

Session Chair: Jonathan May

10:40–11:05

Chart Mining-based Lexical Acquisition with Precision Grammars

Yi Zhang, Timothy Baldwin, Valia Kordoni, David Martinez and Jeremy Nicholson

In this paper, we present an innovative chart mining technique for improving parse coverage based on partial parse outputs from precision grammars. The general approach of mining features from partial analyses is applicable to a range of lexical acquisition tasks, and is particularly suited to domain-specific lexical tuning and lexical acquisition using low-coverage grammars. As an illustration of the functionality of our proposed technique, we develop a lexical acquisition model for English verb particle constructions which operates over unlexicalised features mined from a partial parsing chart. The proposed technique is shown to outperform a state-of-the-art parser over the target task, despite being based on relatively simplistic features.

Using Confusion Networks for Speech Summarization

Shasha Xie and Yang Liu

For extractive meeting summarization, previous studies have shown performance degradation when using speech recognition transcripts because of the relatively high speech recognition errors on meeting recordings. In this paper we investigated using confusion networks to improve the summarization performance on the ASR condition under an unsupervised framework by considering more word candidates and their confidence scores. Our experimental results showed improved summarization performance using our proposed approach, with more contribution from leveraging the confidence scores. We also observed that using these rich speech recognition results can extract similar or even better summary segments than using human transcripts.

11:05–11:30

Products of Random Latent Variable Grammars

Slav Petrov

We show that the automatically induced latent variable grammars of Petrov et al. (2006) vary widely in their underlying representations, depending on their EM initialization point. We use this to our advantage, combining multiple automatically learned grammars into an unweighted product model, which gives significantly improved performance over state-of-the-art individual grammars. In our model, the probability of a constituent is estimated as a product of posteriors obtained from multiple grammars that differ only in the random seed used for initialization, without any learning or tuning of combination weights. Despite its simplicity, a product of eight automatically learned grammars improves parsing accuracy from 90.2% to 91.8% on English, and from 80.3% to 84.5% on German.

Qme! : A Speech-based Question-Answering system on Mobile Devices

Taniya Mishra and Srinivas Bangalore

Mobile devices are becoming the dominant mode of information access despite being cumbersome to input text using small keyboards and browsing web pages on small screens. We present Qme!, a speech-based question-answering system that allows for spoken queries and retrieves answers to the questions instead of web pages. We present bootstrap methods to distinguish dynamic questions from static questions and we demonstrate the benefits of tight coupling of speech recognition and retrieval components of the system.

Semantics I

Gold Room

Session Chair: Eduard Hovy

Taxonomy Learning Using Word Sense Induction

Ioannis P. Klapaftis and Suresh Manandhar

Taxonomies are an important resource for a variety of Natural Language processing (NLP) applications. Despite this, the current state-of-the-art methods in taxonomy learning have disregarded word polysemy, in effect, developing taxonomies that conflate word senses. In this paper, we present an unsupervised method that builds a taxonomy of senses learned automatically from an unlabelled corpus. Our evaluation on two WordNet-derived taxonomies shows that the learned taxonomies capture a higher number of correct taxonomic relations compared to those produced by traditional distributional similarity approaches that merge senses by grouping the features of each word into a single vector.

Visual Information in Semantic Representation

Yansong Feng and Mirella Lapata

The question of how meaning might be acquired by young children and represented by adult speakers of a language is one of the most debated topics in cognitive science. Existing semantic representation models are primarily amodal based on information provided by the linguistic input despite ample evidence indicating that the cognitive system is also sensitive to perceptual information. In this work we exploit the vast resource of images and associated documents available on the web and develop a model of multimodal meaning representation which is based on the linguistic and visual context. Experimental results show that a closer correspondence to human data can be obtained by taking the visual modality into account.

Student Research Workshop I

Emerald Room

Improving Syntactic Coordination Resolution using Language Modeling

Philip Ogren

Determining the correct structure of coordinating conjunctions and the syntactic constituents that they coordinate is a difficult task. This subtask of syntactic parsing is explored here for biomedical scientific literature. In particular, the intuition that sentences containing coordinating conjunctions can often be rephrased as two or more smaller sentences derived from the coordination structure is exploited. Generating candidate sentences corresponding to different possible coordination structures and comparing them with a language model is employed to help determine which coordination structure is best. This strategy is used to augment a simple baseline system for coordination resolution which outperforms both the baseline system and a constituent parser on the same task.

On Automated Evaluation of Readability of Summaries: Capturing Grammaticality, Focus, Structure and Coherence

Ravikiran Vadlapudi and Rahul Katragadda

Readability of a summary is usually graded manually on five aspects of readability: grammaticality, coherence and structure, focus, referential clarity and non-redundancy. In the context of automated metrics for evaluation of summary quality, content evaluations have been presented through the last decade and continue to evolve, however a careful examination of readability aspects of summary quality has not been as exhaustive. In this paper, we explore alternative evaluation metrics for 'grammaticality' and 'structure and coherence' that are able to strongly correlate with manual ratings. Our results establish that our methods are able to perform pairwise ranking of summaries based on grammaticality, as strongly as ROUGE is able to distinguish for content evaluations. We observed that none of the five aspects of readability are independent of each other, and hence by addressing individual criterion of evaluation we aim to achieve automated appreciation of readability of summaries.

10:40–11:10

11:10–11:40

Long Papers: Wed 10:40–12:20 (cont.)

Parsing I

Biltmore Bowl

Noisy Genre I

Crystal Ballroom

11:30–11:55

Automatic Domain Adaptation for Parsing

David McClosky, Eugene Charniak and Mark Johnson

Current statistical parsers tend to perform well only on their training domain and nearby genres. While strong performance on a few related domains is sufficient for many situations, it is advantageous for parsers to be able to generalize to a wide variety of domains. When parsing document collections involving heterogeneous domains (e.g. the web), the optimal parsing model for each document is typically not obvious. We study this problem as a new task — multiple source parser adaptation. Our system trains on corpora from many different domains. It learns not only statistics of those domains but quantitative measures of domain differences and how those differences affect parsing accuracy. Given a specific target text, the resulting system proposes linear combinations of parsing models trained on the source corpora. Tested across six domains, our system outperforms all non-oracle baselines including the best domain-independent parsing model. Thus, we are able to demonstrate the value of customizing parsing models to specific domains.

Dialogue-Oriented Review Summary Generation for Spoken Dialogue Recommendation Systems

Jingjing Liu, Stephanie Seneff and Victor Zue

In this paper we present an opinion summarization technique in spoken dialogue systems. Opinion summarization has been well studied for years, but very few have considered its application in spoken dialogue systems, a much more complicated task than pure text-based summarization. We conduct a systematic study on dialogue-system-oriented review analysis and propose a three-level framework for a recommendation dialogue system. In previous work we explored a linguistic parsing approach to phrase extraction from reviews. In this paper we describe an approach using statistical models such as decision trees and SVMs to select the most representative phrases from the extracted phrase set. We also explain how to generate informative yet concise review summaries for dialogue purposes. Experimental results in the restaurant domain show that the proposed approach using decision tree algorithms achieves an improvement of 13% over SVM models and 36% over a heuristic rule baseline. Experiments also show that the decision-tree-based phrase selection model achieves reliable predictions on the phrase label, comparable to human judgment. The proposed statistical approach is based on domain-independent learning features and can be extended to other domains effectively.

11:55–12:20

Appropriately Handled Prosodic Breaks Help PCFG Parsing

Zhongqiang Huang and Mary Harper

This paper investigates using prosodic information in the form of ToBI break indexes for parsing spontaneous speech. We revisit two previously studied approaches, one that hurt parsing performance and one that achieved minor improvements, and propose a new method that aims to better integrate prosodic breaks into parsing. Although these approaches can improve the performance of basic probabilistic context free grammar (PCFG) parsers, they all fail to produce fine-grained PCFG models with latent annotations (PCFG-LA) that perform significantly better than the baseline PCFG-LA model that does not use break indexes, partially due to mis-alignments between automatic prosodic breaks and true phrase boundaries. We propose two alternative ways to restrict the search space of the prosodically enriched parser models to the n -best parses from the baseline PCFG-LA parser to avoid egregious parses caused by incorrect breaks. Our experiments show that all of the prosodically enriched parser models can then achieve significant improvement over the baseline PCFG-LA parser.

Minimally-Supervised Extraction of Entities from Text Advertisements

Sameer Singh, Dustin Hillard and Chris Leggetter

Extraction of entities from ad creatives is an important problem that can benefit many computational advertising tasks. Supervised and semi-supervised solutions rely on labeled data which is expensive, time consuming, and difficult to procure for ad creatives. A small set of manually derived constraints on feature expectations over unlabeled data can be used to partially and probabilistically label large amounts of data. Utilizing recent work in constraint-based semi-supervised learning, this paper injects light weight supervision specified as these “constraints” into a semi-Markov conditional random field model of entity extraction in ad creatives. Relying solely on the constraints, the model is trained on a set of unlabeled ads using an online learning algorithm. We demonstrate significant accuracy improvements on a manually labeled test set as compared to a baseline dictionary approach. We also achieve accuracy that approaches a fully supervised classifier.

Semantics I

Gold Room

Automatic Evaluation of Topic Coherence

David Newman, Jey Han Lau, Karl Grieser and Timothy Baldwin

This paper introduces the novel task of topic coherence evaluation, whereby a set of words, as generated by a topic model, is rated for coherence or interpretability. We apply a range of topic scoring models to the evaluation task, drawing on WordNet, Wikipedia and the Google search engine, and existing research on lexical similarity/relatedness. In comparison with human scores for a set of learned topics over two distinct datasets, we show a simple co-occurrence measure based on pointwise mutual information over Wikipedia data is able to achieve near-perfect results for the task, and that other Wikipedia-based lexical relatedness methods also achieve strong results. Google produces strong, if less consistent results, while our results over WordNet are patchy at best.

Multi-Prototype Vector-Space Models of Word Meaning

Joseph Reisinger and Raymond J. Mooney

Current vector-space models of lexical semantics create a single “prototype” vector to represent the meaning of a word. However, due to lexical ambiguity, encoding word meaning with a single vector is problematic. This paper presents a method that uses clustering to produce multiple “sense-specific” vectors for each word. This approach provides a context-dependent vector representation of word meaning that naturally accommodates homonymy and polysemy. Experimental comparisons to human judgements of semantic similarity for both isolated words as well as words in sentential contexts demonstrate the superiority of this approach over both prototype and exemplar based vector-space models.

Student Research Workshop I

Emerald Room

Detecting Novelty in the Context of Progressive Summarization

Praveen Bysani

A Progressive summary helps a user to monitor changes in evolving news topics over a period of time. Detecting novel information is the essential part of progressive summarization that differentiates it from normal multi document summarization. In this work, we explore the possibility of detecting novelty at various stages of summarization. New scoring features, Re-ranking criteria and filtering strategies are proposed to identify “relevant novel” information. We compare these techniques using an automated evaluation framework ROUGE, and determine the best. Overall, our summarizer is able to perform on par with existing prime methods in progressive summarization.

11:40–12:10

Long Papers: Wed 2:00–3:40

Machine Translation I

Biltmore Bowl

Session Chair: Philipp Koehn

Noisy Genre II

Crystal Ballroom

Session Chair: Jennifer Foster

2:00–2:25

Unsupervised Syntactic Alignment with Inversion Transduction Grammars

Adam Pauls, Dan Klein, David Chiang and Kevin Knight

Syntactic machine translation systems currently use word alignments to infer syntactic correspondences between the source and target languages. Instead, we propose an unsupervised ITG alignment model that directly aligns syntactic structures. Our model aligns spans in a source sentence to nodes in a target parse tree. We show that our model produces syntactically consistent analyses where possible, while being robust in the face of syntactic divergence. Alignment quality and end-to-end translation experiments demonstrate that this consistency yields higher quality alignments than our baseline.

Training Paradigms for Correcting Errors in Grammar and Usage

Alla Rozovskaya and Dan Roth

This paper proposes a novel approach to the problem of training classifiers to detect and correct grammar and usage errors in text by selectively introducing mistakes into the training data. When training a classifier, we would like the distribution of examples seen in training to be as similar as possible to the one seen in testing. In error correction problems, such as correcting mistakes made by second language learners, a system is generally trained on correct data, since annotating data for training is expensive. Error generation methods avoid expensive data annotation and create training data that resemble non-native data with errors. We apply error generation methods and train classifiers for detecting and correcting article errors in essays written by non-native English speakers; we show that training on data that contain errors produces higher accuracy when compared to a system that is trained on clean native data. We propose several training paradigms with error generation and show that each such paradigm is superior to training a classifier on native data. We also show that the most successful error generation methods are those that use knowledge about the article distribution and error patterns observed in non-native text.

2:25–2:50

Joint Parsing and Alignment with Weakly Synchronized Grammars

David Burkett, John Blitzer and Dan Klein

Syntactic machine translation systems extract rules from bilingual, word-aligned, syntactically parsed text, but current systems for parsing and word alignment are at best cascaded and at worst totally independent of one another. This work presents a unified joint model for simultaneous parsing and word alignment. To flexibly model syntactic divergence, we develop a discriminative log-linear model over two parse trees and an ITG derivation which is encouraged but not forced to synchronize with the parses. Our model gives absolute improvements of 3.3 F1 for English parsing, 2.1 F1 for Chinese parsing, and 5.5 F1 for word alignment over each task's independent baseline, giving the best reported results for both Chinese-English word alignment and joint parsing on the parallel portion of the Chinese treebank. We also show an improvement of 1.2 BLEU in downstream MT evaluation over basic HMM alignments.

Using Mostly Native Data to Correct Errors in Learners' Writing

Michael Gamon

We present results from a range of experiments on article and preposition error correction for non-native speakers of English. We first compare a language model and error-specific classifiers (all trained on large English corpora) with respect to their performance in error detection and correction. We then combine the language model and the classifiers in a meta-classification approach by combining evidence from the classifiers and the language model as input features to the meta-classifier. The meta-classifier in turn is trained on error-annotated learner data, optimizing the error detection and correction performance on this domain. The meta-classification approach results in substantial gains over the classifier-only and language-model-only scenario. Since the meta-classifier requires error-annotated data for training, we investigate how much training data is needed to improve results over the baseline of not using a meta-classifier. All evaluations are conducted on a large error-annotated corpus of learner English.

Speech Processing

Gold Room

Session Chair: Eric Fosler-Lussier

Unsupervised Model Adaptation using Information-Theoretic Criterion

Ariya Rastrow, Frederick Jelinek, Abhinav Sethy and Bhuvana Ramabhadran

In this paper we propose a novel general framework for unsupervised model adaptation. Our method is based on entropy which has been used previously as a regularizer in semi-supervised learning. This technique includes another term which measures the stability of posteriors w.r.t model parameters, in addition to conditional entropy. The idea is to use parameters which result in both low conditional entropy and also stable decision rules. As an application, we demonstrate how this framework can be used for adjusting language model interpolation weight for speech recognition task to adapt from Broadcast news data to MIT lecture data. We show how the new technique can obtain comparable performance to completely supervised estimation of interpolation parameters.

Formatting Time-Aligned ASR Transcripts for Readability

Maria Shugrina

We address the problem of formatting the output of an automatic speech recognition (ASR) system for readability, while preserving word-level timing information of the transcript. Our system enriches the ASR transcript with punctuation, capitalization and properly written dates, times and other numeric entities, and our approach can be applied to other formatting tasks. The method we describe combines hand-crafted grammars with a class-based language model trained on written text and relies on Weighted Finite State Transducers (WFSTs) for the preservation of start and end time of each word.

Student Research Workshop II

Emerald Room

Extrinsic Parse Selection

David Goss-Grubbs

This paper reports on one aspect of Locutus, a natural language interface to databases (NLIDB) which uses the output of a high-precision broad-coverage grammar to build semantic representations and ultimately SQL queries. Rather than selecting just a subset of the parses provided by the grammar to use in further processing, Locutus uses all of them. If the meaning of a parse does not conform to the semantic domain of the database, no query is built for it. Thus, intended parses are chosen extrinsically. The parser gives an average of 3.01 parses to the sentences in the GEOQUERY250 corpus. Locutus generates an average of 1.02 queries per sentence for this corpus, all of them correct.

Towards a Matrix-based Distributional Model of Meaning

Eugenie Giesbrecht

Vector-based distributional models of semantics have proven useful and adequate in a variety of natural language processing tasks. However, most of them lack at least one key requirement in order to serve as an adequate representation of natural language, namely sensitivity to structural information such as word order. We propose a novel approach that offers a potential of integrating order-dependent word contexts in a completely unsupervised manner by assigning to words characteristic distributional matrices. The proposed model is applied to the task of free associations. In the end, the first results as well as directions for future work are discussed.

2:00-2:30

2:30-3:00

Long Papers: Wed 2:00–3:40 (cont.)

Machine Translation I

Biltmore Bowl

2:50–3:15

Learning Translation Boundaries for Phrase-Based Decoding

Deyi Xiong, Min Zhang and Haizhou Li

Constrained decoding is of great importance not only for speed but also for translation quality. Previous efforts explore soft syntactic constraints which are based on constituent boundaries deduced from parse trees of the source language. We present a new framework to establish soft constraints based on a more natural alternative: translation boundary rather than constituent boundary. We propose simple classifiers to learn translation boundaries for any source sentences. The classifiers are trained directly on word-aligned corpus without using any additional resources. We report the accuracy of our translation boundary classifiers. We show that using constraints based on translation boundaries predicted by our classifiers achieves significant improvements over the baseline on large-scale Chinese-to-English translation experiments. The new constraints also significantly outperform constituent boundary based syntactic constraints.

3:15–3:40

Hitting the Right Paraphrases in Good Time

Stanley Kok and Chris Brockett

We present a random-walk-based approach to learning paraphrases from bilingual parallel corpora. The corpora are represented as a graph in which a node corresponds to a phrase, and an edge exists between two nodes if their corresponding phrases are aligned in a phrase table. We sample random walks to compute the average number of steps it takes to reach a ranking of paraphrases with better ones being “closer” to a phrase of interest. This approach allows “feature” nodes that represent domain knowledge to be built into the graph, and incorporates truncation techniques to prevent the graph from growing too large for efficiency. Current approaches, by contrast, implicitly presuppose the graph to be bipartite, are limited to finding paraphrases that are of length two away from a phrase, and do not generally permit easy incorporation of domain knowledge. Manual evaluation of generated output shows that our approach outperforms the state-of-the-art system of Callison-Burch (2008).

Noisy Genre II

Crystal Ballroom

Unsupervised Modeling of Twitter Conversations

Alan Ritter, Colin Cherry and Bill Dolan

We propose the first unsupervised approach to the problem of modeling dialogue acts in an open domain. Trained on a corpus of noisy Twitter conversations, our method discovers dialogue acts by clustering raw utterances. Because it accounts for the sequential behaviour of these acts, the learned model can provide insight into the shape of communication in a new medium. We address the challenge of evaluating the emergent model with a qualitative visualization and an intrinsic conversation ordering task. This work is inspired by a corpus of 1.3 million Twitter conversations, which will be made publicly available. This huge amount of data, available only because Twitter blurs the line between chatting and publishing, highlights the need to be able to adapt quickly to a new medium.

Streaming First Story Detection with application to Twitter

Saša Petrović, Miles Osborne and Victor Lavrenko

With the recent rise in popularity and size of social media, there is a growing need for systems that can extract useful information from this amount of data. We address the problem of detecting new events from a stream of Twitter posts. To make event detection feasible on web-scale corpora, we present an algorithm based on locality-sensitive hashing which is able overcome the limitations of traditional approaches, while maintaining competitive results. In particular, a comparison with a state-of-the-art system on the first story detection task shows that we achieve over an order of magnitude speedup in processing time, while retaining comparable performance. Event detection experiments on a collection of 160 million Twitter posts show that celebrity deaths are the fastest spreading news on Twitter.

Speech Processing

Gold Room

Cheap, Fast and Good Enough: Automatic Speech Recognition with Non-Expert Transcription

Scott Novotney and Chris Callison-Burch

Deploying an automatic speech recognition system with reasonable performance requires expensive and time-consuming in-domain transcription. Previous work demonstrated that non-professional annotation through Amazon's Mechanical Turk can match professional quality. We use Mechanical Turk to transcribe conversational speech for as little as one twentieth the cost of professional transcription. The higher disagreement of non-professional transcribers does not have a significant effect on system performance. While previous work demonstrated that redundant transcription can improve data quality, we found that resources are better spent collecting more data. Finally, we suggest a concrete method for quality control without needing professional transcription.

Contextual Information Improves OOV Detection in Speech

Carolina Parada, Mark Dredze, Denis Filimonov and Frederick Jelinek

Out-of-vocabulary (OOV) words represent an important source of error in large vocabulary continuous speech recognition (LVCSR) systems. These words cause recognition failures, which propagate through pipeline systems impacting the performance of downstream applications. The detection of OOV regions in the output of a LVCSR system is typically addressed as a binary classification task, where each region is independently classified using local information. In this paper, we show that jointly predicting OOV regions, and including contextual information from each region, leads to substantial improvement in OOV detection. Compared to the state-of-the-art, we reduce the missed OOV rate from 42.6% to 28.4% at 10% false alarm rate.

Student Research Workshop II

Emerald Room

Distinguishing Use and Mention in Natural Language Shomir Wilson

When humans communicate via natural language, they frequently make use of metalanguage to clarify what they mean and promote a felicitous exchange of ideas. One key aspect of metalanguage is the mention of words and phrases, as distinguished from their use. This paper presents ongoing work on identifying and categorizing instances of language-mention, with the goal of building a system capable of automatic recognition of the phenomenon. A definition of language-mention and a corpus of instances gathered from Wikipedia are discussed, and the future direction of the project is described.

3:00-3:30

One-Minute Madness: Poster and Demo Previews

Wed 4:10–5:30

Biltmore Bowl

Session Chair: Carolyn P. Rosé

This year NAACL HLT has introduced for the first time a one-minute madness plenary session to highlight posters and demos to be presented in the Poster and Demo Session. At this session, presenters will have the opportunity to summarize their poster or demo in 60 seconds and a single slide. Since there are over 50 posters and demos this year, this session could help you to decide which you would like to visit! Please join us!

Posters: Wed 6:30–8:30

Regency Room

Improved Extraction Assessment through Better Language Models

Arun Ahuja and Doug Downey

A variety of information extraction techniques rely on the fact that instances of the same relation are “distributionally similar,” in that they tend to appear in similar textual contexts. We demonstrate that extraction accuracy depends heavily on the accuracy of the language model utilized to estimate distributional similarity. An unsupervised model selection technique based on this observation is shown to reduce extraction and type-checking error by 26% over previous results, in experiments with Hidden Markov Models. The results suggest that optimizing statistical language models over unlabeled data is a promising direction for improving weakly supervised and unsupervised information extraction.

Language Identification: The Long and the Short of the Matter

Timothy Baldwin and Marco Lui

Language identification is the task of identifying the language a given document is written in. This paper describes a detailed examination of what models perform best under different conditions, based on experiments across three separate datasets and a range of tokenisation strategies. We demonstrate that the task becomes increasingly difficult as we increase the number of languages, reduce the amount of training data and reduce the length of documents. We also show that it is possible to perform language identification without having to perform explicit character encoding detection.

Inducing Synchronous Grammars with Slice Sampling

Phil Blunsom and Trevor Cohn

This paper describes an efficient sampler for synchronous grammar induction under a non-parametric Bayesian prior. Inspired by ideas from slice sampling, the proposed

sampler is able to draw samples from the posterior distributions of models for which the standard dynamic programming based sampler proves intractable for non-trivial corpora. We compare our sampler to a previously proposed Gibbs sampler and demonstrate strong improvements in terms of both training log-likelihood and performance on an end-to-end translation evaluation.

Task-based Evaluation of Multiword Expressions: a Pilot Study in Statistical Machine Translation

Marine Carpuat and Mona Diab

We conduct a pilot study for task-oriented evaluation of Multiword Expression (MWE) in Statistical Machine Translation (SMT). We propose two different integration strategies for MWE in SMT, which take advantage of different degrees of MWE semantic compositionality and improves SMT quality on a large-scale translation task.

Improving Semantic Role Labeling with Word Sense

Wanxiang Che, Ting Liu and Yongqiang Li

Semantic role labeling (SRL) not only needs lexical and syntactic information, but also needs word sense information. However, because of the lack of corpus annotated with both word senses and semantic roles, there is few research on using word sense for SRL. The release of OntoNotes provides an opportunity for us to study how to use word sense for SRL. In this paper, we present some novel word sense features for SRL and find that they can improve the performance significantly.

Extending the METEOR Machine Translation Evaluation Metric to the Phrase Level

Michael Denkowski and Alon Lavie

This paper presents METEOR-NEXT, an extended version of the METEOR metric designed to have high correlation with post-editing measures of machine translation quality. We describe changes made to the metric's

sentence aligner and scoring scheme as well as a method for tuning the metric's parameters to optimize correlation with human-targeted Translation Edit Rate (HTER). We then show that METEOR-NEXT improves correlation with HTER over baseline metrics, including traditional METEOR, and approaches the correlation level of a state-of-the-art metric, TER-plus (TERp).

Testing a Grammar Customization System with Sahaptin

Scott Drellishak

I briefly describe a system for automatically creating an implemented grammar of a natural language based on answers to a web-based questionnaire, then present a grammar of Sahaptin, a language of the Pacific Northwest with complex argument-marking and agreement patterns, that was developed to test the system. The development of this grammar has proved useful in three ways: (1) verifying the correct functioning of the grammar customization system, (2) motivating the addition of a new pattern of agreement to the system, and (3) making detailed predictions that uncovered gaps in the linguistic descriptions of Sahaptin.

Two monolingual parses are better than one (synchronous parse)

Chris Dyer

We describe a synchronous parsing algorithm that is based on two successive monolingual parses of an input sentence pair. Although the worst-case complexity of this algorithm is and must be $O(n^6)$ for binary SCFGs, its average-case run-time is far better. We demonstrate that for a number of common synchronous parsing problems, the two-parse algorithm substantially outperforms alternative synchronous parsing strategies, making it efficient enough to be utilized without resorting to a pruned search.

Fast Query for Large Treebanks

Sumukh Ghodke and Steven Bird

A variety of query systems have been developed for interrogating parsed corpora, or treebanks. With the arrival of efficient, wide-coverage parsers, it is feasible to create very large databases of trees. However, existing approaches that use in-memory search, or relational or XML database technologies, do not scale up. We describe a method for storage, indexing, and query of treebanks that uses an information retrieval engine. Several experiments with a large treebank demonstrate excellent scaling characteristics for a wide range of query types. This work facilitates the curation of much larger treebanks, and enables them to be used effectively in a variety of scientific and engineering tasks.

Efficient Parsing of Well-Nested Linear Context-Free Rewriting Systems

Carlos Gómez-Rodríguez, Marco Kuhlmann and Giorgio Satta

The use of well-nested linear context-free rewriting systems has been empirically motivated for modeling of the syntax of languages with discontinuous constituents or relatively free word order. We present a chart-based parsing algorithm that asymptotically improves the known running time upper bound for this class of rewriting systems. Our result is obtained through a linear space construction of a binary normal form for the grammar at hand.

Utility Evaluation of Cross-document Information Extraction

Heng Ji, Zheng Chen, Jonathan Feldman, Antonio Gonzalez, Ralph Grishman and Vivek Upadhyay

We describe a utility evaluation to determine whether cross-document information extraction (IE) techniques measurably improve user performance in news summary writing. Two groups of subjects were asked to perform the same time-restricted summary writing tasks, reading news under different conditions: with no IE results at all, with traditional single-document IE results, and with cross-document IE results. Our results show that, in comparison to using source documents only, the quality of summary reports assembled using IE results, especially from cross-document IE, was significantly better and user satisfaction was higher. We also compare the impact of different user groups on the results.

Evaluation Metrics for the Lexical Substitution Task

Sanaz Jabbari, Mark Hepple and Louise Guthrie

We identify some problems of the evaluation metrics used for the English Lexical Substitution Task of SemEval-2007, and propose alternative metrics that avoid these problems, which we hope will better guide the future development of lexical substitution systems.

Movie Reviews and Revenues: An Experiment in Text Regression

Mahesh Joshi, Dipanjan Das, Kevin Gimpel and Noah A. Smith

We consider the problem of predicting a movie's opening weekend revenue. Previous work on this problem has used metadata about a movie—e.g., its genre, MPAA rating, and cast—with very limited work making use of text about the movie. In this paper, we use the text of film critics' reviews from several sources to predict opening weekend revenue. We describe a new dataset pairing movie reviews with metadata and revenue data, and show that review text can substitute for metadata, and even improve over it, for prediction.

Posters: Wed 6:30–8:30 (cont.)

Using Gaussian Mixture Models to Detect Figurative Language in Context Linlin Li and Caroline Sporleder

We present a Gaussian Mixture model for detecting different types of figurative language in context. We show that this model performs well when the parameters are estimated in an unsupervised fashion using EM. Performance can be improved further by estimating the parameters from a small annotated data set.

Improving Phrase-Based Translation with Prototypes of Short Phrases Frank Liberato, Behrang Mohit and Rebecca Hwa

We focus on the task of automatically translating short sequences of source text for use as additional bilingual phrase pairs for a phrase-based decoder. Because ours is a more constrained translation task, we can use a model that employs more linguistically rich features than a traditional decoder. We have implemented an example of this approach. Experimental results suggest that the phrase pairs produced by our method are useful to the decoder, and lead to improved sentence translations.

Putting the User in the Loop: Interactive Maximal Marginal Relevance for Query-Focused Summarization

Jimmy Lin, Nitin Madnani and Bonnie Dorr

This work represents an initial attempt to move beyond “single-shot” summarization to *interactive* summarization. We present an extension to the classic Maximal Marginal Relevance (MMR) algorithm that places a user “in the loop” to assist in candidate selection. Experiments in the complex interactive Question Answering (ciQA) task at TREC 2007 show that interactively-constructed responses are significantly higher in quality than automatically-generated ones. This novel algorithm provides a starting point for future work on interactive

Improving Blog Polarity Classification via Topic Analysis and Adaptive Methods

Feifan Liu, Dong Wang, Bin Li and Yang Liu

In this paper we examine different linguistic features for sentimental polarity classification, and perform a comparative study on this task between blog and review data. We found that results on blog are much worse than reviews and investigated two methods to improve the performance on blogs. First we explored information retrieval based topic analysis to extract relevant sentences to the given topics for polarity classification. Second, we adopted an adaptive method where we train classifiers from review data and incorporate their hypothesis as features. Both methods yielded performance gain for polarity classification on blog data.

Creating Local Coherence: An Empirical Assessment

Annie Louis and Ani Nenkova

Two of the mechanisms for creating natural transitions between adjacent sentences in a text, resulting in local coherence, involve discourse relations and switches of focus of attention between discourse entities. These two aspects of local coherence have been traditionally discussed and studied separately. But some empirical studies have given strong evidence for the necessity of understanding how the two types of coherence-creating devices interact. Here we present a joint corpus study of discourse relation and entity coherence exhibited in news texts from the Wall Street Journal and test several hypotheses expressed in earlier work about their interaction.

Time-Efficient Creation of an Accurate Sentence Fusion Corpus

Kathleen McKeown, Sara Rosenthal, Kapil Thadani and Coleman Moore

Sentence fusion enables summarization and question-answering systems to produce output by combining fully formed phrases from different sentences. Yet there is little data that can be used to develop and evaluate fusion techniques. In this paper, we present a methodology for collecting fusions of similar sentence pairs using Amazon’s Mechanical Turk, selecting the input pairs in a semi-automated fashion. We evaluate the results using a novel technique for automatically selecting a representative sentence from multiple responses. Our approach allows for rapid construction of a high accuracy fusion corpus.

Towards Cross-Lingual Textual Entailment

Yashar Mehdad, Matteo Negri and Marcello Federico

This paper investigates cross-lingual textual entailment as a semantic relation between two text portions in different languages, and proposes a prospective research direction. We argue that cross-lingual textual entailment (CLTE) can be a core technology for several cross-lingual NLP applications and tasks. Through preliminary experiments, we aim at proving the feasibility of the task, and providing a reliable baseline. We also introduce new applications for CLTE that will be explored in future work.

A Comparative Study of Word Co-occurrence for Term Clustering in Language Model-based Sentence Retrieval

Saeedeh Momtazi, Sanjeev Khudanpur and Dietrich Klakow

Sentence retrieval is a very important part of question answering systems. Term clustering, in turn, is an effective approach for improving sentence retrieval performance: the more similar the terms in each cluster, the better the

performance of the retrieval system. A key step in obtaining appropriate word clusters is accurate estimation of pairwise word similarities, based on their tendency to co-occur in similar contexts. In this paper, we compare four different methods for estimating word co-occurrence frequencies from two different corpora. The results show that different, commonly-used contexts for defining word co-occurrence differ significantly in retrieval performance. Using an appropriate co-occurrence criterion and corpus is shown to improve the mean average precision of sentence retrieval from 36.8% to 42.1%.

Information Content Measures of Semantic Similarity Perform Better Without Sense-Tagged Text

Ted Pedersen

This paper presents an empirical comparison of similarity measures for pairs of concepts based on Information Content. It shows that using modest amounts of untagged text to derive Information Content results in higher correlation with human similarity judgments than using the largest available corpus of manually annotated sense-tagged text.

Generating Expository Dialogue from Monologue: Motivation, Corpus and Preliminary Rules

Paul Piwek and Svetlana Stoyanchev

Generating expository dialogue from monologue is a task that poses an interesting and rewarding challenge for Natural Language Processing. This short paper has three aims: firstly, to motivate the importance of this task, both in terms of the benefits of expository dialogue as a way to present information and in terms of potential applications; secondly, to introduce a parallel corpus of monologues and dialogues which enables a data-driven approach to this challenge; and, finally, to describe work-in-progress on semi-automatic construction of monologue to dialogue generation rules.

The Simple Truth about Dependency and Phrase Structure Representations: An Opinion Piece

Owen Rambow

There are many misconceptions about dependency representations and phrase structure representations for syntax. They are partly due to terminological confusion, partly due to a lack of meta-scientific clarity about the roles of representations and linguistic theories. This opinion piece argues for a simple but clear view of syntactic representation.

Word Alignment with Stochastic Bracketing Linear Inversion Transduction Grammar

Markus Saers, Joakim Nivre and Dekai Wu

The class of Linear Inversion Transduction Grammars (LITGs) is introduced, and used to induce a word alignment over a parallel corpus. We show that alignment via

Stochastic Bracketing LITGs is considerably faster than Stochastic Bracketing ITGs, while still yielding alignments superior to the widely-used heuristic of intersecting bidirectional IBM alignments. Performance is measured as the translation quality of a phrase-based machine translation system built upon the word alignments, and an improvement of 2.85 BLEU points over baseline is noted for French-English.

Crowdsourcing the evaluation of a domain-adapted named entity recognition system

Asad B. Sayeed, Timothy J. Meyer, Hieu C. Nguyen, Olivia Buzek and Amy Weinberg

Named entity recognition systems sometimes have difficulty when applied to data from domains that do not closely match the training data. We first use a simple rule-based technique for domain adaptation. Data for robust validation of the technique is then generated, and we use crowdsourcing techniques to show that this strategy produces reliable results even on data not seen by the rule designers. We show that it is possible to extract large improvements on the target data rapidly at low cost using these techniques.

Generalizing Hierarchical Phrase-based Translation using Rules with Adjacent Nonterminals

Hendra Setiawan and Philip Resnik

Hierarchical phrase-based translation (Hiero) provides an attractive framework within which both short- and long-distance reorderings can be addressed consistently and efficiently. However, Hiero is generally implemented with a constraint preventing the creation of rules with adjacent nonterminals, because such rules introduce computational and modeling challenges. We introduce methods to address these challenges, and demonstrate that rules with adjacent nonterminals can improve Hiero's generalization power and lead to significant performance gains in Chinese-English translation.

The Effect of Ambiguity on the Automated Acquisition of WSD Examples

Mark Stevenson and Yikun Guo

Several methods for automatically generating labeled examples that can be used as training data for WSD systems have been proposed including a semi-supervised approach based on relevance feedback. This approach was shown to generate examples that improved the performance of a WSD system for a set of ambiguous terms from the biomedical domain. However, we find that this approach does not perform as well on other data sets. The levels of ambiguity in these data sets are analysed and we suggest this is the reason for this negative result.

Posters: Wed 6:30–8:30 (cont.)

Word Sense Subjectivity for Cross-lingual Lexical Substitution

Fangzhong Su and Katja Markert

We explore the relation between word sense subjectivity and cross-lingual lexical substitution, following the intuition that good substitutions will transfer a word's (contextual) sentiment from the source language into the target language. Experiments on English–Chinese lexical substitution show that taking a word's subjectivity into account can indeed improve performance. We also show that just using word sense subjectivity can perform as well as integrating fully-fledged fine-grained word sense disambiguation for words which have both subjective and objective senses.

Query Ambiguity Revisited: Clickthrough Measures for Distinguishing Informational and Ambiguous Queries

Yu Wang and Eugene Agichtein

Understanding query ambiguity in web search remains an important open problem. In this paper we reexamine query ambiguity by analyzing the result clickthrough data. Previously proposed clickthrough-based metrics of query ambiguity tend to conflate informational and ambiguous queries. To distinguish between these query classes, we introduce novel metrics based on the entropy of the click distributions of individual searchers. Our experiments over a clickthrough log of commercial search engine demonstrate the benefits of our approach for distinguishing informational from truly ambiguous queries.

For the sake of simplicity: Unsupervised extraction of lexical simplifications from Wikipedia

Mark Yatskar, Bo Pang, Cristian Danescu-Niculescu-Mizil and Lillian Lee

We report on work in progress on extracting lexical simplifications (e.g., “collaborate” → “work together”), focusing on utilizing edit histories in Simple English Wikipedia for this task. We consider two main approaches: (1) deriving simplification probabilities via an edit model that accounts for a mixture of different operations, and (2) using metadata to focus on edits that are more likely to be simplification operations. We find our methods to outperform a reasonable baseline and yield many high-quality lexical simplifications not included in an independently-created manually prepared list.

Predicting Human-Targeted Translation Edit Rate via Untrained Human Annotators

Omar F. Zaidan and Chris Callison-Burch

In the field of machine translation, automatic metrics have proven quite valuable in system development for tracking progress and measuring the impact of incremental changes. However, human judgment still plays a large role in the context of evaluating MT systems. For example, the GALE project uses human-targeted translation edit rate (HTER), wherein the MT output is scored against a post-edited version of itself (as opposed to being scored against an existing human reference). This poses a problem for MT researchers, since HTER is not an easy metric to calculate, and would require hiring and training human annotators to perform the editing task. In this work, we explore soliciting those edits from untrained human annotators, via the online service Amazon Mechanical Turk. We show that the collected data allows us to predict HTER-ranking of documents at a significantly higher level than the ranking obtained using automatic metrics.

Improving Semantic Role Classification with Selectional Preferences

Beñat Zepirain, Eneko Agirre, Lluís Màrquez and Mihai Surdeanu

This work incorporates Selectional Preferences (SP) into a Semantic Role (SR) Classification system. We learn separate selectional preferences for noun phrases and prepositional phrases and we integrate them in a state-of-the-art SR classification system both in the form of features and individual class predictors. We show that the inclusion of the refined SPs yields statistically significant improvements on both in domain and out of domain data (14.07% and 11.67% error reduction, respectively). The key factor for success is the combination of several SP methods with the original classification model using meta-classification.

Generalizing Syntactic Structures for Product Attribute Candidate Extraction

Yanyan Zhao, Bing Qin, Shen Hu and Ting Liu

Noun phrases (NP) in a product review are always considered as the product attribute candidates in previous work. However, this method limits the recall of the product attribute extraction. We therefore propose a novel approach by generalizing syntactic structures of the product attributes with two strategies: intuitive heuristics and syntactic structure similarity. Experiments show that the proposed approach is effective.

Demos: Wed 6:30–8:30

Regency Room

Camtology: Intelligent Information Access for Science

Ted Briscoe, Karl Harrison, Andrew Naish-Guzman, Andy Parker, Advait Siddharthan, David Sinclair, Mark Slater and Rebecca Watson

We describe a novel semantic search engine for scientific literature. The Camtology system allows for sentence-level searches of PDF files and combines text and image searches, thus facilitating the retrieval of information present in tables and figures. It allows the user to generate complex queries for search terms that are related through particular grammatical/semantic relations in an intuitive manner. The system uses Grid processing to parallelise the analysis of large numbers of papers.

Summarizing Textual Information about Locations In a Geo-Spatial Information Display System

Congxing Cai and Eduard Hovy

This demo describes the summarization of textual material about locations in the context of a geo-spatial information display system. When the amount of associated textual data is large, it is organized and summarized before display. A hierarchical summarization framework, conditioned on the small space available for display, has been fully implemented. Snapshots of the system, with narrative descriptions, are presented to demonstrate our results.

Phrasal: A Statistical Machine Translation Toolkit for Exploring New Model Features

Daniel Cer, Michel Galley, Daniel Jurafsky and Christopher D. Manning

We propose to present a new Java based open source toolkit for phrase based machine translation. The toolkit provides an easy to use API for integrating new features (i.e., knowledge sources) into a decoding model and for extracting feature statistics from aligned bitexts. Other useful utilities packaged with the toolkit include: a conditional phrase extraction system that builds a phrase table just for a specific dataset; and an implementation of MERT that allows for pluggable evaluation metrics and that includes built in support for a variety of metrics, including TERp, BLEU, and METEOR. We will provide an interactive demonstration of the package whereby users can enter sentences in Chinese or Arabic and have them translated into English. Users will be able to turn on and off different features provided by the system and see what the effects are on the resulting translation.

Multilingual Propbank Annotation Tools: Cornerstone and Jubilee

Jinho Choi, Claire Bonial and Martha Palmer

This paper demonstrates two annotation tools related to Propbank: Cornerstone and Jubilee. Propbank is a corpus

in which the arguments of each verb predicate are annotated with their semantic roles. Propbank annotation also requires the choice of a sense id for each predicate, defined in the corresponding frameset file. Since frameset files are written in XML, it is helpful to develop a user-friendly editor such as Cornerstone, customized to create and edit frameset files. On the other hand, Jubilee facilitates the annotation process by displaying several resources of syntactic and semantic information simultaneously. Easy access to each of these resources allows the annotator to quickly absorb and apply the necessary syntactic and semantic information pertinent to each predicate for consistent and efficient annotation. Both tools have been successfully adapted to many Propbank projects; they run platform independently, are light enough to run as X11 applications and support multiple languages such as Arabic, Chinese, English, Hindi and Korean.

KSC-PaL: A Peer Learning Agent that Encourages Students to take the Initiative

Cynthia Kersey, Barbara Di Eugenio, Pamela Jordan and Sandra Katz

We present an innovative application of dialogue processing concepts to educational technology. In a previous corpus analysis of peer learning dialogues, we found that initiative and initiative shifts are indicative of learning, and of learning-conducive episodes. We have incorporated this finding in KSC-PaL, a peer learning agent. KSC-PaL promotes learning by encouraging shifts in task initiative. We will demonstrate a problem solving episode with KSC-PaL. Specifically we will show how KSC-PaL attempts to manage the level of initiative and how KSC-PaL reacts to student initiative.

A Detailed, Accurate, Extensive, Available English Lexical Database

Adam Kilgarriff

We present an English lexical database which is, we believe, fuller, more accurate and more consistent than any other. We believe this to be so because the project has been well-planned, with a 12-month intensive planning phase prior to the lexicography beginning; well-resourced, employing a team of fifteen highly experienced lexicographers for a thirty-month main phase; it has had access to the latest corpus and dictionary-editing technology; it has not been constrained to meet any goals other than an accurate description of the language; and it has been led by a team with singular experience in delivering high-quality and innovative resources. The lexicon will be complete in Summer 2010 and will be available for NLP groups, on terms designed to encourage its research use.

Demos: Wed 6:30–8:30 (cont.)

An Interactive Tool for Supporting Error Analysis for Text Mining

Elijah Mayfield and Carolyn Penstein Rosé

This demo abstract presents an interactive tool for supporting error analysis for text mining, which is situated within the Summarization Integrated Development Environment (SIDE). This freely downloadable tool was designed based on repeated experience teaching text mining over a number of years, and has been successfully tested in that context as a tool for students to use in conjunction with machine learning projects.

Serious Game Environments for Language and Culture Education

Alicia Sagae, W. Lewis Johnson and Rebecca Row

In this demonstration we present technologies that enable learners to engage in spoken conversations in foreign languages, integrating intelligent tutoring and serious game capabilities into a package that helps learners quickly acquire communication skills. Conversational AI technologies based on the SAIBA framework for dialog modeling are realized in this 3-D game environment. Participants will be introduced to tools for author-ing dialogs in this framework, and will have an opportunity to experience learning with Alelo products, including the Operational Language and Culture Training System (OLCTS).

Interpretation of Partial Utterances in Virtual Human Dialogue Systems

Kenji Sagae, David DeVault and David Traum

Dialogue systems typically follow a rigid pace of interaction where the system waits until the user has finished speaking before producing a response. Interpreting user utterances before they are completed allows a system to display more sophisticated conversational behavior, such as rapid turn-taking and appropriate use of backchannels and interruptions. We demonstrate a natural language understanding approach for partial utterances, and its use in a virtual human dialogue system that can often complete a user's utterances in real time.

Interactive Predictive Parsing using a Web-based Architecture

Ricardo Sánchez-Sáez, Luis A. Leiva, Joan-Andreu Sánchez and José-Miguel Benedí

There is a whole family of problems within the parsing world where error-free results, in the form of perfectly annotated trees, are needed. Constructing error-free trees is

a necessity in many tasks, such as recognising of handwritten mathematical expressions or creating new gold standard treebanks. It is a fact that current state-of-the-art syntactic parsers provide trees that, although of excellent quality, still contain errors. Because of this, the figure of a human corrector who supervises the annotation process is unavoidable in these kind of problems. This paper introduces a Web-based demo of an interactive-predictive framework for syntactic tree annotation, where the user is tightly integrated into the interactive parsing system. Rather than the traditional post-editing approach, both the user and the system cooperate to generate error-free annotated trees. The user feedback is provided by means of natural mouse gestures and keyboard strokes.

SIMPLIFICA: a tool for authoring simplified texts in Brazilian Portuguese guided by readability assessments

Carolina Scarton, Matheus Oliveira, Arnaldo Candido Jr., Caroline Gasperin and Sandra Aluísio

SIMPLIFICA is an authoring tool for producing simplified texts in Portuguese. It provides functionalities for lexical and syntactic simplification and for readability assessment. This tool is the first of its kind for Portuguese; it brings innovative aspects for simplification tools in general, since the authoring process is guided by readability assessment based on the levels of literacy of the Brazilian population.

An Overview of Microsoft Web N-gram Corpus and Applications

Kuansan Wang, Chris Thrasher, Evelyne Viegas, Xiaolong Li and Bo-june (Paul) Hsu

This document describes the properties and some applications of the Microsoft Web N-gram corpus. The corpus is designed to have the following characteristics. First, in contrast to static data distribution of previous corpus releases, this N-gram corpus is made publicly available as an XML Web Service so that it can be updated as deemed necessary by the user community to include new words and phrases constantly being added to the Web. Secondly, the corpus makes available various sections of a Web document, specifically, the body, title, and anchor text, as separates models as text contents in these sections are found to possess significantly different statistical properties and therefore are treated as distinct languages from the language modeling point of view. The usages of the corpus are demonstrated here in two NLP tasks: phrase segmentation and word breaking.

Student Research Workshop Posters: Wed 6:30–8:30

Regency Room

Towards a Matrix-based Distributional Model of Meaning

Eugenie Giesbrecht

See page 15 for abstract.

Extrinsic Parse Selection

David Goss-Grubbs

See page 15 for abstract.

A Learning-based Sampling Approach to Extractive Summarization

Vishal Juneja, Sebastian Germesin and Thomas Kleinbauer

In this paper we present a novel resampling model for extractive meeting summarization. With resampling based on the output of a baseline classifier, our method outperforms previous research in the field. Further, we compare an existing resampling technique with our model. We report on an extensive series of experiments on a large meeting corpus which leads to classification improvement in weighted precision and f-score.

Temporal Relation Identification with Endpoints

Chong Min Lee

Temporal relation classification task has issues of fourteen target relations, skewed distribution of the target relations, and relatively small amount of data. To overcome the issues, methods such as merging target relations and increasing data size with closure algorithm have been used. However, the method using merged relations has a problem on how to recover original relations. In this paper, a new reduced-relation method is proposed. The method decomposes a target relation into four pairs of endpoints with three target relations. After classifying a relation of each endpoint pair, four classified relations are combined into a relation of original fourteen target relations. In the combining step, two heuristics are examined.

Identifying Opinion Holders and Targets with Dependency Parser in Chinese News Texts

Bin Lu

Although there have been research on identifying opinion holders and targets in English product reviews and news texts, little work has been reported on the similar tasks on Chinese news texts. In this paper, we propose to identify opinion holders and targets with dependency parser in Chinese news texts, i.e. to identify opinion holders by means of reporting verbs and to identify opinion targets by considering both opinion holders and opinion-bearing words. The experiments with NTCIR-7 MOAT's Chinese

test data show that our approach provides better performance than the baselines and most systems reported at NTCIR-7.

Improving Syntactic Coordination Resolution using Language Modeling

Philip Ogren

See page 11 for abstract.

A Data Mining Approach to Learn Reorder Rules for SMT

Avinesh PVS

In this paper, we describe a syntax based source side reordering method for phrase-based statistical machine translation (SMT) systems. The source side training corpus is first parsed, then reordering rules are automatically learnt from source-side phrases and word alignments. Later the source side training and test corpus are reordered and given to SMT system. Reordering is common in a language pair of distant language origins. This paper describes an automated approach of learning reorder rules from a word-aligned parallel corpus using Association rule mining. Here we focus mainly on reordering rules and their generalization. We conducted our experiments on English-Hindi EILMT corpus.

Fine-Tuning in Brazilian Portuguese-English Statistical Transfer Machine Translation: Verbal Tenses

Lucia Silva

This paper describes an experiment designed to evaluate the development of a Statistical Transfer-based Brazilian Portuguese to English Machine Translation system. We compare the performance of the system with the inclusion of new syntactic written rules concerning verbal tense between the Brazilian Portuguese and English languages. Results indicate that the system performance improved compared with an initial version of the system. However significant adjustments remain to be done.

On Automated Evaluation of Readability of Summaries: Capturing Grammaticality, Focus, Structure and Coherence

Ravikiran Vadlapudi and Rahul Katragadda

See page 11 for abstract.

Distinguishing Use and Mention in Natural Language

Shomir Wilson

See page 17 for abstract.

Thursday, 3 June: Overview

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2:15–3:30	Machine Translation III	Machine Learning II	Generation	Lexical Semantics	34
4:00–5:30	Parsing: Short Papers	Noisy Genre: Short Papers	Morphology Phonology: Short Papers	Machine Learning: Short Papers	38
7:00–11:00	Banquet— <i>Maguire Gardens</i>				44

Paper Awards: Thu 9:00–10:15

Biltmore Bowl

Best Short Paper: 9:10–9:40

“cba to check the spelling”: Investigating Parser Performance on Discussion Forum Posts

Jennifer Foster

We evaluate the Berkeley parser on text from an online discussion forum. We evaluate the parser output with and without gold tokens and spellings (using Sparseval and Parseval), and we compile a list of problematic phenomena for this domain. The Parseval f-score for a small development set is 77.56. This increases to 80.27 when we apply a set of simple transformations to the input sentences and to the Wall Street Journal (WSJ) training sections.

Best Long Paper: 9:40–10:15

Coreference Resolution in a Modular, Entity-Centered Model

Aria Haghighi and Dan Klein

Coreference resolution is governed by syntactic, semantic, and discourse constraints. We present a generative, model-based approach in which each of these factors is modularly encapsulated and learned in a primarily unsupervised manner. Our semantic representation first hypothesizes an underlying set of latent entity types, which generate specific entities that in turn render individual mentions. By sharing lexical statistics at the level of abstract entity types, our model is able to substantially reduce semantic compatibility errors, resulting in the best results to date on the complete end-to-end coreference task.

Session Chair: Aravind Joshi

Long Papers: Thu 10:45–12:25

Machine Translation II

Biltmore Bowl

Session Chair: Chris Dyer

Machine Learning I

Crystal Ballroom

Session Chair: Damianos Karakos

10:45–11:10

Stream-based Translation Models for Statistical Machine Translation

Abby Levenberg, Chris Callison-Burch and Miles Osborne

Typical statistical machine translation systems are trained with static parallel corpora. Here we account for scenarios with a continuous incoming stream of parallel training data. Such scenarios include daily governmental proceedings, sustained output from translation agencies, or crowd-sourced translations. We show incorporating recent sentence pairs from the stream improves performance compared with a static baseline. Since frequent batch retraining is computationally demanding we introduce a fast incremental alternative using an online version of the EM algorithm. To bound our memory requirements we use a novel data-structure and associated training regime. When compared to frequent batch retraining, our online time and space-bounded model achieves the same performance with significantly less computational overhead.

11:10–11:35

Extracting Parallel Sentences from Comparable Corpora using Document Level Alignment

Jason R. Smith, Chris Quirk and Kristina Toutanova

The quality of a statistical machine translation (SMT) system is heavily dependent upon the amount of parallel sentences used in training. In recent years, there have been several approaches developed for obtaining parallel sentences from non-parallel, or comparable data, such as news articles published within the same time period, or web pages with a similar structure. One resource not yet thoroughly explored is Wikipedia, an online encyclopedia containing linked articles in many languages. We advance the state of the art in parallel sentence extraction by modeling the document level alignment, motivated by the observation that parallel sentence pairs are often found in close proximity. We also include features which make use of the additional annotation given by Wikipedia, and features using an automatically induced lexicon model. Results for both accuracy in sentence extraction and downstream improvement in an SMT system are presented.

Distributed Training Strategies for the Structured Perceptron

Ryan McDonald, Keith Hall and Gideon Mann

Perceptron training is widely applied in the natural language processing community for learning complex structured models. Like all structured prediction learning frameworks, the structure perceptron can be costly to train as training complexity is proportional to inference, which is frequently non-linear in example sequence length. In this paper we investigate distributed training strategies for the structured perceptron as a means to reduce training times when computing clusters are available. We look at two strategies and provide convergence bounds for a particular mode of distributed structured perceptron training based on iterative parameter mixing (or averaging). We present experiments on two structured prediction problems – named-entity recognition and dependency parsing – to highlight the efficiency of this method.

Discriminative Learning over Constrained Latent Representations

Ming-Wei Chang, Dan Goldwasser, Dan Roth and Vivek Srikumar

This paper proposes a general learning framework for a class of problems that require learning over latent intermediate representations. Many natural language processing (NLP) decision problems are defined over an expressive intermediate representation that is not explicit in the input, leaving the algorithm with both the task of recovering a good intermediate representation and learning to classify correctly. Most current systems separate the learning problem into two stages by solving the first step of recovering the intermediate representation heuristically and using it to learn the final classifier. This paper develops a novel joint learning algorithm for both tasks, that uses the final prediction to guide the selection of the best intermediate representation. We evaluate our algorithm on three different NLP tasks – transliteration, paraphrase identification and textual entailment – and show that our joint method significantly improves performance.

Information Retrieval and Extraction I

Gold Room

Session Chair: Donald Metzler

Morphology/Phonology

Emerald Room

Session Chair: Grzegorz Kondrak

Term Weighting Schemes for Latent Dirichlet Allocation

Andrew T. Wilson and Peter A. Chew

Many implementations of Latent Dirichlet Allocation (LDA), including those described in Blei et al. (2003), rely at some point on the removal of stopwords, words which are assumed to contribute little to the meaning of the text. This step is considered necessary because otherwise high-frequency words tend to end up scattered across many of the latent topics without much rhyme or reason. We show, however, that the ‘problem’ of high-frequency words can be dealt with more elegantly, and in a way that to our knowledge has not been considered in LDA, through the use of appropriate weighting schemes comparable to those sometimes used in Latent Semantic Indexing (LSI). Our proposed weighting methods not only make theoretical sense, but can also be shown to improve precision significantly on a non-trivial cross-language retrieval task.

Learning Words and Their Meanings from Unsegmented Child-directed Speech

Bevan K. Jones, Mark Johnson and Michael C. Frank

Most work on language acquisition treats word segmentation—the identification of linguistic segments from continuous speech—and word learning—the mapping of those segments to meanings—as separate problems. These two abilities develop in parallel, however, raising the question of whether they might interact. To explore the question, we present a new Bayesian segmentation model that incorporates aspects of word learning and compare it to a model that ignores word meanings. The model that learns word meanings proposes more adult-like segmentations for the meaning-bearing words. This result suggests that the non-linguistic context may supply important information for learning word segmentations as well as word meanings.

Learning Dense Models of Query Similarity from User Click Logs

Fabio De Bona, Stefan Riezler, Keith Hall, Massimiliano Ciaramita, Amaç Herdağdelen and Maria Holmqvist

The goal of this work is to integrate query similarity metrics as features into a dense model that can be trained on large amounts of query log data, in order to rank query rewrites. We propose features that incorporate various notions of syntactic and semantic similarity in a generalized edit distance framework. We use the implicit feedback of user clicks on search results as weak labels in training linear ranking models on large data sets. We optimize different ranking objectives in a stochastic gradient descent framework. Our experiments show that a pairwise SVM ranker trained on multipartite rank levels outperforms other pairwise and listwise ranking methods under a variety of evaluation metrics.

Subword Variation in Text Message Classification

Robert Munro and Christopher D. Manning

For millions of people in less resourced regions of the world, text messages (SMS) provide the only regular contact with their doctor. Classifying messages by medical labels supports rapid responses to emergencies, the early identification of epidemics and everyday administration, but challenges include text-brevity, rich morphology, phonological variation, and limited training data. We present a novel system that addresses these, working with a clinic in rural Malawi and texts in the Chichewa language. We show that modeling morphological and phonological variation leads to a substantial average gain of $F=0.206$ and an error reduction of up to 63.8% for specific labels, relative to a baseline system optimized over word-sequences. By comparison, there is no significant gain when applying the same system to the English translations of the same texts/labels, emphasizing the need for subword modeling in many languages. Language independent morphological models perform as accurately as language specific models, indicating a broad deployment potential.

Long Papers: Thu 10:45–12:25 (cont.)

Machine Translation II

Biltmore Bowl

Machine Learning I

Crystal Ballroom

11:35–12:00

Statistical Machine Translation of Texts with Misspelled Words

Nicola Bertoldi, Mauro Cettolo and Marcello Federico

This paper investigates the impact of misspelled words in statistical machine translation and proposes an extension of the translation engine for handling misspellings. The enhanced system decodes a word-based confusion network representing spelling variations of the input text. We present extensive experimental results on two translation tasks of increasing complexity which show how misspellings of different types do affect performance of a statistical machine translation decoder and to what extent our enhanced system is able to recover from such errors.

Bayesian Inference for Finite-State Transducers

David Chiang, Jonathan Graehl, Kevin Knight, Adam Pauls and Sujith Ravi

We describe a Bayesian inference algorithm that can be used to train any cascade of weighted finite-state transducers on end-to-end data. We also investigate the problem of automatically selecting from among multiple training runs. Our experiments on four different tasks demonstrate the genericity of this framework, and, where applicable, large improvements in performance over EM. We also show, for unsupervised part-of-speech tagging, that automatic run selection gives a large improvement over previous Bayesian approaches.

12:00–12:25

Everybody loves a rich cousin: An empirical study of transliteration through bridge languages

Mitesh M. Khapra, A Kumaran and Pushpak Bhattacharyya

Most state of the art approaches for machine transliteration are data driven and require significant parallel names corpora between languages. As a result, developing transliteration functionality among n languages could be a resource intensive task requiring parallel names corpora in the order of n choose 2. In this paper, we explore ways of reducing this high resource requirement by leveraging the available parallel data between subsets of the n languages, transitively; that is, transitioning through a bridge language Z , in cases where there is no direct parallel names data available between two languages X and Y . We propose, and demonstrate in a diverse set of languages, that reasonable quality transliteration engines may be developed by such methodology. Such systems alleviate the need for $O(n$ choose 2) corpora, significantly. In addition we show that the performance of such bridge transliteration systems is in par with direct transliteration systems, in practical applications, such as Cross Language Information Retrieval (CLIR) systems.

Some Empirical Evidence for Annotation Noise in a Benchmarked Dataset

Beata Beigman Klebanov and Eyal Beigman

A number of recent articles in computational linguistics venues called for a closer examination of the type of noise present in annotated datasets used for benchmarking (Reidsma and Carletta, 2008; Beigman Klebanov and Beigman, 2009). In particular, Beigman Klebanov and Beigman articulated a type of noise they call annotation noise and showed that in worst case such noise can severely degrade the generalization ability of a linear classifier (Beigman and Beigman Klebanov, 2009). In this paper, we provide quantitative empirical evidence for the existence of this type of noise in a recently benchmarked dataset. The proposed methodology can be used to zero in on unreliable instances, facilitating generation of cleaner gold standards for benchmarking.

Learning to Link Entities with Knowledge Base
Zhicheng Zheng, Fangtao Li, Minlie Huang and
Xiaoyan Zhu

This paper address the problem of entity linking. Specifically, given an entity mentioned in unstructured texts, the task is to link this entity with an entry stored in the existing knowledge base. This is an important task for information extraction. It can serve as a convenient gateway to encyclopedic information, and can greatly improve the web users' experience. Previous learning based solutions mainly focus on classification framework. However, it's more suitable to consider it as a ranking problem. In this paper, we propose a learning to rank algorithm for entity linking. It effectively utilizes the relationship information among the candidates when ranking. The experiment results on the TAC2009 data set demonstrate the effectiveness of our proposed framework. The proposed method achieves 18.5 improvement in terms of accuracy over the classification model for those entities which have corresponding entry in the Knowledge Base. We also show how to deal with NIL link with a module of top1 candidate validation. The overall performance of the system is also better than that of the state-of-the-art methods.

Automatic Diacritization for Low-Resource Languages Using a Hybrid Word and Consonant CMM

Robbie Haertel, Peter McClanahan and Eric K. Ringger

We are interested in diacritizing Semitic languages, especially Syriac, using only diacritized texts. Previous methods have required the use of tools such as part-of-speech taggers, segmenters, morphological analyzers, and linguistic rules to produce state-of-the-art results. We present a low-resource, data-driven, and language-independent approach that uses a hybrid word- and consonant-level conditional Markov model. Our approach rivals the best previously published results in Arabic (15% WER with case endings), without the use of a morphological analyzer. In Syriac, we reduce the WER over a strong baseline by 30% to achieve a WER of 10.5%. We also report results for Hebrew and English.

Improving the Multilingual User Experience of Wikipedia Using Cross-Language Name Search
Raghavendra Udupa and Mitesh Khapra

Although Wikipedia has emerged as a powerful collaborative Encyclopedia on the Web, it is only partially multilingual as most of the content is in English and a small number of other languages. In real-life scenarios, non-English users in general and ESL/EFL users in particular, have a need to search for relevant English Wikipedia articles as no relevant articles are available in their language. The multilingual experience of such users can be significantly improved if they could express their information need in their native language while searching for English Wikipedia articles. In this paper, we propose a novel cross-language name search algorithm and employ it for searching English Wikipedia articles in a diverse set of languages including Hebrew, Hindi, Russian, Kannada, Bangla and Tamil. Our empirical study shows that the multilingual experience of users is significantly improved by our approach.

Urdu Word Segmentation

Nadir Durrani and Sarmad Hussain

Word Segmentation is the foremost obligatory task in almost all the NLP applications where the initial phase requires tokenization of input into words. Urdu is amongst the Asian languages that face word segmentation challenge. However, unlike other Asian languages, word segmentation in Urdu not only has space deletion errors but also space insertion errors. This paper discusses how orthographic and linguistic features in Urdu trigger these two problems. It also discusses the work that has been done to tokenize input text. We employ a hybrid solution that performs an n-gram ranking on top of rule based maximum matching heuristic. Our best technique gives an error detection of 85.8% and overall accuracy of 95.8%. Further issues and possible future directions are also discussed.

Panel: Thu 12:40–2:00

Biltmore Bowl

Recent and Future HLT Challenges in Industry

Several leaders from industrial and government research labs will give an overview of HLT problems that are seen as important and promising at their respective institutions. They will discuss the research process as it compares to purely academic research, the implications of working with real (noisy) data, and the kinds of skills that are important for success in industrial/government research settings.

Panelists

Dekang Lin

Google Research

Arul Menezes

Microsoft Research

Bo Pang

Yahoo! Research

Rion Snow

Twitter

Bowen Zhou

IBM Research

Session Chair: Kristina Toutanova

Long Papers: Thu 2:15–3:30

Machine Translation III

Biltmore Bowl

Session Chair: Kevin Knight

Machine Learning II

Crystal Ballroom

Session Chair: Jenny Rose Finkel

2:15–2:40

Enabling Monolingual Translators: Post-Editing vs. Options

Philipp Koehn

We carried out a study on monolingual translators with no knowledge of the source language, but aided by post-editing and the display of translation options. On Arabic-English and Chinese-English, using standard test data and current statistical machine translation systems, 10 monolingual translators were able to translate 35% of Arabic and 28% of Chinese sentences correctly on average, with some of the participants coming close to professional bilingual performance on some of the documents.

2:40–3:05

Online Learning for Interactive Statistical Machine Translation

Daniel Ortiz-Martínez, Ismael García-Varea and Francisco Casacuberta

State-of-the-art Machine Translation (MT) systems are still far from being perfect. An alternative is the so-called Interactive Machine Translation (IMT) framework. In this framework, the knowledge of a human translator is combined with a MT system. The vast majority of the existing work on IMT makes use of the well-known batch learning paradigm. In the batch learning paradigm, the training of the IMT system and the interactive translation process are carried out in separate stages. This paradigm is not able to take advantage of the new knowledge produced by the user of the IMT system. In this paper, we present an application of the online learning paradigm to the IMT framework. In the online learning paradigm, the training and prediction stages are no longer separated. This feature is particularly useful in IMT since it allows the user feedback to be taken into account. The online learning techniques proposed here incrementally update the statistical models involved in the translation process. Empirical results show the great potential of online learning in the IMT framework.

Variational Inference for Adaptor Grammars

Shay B. Cohen, David M. Blei and Noah A. Smith

Adaptor grammars extend probabilistic context-free grammars to define prior distributions over trees with “rich get richer” dynamics. Inference for adaptor grammars seeks to find parse trees for raw text. This paper describes a variational inference algorithm for adaptor grammars, providing an alternative to Markov chain Monte Carlo methods. To derive this method, we develop a stick-breaking representation of adaptor grammars, a representation that enables us to define adaptor grammars with recursion. We report experimental results on a word segmentation task, showing that variational inference performs comparably to MCMC. Further, we show a significant speed-up when parallelizing the algorithm. Finally, we report promising results for a new application for adaptor grammars, dependency grammar induction.

Type-Based MCMC

Percy Liang, Michael I. Jordan and Dan Klein

Most existing algorithms for learning latent-variable models—such as EM and existing Gibbs samplers—are token-based, meaning that they update the variables associated with one sentence at a time. The incremental nature of these methods makes them susceptible to local optima/slow mixing. In this paper, we introduce a type-based sampler, which updates a block of variables, identified by a type, which spans multiple sentences. We show improvements on part-of-speech induction, word segmentation, and learning tree-substitution grammars.

Generation

Gold Room

Session Chair: Kathleen McKeown

Linguistic Steganography Using Automatically Generated Paraphrases

Ching-Yun Chang and Stephen Clark

This paper describes a method for checking the acceptability of paraphrases in context. We use the Google n-gram data and a CCG parser to certify the paraphrasing grammaticality and fluency. We collect a corpus of human judgements to evaluate our system. The ultimate goal of our work is to integrate text paraphrasing into a Linguistic Steganography system, by using paraphrases to hide information in a cover text. We propose automatically generated paraphrases as a new and useful source of transformations for Linguistic Steganography, and show that our method for checking paraphrases is effective at maintaining a high level of imperceptibility, which is crucial for effective steganography.

Prenominal Modifier Ordering via Multiple Sequence Alignment

Aaron Dunlop, Margaret Mitchell and Brian Roark

Producing a natural-sounding ordering for a set of prenominal modifiers in a noun phrase (NP) is a problematic task for natural language generation and machine translation systems. We present a novel approach to this issue, adapting multiple sequence alignment techniques used in computational biology to the alignment of modifiers. We describe two training techniques to create such alignments based on raw text, and demonstrate ordering accuracies superior to earlier reported approaches.

Lexical Semantics

Emerald Room

Session Chair: Ted Pedersen

Not All Seeds Are Equal: Measuring the Quality of Text Mining Seeds

Zornitsa Kozareva and Eduard Hovy

Open-class semantic lexicon induction is of great interest for current knowledge harvesting algorithms. We propose a general framework that uses patterns in bootstrapping fashion to learn open-class semantic lexicons for different kinds of relations. These patterns require seeds. To estimate the ‘goodness’ (the potential yield) of new seeds, we introduce a regression model that considers the connectivity behavior of the seed during bootstrapping. The generalized regression model is evaluated on six different kinds of relations with over \$10000\$ different seeds for English and Spanish patterns. Our approach reaches robust performance of 90% correlation coefficient with 15% error rate for any of the patterns when predicting the ‘goodness’ of seeds.

Extracting Glosses to Disambiguate Word Senses

Weisi Duan and Alexander Yates

Like most natural language disambiguation tasks, word sense disambiguation (WSD) requires world knowledge for accurate predictions. Several proxies for this knowledge have been investigated, including labeled corpora, user-contributed knowledge, and machine readable dictionaries, but each of these proxies requires significant manual effort to create, and they do not cover all of the ambiguous terms in a language. We investigate the task of automatically extracting world knowledge, in the form of glosses, from an unlabeled corpus. We demonstrate how to use these glosses to automatically label a training corpus to build a statistical WSD system that uses no manually-labeled data, with experimental results approaching that of a supervised SVM-based classifier.

Long Papers: Thu 2:15–3:30 (cont.)

Machine Translation III

Biltmore Bowl

Machine Learning II

Crystal Ballroom

3:05–3:30

The Best Lexical Metric for Phrase-Based Statistical MT System Optimization

Daniel Cer, Christopher D. Manning and Daniel Jurafsky

Translation systems are generally trained to optimize BLEU, but many alternative metrics are available. We explore how optimizing toward various automatic evaluation metrics (BLEU, METEOR, NIST, TER) affects the resulting model. We train a state-of-the-art MT system using MERT on many parameterizations of each metric and evaluate the resulting models on the other metrics and also using human judges. In accordance with popular wisdom, we find that it's important to train on the same metric used in testing. However, we also find that training to a newer metric is only useful to the extent that the MT model's structure and features allow it to take advantage of the metric. Contrasting with TER's good correlation with human judgments, we show that people tend to prefer BLEU and NIST trained models to those trained on edit distance based metrics like TER or WER. Human preferences for METEOR trained models varies depending on the source language. Since using BLEU or NIST produces models that are more robust to evaluation by other metrics and perform well in human judgments, we conclude they are still the best choice for training.

Painless Unsupervised Learning with Features

Taylor Berg-Kirkpatrick, Alexandre Bouchard-Côté, John DeNero and Dan Klein

We show how features can easily be added to standard generative models for unsupervised learning, without requiring complex new training methods. In particular, each component multinomial of a generative model can be turned into a miniature logistic regression model if feature locality permits. The intuitive EM algorithm still applies, but with a gradient-based M-step familiar from discriminative training of logistic regression models. We apply this technique to part-of-speech induction, grammar induction, word alignment, and word segmentation, incorporating a few linguistically-motivated features into the standard generative model for each task. These feature-enhanced models each outperform their basic counterparts by a substantial margin, and even compete with and surpass more complex state-of-the-art models.

Generation

Gold Room

Good Question! Statistical Ranking for Question Generation

Michael Heilman and Noah A. Smith

We address the challenge of automatically generating questions from reading materials for educational practice and assessment. Our approach is to overgenerate questions, then rank them. We use manually written rules to perform a sequence of general purpose syntactic transformations (e.g., subject-auxiliary inversion) to turn declarative sentences into questions. These questions are then ranked by a logistic regression model trained on a small, tailored dataset consisting of labeled output from our system. Experimental results show that ranking nearly doubles the percentage of questions rated as acceptable by annotators, from 27% of all questions to 52% of the top ranked 20% of questions.

Lexical Semantics

Emerald Room

Can Recognising Multiword Expressions Improve Shallow Parsing?

Ioannis Korkontzelos and Suresh Manandhar

There is significant evidence in the literature that integrating knowledge about multiword expressions can improve shallow parsing accuracy. We present an experimental study to quantify this improvement, focusing on compound nominals, proper names and adjective-noun constructions. The evaluation set of multiword expressions is derived from WordNet and the textual data are downloaded from the web. We use a classification method to aid human annotation of output parses. This method allows us to conduct experiments on a large dataset of unannotated data. Experiments show that knowledge about multiword expressions leads to an increase of between 7.5 % and 9.5 % in accuracy of shallow parsing in sentences containing these multiword expressions.

Short Papers: Thu 4:00–5:30

Parsing: Short Papers

Biltmore Bowl

Session Chair: Jason Eisner

Noisy Genre: Short Papers

Crystal Ballroom

Session Chair: Adam Kilgarriff

4:00–4:15

A Simple Approach for HPSG Supertagging Using Dependency Information

Yao-zhong Zhang, Takuya Matsuzaki and Jun'ichi Tsujii

In a supertagging task, sequence labeling models are commonly used. But their limited ability to model long-distance information presents a bottleneck to make further improvements. In this paper, we modeled this long-distance information in dependency formalism and integrated it into the process of HPSG supertagging. The experiments showed that the dependency information is very informative for supertag disambiguation. We also evaluated the improved supertagger in the HPSG parser.

An Exploration of Off Topic Conversation

Whitney L. Cade, Blair A. Lehman and Andrew Olney

In this paper, “off topic” conversation within an expert tutoring corpus is examined to determine its potential functions and utility. Using the Linguistic Inquiry and Word Count (LIWC) tool, phases of tutoring dialogue classified as “off topic” were compared with dialogue from a collaborate problem solving phase called scaffolding on the emotional, psychological, and topical dimensions provided by LIWC. The results of this comparison point to a motivational and globally pedagogical purpose underlying the off topic mode. These findings can be used to orient future research on off topic conversation, and help to make sense of both previous coding schemes and noisy data sets.

4:15–4:30

Ensemble Models for Dependency Parsing: Cheap and Good?

Mihai Surdeanu and Christopher D. Manning

Previous work on dependency parsing used various kinds of combination models but a systematic analysis and comparison of these approaches is lacking. In this paper we implemented such a study for English dependency parsing and find several non-obvious facts: (a) the diversity of base parsers is more important than complex models for learning (e.g., stacking, supervised meta-classification), (b) approximate, linear-time re-parsing algorithms guarantee well-formed dependency trees without significant performance loss, and (c) the simplest scoring model for re-parsing (unweighted voting) performs essentially as well as other more complex models. This study proves that fast and accurate ensemble parsers can be built with minimal effort.

Making Conversational Structure Explicit: Identification of Initiation-response Pairs within Online Discussions

Yi-Chia Wang and Carolyn P. Rosé

In this paper we investigate how to identify initiation-response pairs in asynchronous, multi-threaded, multi-party conversations. We formulate the task of identifying initiation-response pairs as a pairwise ranking problem. A novel variant of Latent Semantic Analysis (LSA) is proposed to overcome a limitation of standard LSA models, namely that uncommon words, which are critical for signaling initiation-response links, tend to be deemphasized as it is the more frequent terms that end up closer to the latent factors selected through singular value decomposition. We present experimental results demonstrating significantly better performance of the novel variant of LSA over standard LSA.

Morphology/Phonology: Short Papers

Gold Room

Session Chair: Kemal Oflazer

Language identification of names with SVMs

Aditya Bhargava and Grzegorz Kondrak

The task of identifying the language of text or utterances has a number of applications in natural language processing. Language identification has traditionally been approached with character-level language models. However, the language model approach crucially depends on the length of the text in question. In this paper, we consider the problem of language identification of names. We show that an approach based on SVMs with n-gram counts as features performs much better than language models. We also experiment with applying the method to pre-process transliteration data for the training of separate models.

Integrating Joint n-gram Features into a Discriminative Training Framework

Sittichai Jiampojamarn, Colin Cherry and Grzegorz Kondrak

Phonetic string transduction problems, such as letter-to-phoneme conversion and name transliteration, have recently received much attention in the NLP community. In the past few years, two methods have come to dominate as solutions to supervised string transduction: generative joint n-gram models, and discriminative sequence models. Both approaches benefit from their ability to consider large, flexible spans of source context when making transduction decisions. However, they encode this context in different ways, providing their respective models with different information. To combine the strengths of these two systems, we include joint n-gram features inside a state-of-the-art discriminative sequence model. We evaluate our approach on several letter-to-phoneme and transliteration data sets. Our results indicate an improvement in overall performance with respect to both the joint n-gram approach and traditional feature sets for discriminative models.

Machine Learning: Short Papers

Emerald Room

Session Chair: Bowen Zhou

Extracting Phrase Patterns with Minimum Redundancy for Unsupervised Speaker Role Classification

Bin Zhang, Brian Hutchinson, Wei Wu and Mari Ostendorf

This paper addresses the problem of learning phrase patterns for unsupervised speaker role classification. Phrase patterns are automatically extracted from large corpora, and redundant patterns are removed via a graph pruning algorithm. In experiments on English and Mandarin talk shows, the use of phrase patterns results in an increase of role classification accuracy over n-gram lexical features, and more compact phrase pattern lists are obtained due to the redundancy removal.

Classification of Prosodic Events using Quantized Contour Modeling

Andrew Rosenberg

We present Quantized Contour Modeling (QCM), a Bayesian approach to the classification of acoustic contours. We evaluate the performance of this technique in the classification of prosodic events. We use the ToBI standard to define the inventory of prosodic events, classifying pitch accent types, and phrase ending tones – phrase accents and boundary tones. We find that, on BURNC, this technique can successfully classify pitch accents with 63.99% accuracy (.4481 CER), and phrase ending tones with 72.91% accuracy.

Short Papers: Thu 4:00–5:30 (cont.)

Parsing: Short Papers

Biltmore Bowl

4:30–4:45

Enlarged Search Space for SITG Parsing

Guillem Gascó, Joan-Andreu Sánchez and José-Miguel Benedí

Stochastic Inversion Transduction Grammars constitute a powerful formalism in Machine Translation for which an efficient Dynamic Programming parsing algorithm exists. In this work, we review this parsing algorithm and propose important modifications that enlarge the search space. These modifications allow the parsing algorithm to search for more and better solutions.

4:45–5:00

Improving Data Driven Dependency Parsing using Clausal Information

Phani Gadde, Karan Jindal, Samar Husain, Dipti Misra Sharma and Rajeev Sangal

The paper describes a data driven dependency parsing approach which uses clausal information of a sentence to improve the parser performance. The clausal information is added automatically during the parsing process. We demonstrate the experiments on Hindi, a language with relatively rich case marking system and free-word-order. All the experiments are done using a modified version of MSTParser. We did all the experiments on the ICON 2009 parsing contest data. We achieved an improvement of 0.87% and 0.77% in unlabeled attachment and labeled attachment accuracies respectively over the baseline parsing accuracies.

Noisy Genre: Short Papers

Crystal Ballroom

Engaging learning groups using Social Interaction Strategies

Rohit Kumar and Carolyn P. Rosé

Conversational Agents have been shown to be effective tutors in a wide range of educational domains. However, these agents are often ignored and abused in collaborative learning scenarios involving multiple students. In our work presented here, we design and evaluate interaction strategies motivated from prior research in small group communication. We will discuss how such strategies can be implemented in agents. As a first step towards evaluating agents that can interact socially, we report results showing that human tutors employing these strategies are able to cover more concepts with the students besides being rated as better integrated, likeable and friendlier.

Using Entity-Based Features to Model Coherence in Student Essays

Jill Burstein, Joel Tetreault and Slava Andreyev

We show how the Barzilay and Lapata entity-based coherence algorithm (2008) can be applied to a new, noisy data domain – student essays. We demonstrate that by combining Barzilay and Lapata's entity-based features with novel features related to grammar errors and word usage, one can greatly improve the performance of automated coherence prediction for student essays for different populations.

A Hybrid Morphologically Decomposed Factored Language Models for Arabic LVCSR

Amr El-Desoky, Ralf Schlüter and Hermann Ney

In this work, we try a hybrid methodology for language modeling where both morphological decomposition and factored language modeling (FLM) are exploited to deal with the complex morphology of Arabic language. At the end, we are able to obtain from 3.5% to 7.0% relative reduction in word error rate (WER) with respect to a traditional full-words system, and from 1.0% to 2.0% relative WER reduction with respect to a non-factored decomposed system.

Investigations into the Crandem Approach to Word Recognition

Rohit Prabhavalkar, Preethi Jyothi, William Hartmann, Jeremy Morris and Eric Fosler-Lussier

We suggest improvements to a previously proposed framework for integrating Conditional Random Fields and Hidden Markov Models, dubbed a Crandem system (2009). The previous authors' work suggested that local label posteriors derived from the CRF were too low-entropy for use in word-level automatic speech recognition. As an alternative to the log posterior representation used in their system, we explore frame-level representations derived from the CRF feature functions. We also describe a weight normalization transformation that leads to increased entropy of the CRF posteriors. We report significant gains over the previous Crandem system on the Wall Street Journal word recognition task.

Is Arabic Part of Speech Tagging Feasible Without Word Segmentation?

Emad Mohamed and Sandra Kübler

In this paper, we compare two novel methods for part of speech tagging of Arabic without the use of gold standard word segmentation but with the full POS tagset of the Penn Arabic Treebank. The first approach uses complex tags without any word segmentation, the second approach is segmentation-based, using a machine learning segmenter. Surprisingly, word-based POS tagging yields the best results, with a word accuracy of 94.74%.

Constraint-Driven Rank-Based Learning for Information Extraction

Sameer Singh, Limin Yao, Sebastian Riedel and Andrew McCallum

Most learning algorithms for undirected graphical models require complete inference over at least one instance before parameter updates can be made. SampleRank is a rank-based learning framework that alleviates this problem by updating the parameters during inference. Most semi-supervised learning algorithms also perform full inference on at least one instance before each parameter update. We extend SampleRank to semi-supervised learning in order to circumvent this computational bottleneck. Different approaches to incorporate unlabeled data and prior knowledge into this framework are explored. When evaluated on a standard information extraction dataset, our method significantly outperforms the supervised method, and matches results of a competing state-of-the-art semi-supervised learning approach.

Short Papers: Thu 4:00–5:30 (cont.)

Parsing: Short Papers

Biltmore Bowl

5:00–5:15

A Treebank Query System Based on an Extracted Tree Grammar

Seth Kulick and Ann Bies

Recent work has proposed the use of an extracted tree grammar as the basis for treebank analysis and search queries, in which queries are stated over the elementary trees, which are small chunks of syntactic structure. However, this work was lacking in two crucial ways. First, it did not allow for including lexical properties of tokens in the search. Second, it did not allow for using the derivation tree in the search, describing how the elementary trees are connected together. In this work we describe an implementation that overcomes these problems.

5:15–5:30

Reranking the Berkeley and Brown Parsers

Mark Johnson and Ahmet Engin Ural

The Brown and the Berkeley parsers are two state-of-the-art generative parsers. Since both parsers produce n-best lists, it is possible to apply reranking techniques to the output of both of these parsers, and to their union. We note that the standard reranker feature set distributed with the Brown parser does not do well with the Berkeley parser, and propose an extended set that does better. An ablation experiment shows that different parsers benefit from different reranker features.

Noisy Genre: Short Papers

Crystal Ballroom

Summarizing Microblogs Automatically

Beaux Sharifi, Mark-Anthony Hutton and Jugal Kalita

In this paper, we focus on a recent Web trend called microblogging, and in particular a site called Twitter. The content of such a site is an extra-ordinarily large number of small textual messages, posted by millions of users, at random or in response to perceived events or situations. We have developed an algorithm that takes a trending phrase or any phrase specified by a user, collects a large number of posts containing the phrase, and provides an automatically created summary of the posts related to the term. We present examples of summaries we produce along with initial evaluation.

Automatic Generation of Personalized Annotation Tags for Twitter Users

Wei Wu, Bin Zhang and Mari Ostendorf

This paper introduces a system designed for automatically generating personalized annotation tags to label Twitter user's interests and concerns. We applied TFIDF ranking and TextRank to extract keywords from Twitter messages to tag the user. The user tagging precision we obtained is comparable to the precision of keyword extraction from web pages for content-targeted advertising.

Arabic Mention Detection: Toward Better Unit of Analysis

Yassine Benajiba and Imed Zitouni

We investigate in this paper the adequate unit of analysis for Arabic Mention Detection. We experiment different segmentation schemes with various feature-sets. Results show that when limited resources are available, models built on morphologically segmented data outperform other models by up to 4F points. On the other hand, when more resources extracted from morphologically segmented data become available, models built with Arabic TreeBank style segmentation yield to better results. We also show additional improvement by combining different segmentation schemes.

Softmax-Margin CRFs: Training Log-Linear Models with Cost Functions

Kevin Gimpel and Noah A. Smith

We describe a method of incorporating task-specific cost functions into standard conditional log-likelihood (CLL) training of linear structured prediction models. Recently introduced in the speech recognition community, we describe the method generally for structured models, highlight connections to CLL and max-margin learning for structured prediction (Taskar et al., 2003), and show that the method optimizes a bound on risk. The approach is simple, efficient, and easy to implement, requiring very little change to an existing CLL implementation. We present experimental results comparing with several commonly-used methods for training structured predictors for named-entity recognition.

An MDL-based approach to extracting subword units for grapheme-to-phoneme conversion

Sravana Reddy and John Goldsmith

We address a key problem in grapheme-to-phoneme conversion: the translational ambiguity in mapping grapheme units to phonemes. Rather than using single letters and phonemes as units, we propose learning chunks, or subwords, to reduce ambiguity. This can be interpreted as learning a lexicon of subwords that has minimum description length. We implement an algorithm to build such a lexicon, as well as a simple grapheme-to-phoneme decoder that uses these subwords.

Bitext-Based Resolution of German Subject-Object Ambiguities

Florian Schwarck, Alexander Fraser and Hinrich Schütze

We present a method for disambiguating syntactic subjects from syntactic objects (a frequent ambiguity) in German sentences taken from an English-German bitext. We exploit the fact that subject and object are usually easily determined in English. We show that a simple method disambiguates some subject-object ambiguities in German, while making few errors. We view this procedure as the first step in automatically acquiring (mostly) correct labeled data. We also evaluate using it to improve a state of the art statistical parser.

Banquet: Thu 7:00–11:00 pm

Maguire Gardens at the Central Library, 5th St and Flower St

The Central Library is the third largest public library in the United States in terms of book and periodical holdings. It was built by Bertram Grosvenor Goodhue in a style that mixed Byzantine, Egyptian, modern, and Spanish themes, and opened in 1926. Most of the terra-cotta bas-reliefs were done by Lee Oskar Lawrie, and entitled “Meaning and Purpose of Library.” The Library is open until 8 pm and is worth a visit for the architecture and art, and for the two exhibits currently on display: “The World of William Joyce,” first floor; “Treasures of Los Angeles,” second floor.



The NAACL HLT banquet will be held in the Maguire Gardens in front of the Library. The sculptural installation here is *Spine* by Jud Fine (1993). The four sections of steps present eighty selections from different approaches to written communication. The first section contains archaic scripts (the first step is blank indicating the unfathomable past); the second, the emergence of writing; the third, the growth of print and graphic reproduction; the fourth, the post-literate period (the last step is blank indicating the unknown future).

Entertainment will be provided by Mora’s Modern Swingtet, founded by pianist Dean Mora and based in Los Angeles. Their repertoire is that of the famous small groups of the 1930s and 1940s, such as Tommy Dorsey’s Clambake Seven, Artie Shaw’s Gramercy Five, the Ellingtonians, and the John Kirby Orchestra, among others. They perform using period arrangements and transcriptions from the original recordings with a keen eye towards authenticity, both in terms of musical performance, as well as the appearance of its musicians. Their first CD, *20th Century Closet*, was released in 2004 to critical acclaim.

Source: Ruth Wallach, USC Libraries. www.publicartinla.com/LAPL

Friday, 4 June: Overview

Time	<i>Biltmore Bowl</i>	<i>Crystal Ballroom</i>	<i>Gold Room</i>	Page
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Keynote: Fri 9:00–10:10

Biltmore Bowl

David Temperley
University of Rochester

Music, Language, and
Computational Modeling:
Lessons from the
Key-Finding Problem



Abstract Recent research in computational music research, including my own, has been greatly influenced by methods in computational linguistics. But I believe the influence could also go the other way: Music may offer some interesting lessons for language research, particularly with regard to the modeling of cognition.

In this talk I will focus on an important problem in music cognition: the problem of key identification. I will argue that this problem is in some ways analogous to the problem of syntactic parsing in language. I will present a simple Bayesian model that performs well at the key-finding task. I will then consider some implications of the model for other issues. The model represents moment-to-moment changes in key over time and captures “reanalysis” effects in key perception. The model can be used to estimate the tonal ambiguity of a musical passage, and can also be used to estimate the probability of note patterns (just as a probabilistic grammar can be used to estimate the probability of word strings). An interesting question here concerns expectation: In forming expectations for the next surface element (note or word), do we consider all possible structures (syntactic structures or keys) or just the most probable one? Finally, the model sheds light on the concept of “information flow.” It has been suggested that language reflects a tendency towards uniform density of information, in that less probable elements are spread out or elongated; I will suggest that the same may be true in music.

Biography David Temperley is Associate Professor of Music Theory at Eastman School of Music. After attending Swarthmore College, he worked for several years as a free-lance accompanist and composer in New York City. Temperley earned his PhD in music theory from Columbia in 1996, and subsequently was a post-doctoral fellow in music cognition at Ohio State University. Temperley’s music research has spanned a wide range of areas, including rhythm and meter, rock, and African music, but his primary focus has been computational modeling of music cognition.

For many years, Temperley has had a strong secondary interest in language. In the early 1990s, along with Daniel Sleator and John Lafferty, he developed the link grammar parser, a wide-coverage English parser based on an original theory of dependency syntax; the parser has been used in a wide variety of applications, and currently serves as the grammar-checker for the AbiWord word-processing system. More recently, Temperley’s language research has focused on corpus research and computational models of language perception and production.

Session Chair: Jill Burstein

Long Papers: Fri 10:40–12:20

Parsing II

Biltmore Bowl

Session Chair: Slav Petrov

Sentiment Analysis

Crystal Ballroom

Session Chair: Philip Resnik

10:40–11:05

An Efficient Algorithm for Easy-First Non-Directional Dependency Parsing

Yoav Goldberg and Michael Elhadad

We present a novel deterministic dependency parsing algorithm that attempts to create the easiest arcs in the dependency structure first in a non-directional manner. Traditional deterministic parsing algorithms are based on a shift-reduce framework: they traverse the sentence from left-to-right and, at each step, perform one of a possible set of actions, until a complete tree is built. A drawback of this approach is that it is extremely local: while decisions can be based on complex structures on the left, they can look only at a few words to the right. In contrast, our algorithm builds a dependency tree by iteratively selecting the best pair of neighbours to connect at each parsing step. This allows incorporation of features from already built structures both to the left and to the right of the attachment point. The parser learns both the attachment preferences and the order in which they should be performed. The result is a deterministic, best-first, $O(n \log n)$ parser, which is significantly more accurate than best-first transition based parsers, and nears the performance of globally optimized parsing models.

The viability of web-derived polarity lexicons

Leonid Velikovich, Sasha Blair-Goldensohn, Kerry Hannan and Ryan McDonald

We examine the viability of building large polarity lexicons semi-automatically from the web. We begin by describing a graph propagation framework inspired by previous work on constructing polarity lexicons from lexical graphs. We then apply this technique to build an English lexicon that is an order of magnitude larger than those previously studied. Crucially, this web-derived lexicon does not require WordNet, part-of-speech taggers, or other language-dependent resources typical of sentiment analysis systems. As a result, the lexicon is not limited to specific word classes – e.g., adjectives that occur in WordNet – and in fact contains slang, misspellings, vulgarity and multi-word expressions, including “just what the doctor ordered” and “run of the mill”. We evaluate a lexicon derived from English documents, both qualitatively and quantitatively, and show that it provides superior performance to those based on WordNet and manually collected resources.

11:05–11:30

From Baby Steps to Leapfrog: How “Less is More” in Unsupervised Dependency Parsing

Valentin I. Spitkovsky, Hiyah Alshawi and Daniel Jurafsky

We present three approaches for unsupervised grammar induction that are sensitive to data complexity and apply them to Klein and Manning’s Dependency Model with Valence. The first, Baby Steps, bootstraps itself via iterated learning of increasingly longer sentences and requires no initialization. This method substantially exceeds Klein and Manning’s published scores and achieves 39.4% accuracy on Section 23 (all sentences) of the Wall Street Journal corpus. The second, Less is More, uses a low-complexity subset of the available data: sentences up to length 15. Focusing on fewer but simpler examples trades off quantity against ambiguity; it attains 44.1% accuracy, using the standard linguistically-informed prior and batch training, beating state-of-the-art. Leapfrog, our third heuristic, combines Less is More with Baby Steps by mixing their models of shorter sentences, then rapidly ramping up exposure to the full training set, driving up accuracy to 45.0%. These trends generalize to the Brown corpus; awareness of data complexity may improve other parsing models and unsupervised algorithms.

Dependency Tree-based Sentiment Classification using CRFs with Hidden Variables

Tetsuji Nakagawa, Kentaro Inui and Sadao Kurohashi

In this paper, we present a dependency tree-based method for sentiment classification of Japanese and English subjective sentences using conditional random fields with hidden variables. Subjective sentences often contain words which reverse the sentiment polarities of other words. Therefore, interactions between words need to be considered in sentiment classification, which is difficult to be handled with a simple bag-of-words approach, and the syntactic dependency structures of subjective sentences are exploited in our method. In the method, the sentiment polarity of each dependency subtree in a sentence, which is not observable in training data, is represented by a hidden variable. The polarity of the whole sentence is calculated in consideration of interactions between the hidden variables. Sum-product belief propagation is used for inference. Experimental results of sentiment classification for Japanese and English subjective sentences showed that the method performs better than other methods based on bag-of-features.

Information Retrieval and Extraction II

Gold Room

Session Chair: Burr Settles

Joint Inference for Knowledge Extraction from Biomedical Literature

Hoifung Poon and Lucy Vanderwende

Knowledge extraction from online repositories such as PubMed holds the promise of dramatically speeding up biomedical research and drug design. After initially focusing on recognizing proteins and binary interactions, the community has recently shifted their attention to the more ambitious task of recognizing complex, nested event structures. State-of-the-art systems use a pipeline architecture in which the candidate events are identified first, and subsequently the arguments. This fails to leverage joint inference among events and arguments for mutual disambiguation. Some joint approaches have been proposed, but they still lag much behind in accuracy. In this paper, we present the first joint approach for bio-event extraction that obtains state-of-the-art results. Our system is based on Markov logic and adopts a novel formulation by jointly predicting events and arguments, as well as individual dependency edges that compose the argument paths. On the BioNLP'09 Shared Task dataset, it reduced F1 errors by more than 10% compared to the previous best joint approach.

Clinical Information Retrieval using Document and PICO Structure

Florian Boudin, Jian-Yun Nie and Martin Dawes

In evidence-based medicine, clinical questions involve four aspects: Patient/Problem (P), Intervention (I), Comparison (C) and Outcome (O), known as PICO elements. In this paper we present a method that extends the language modeling approach to incorporate both document structure and PICO query formulation. We present an analysis of the distribution of PICO elements in medical abstracts that motivates the use of a location-based weighting strategy. In experiments carried out on a collection of 1.5 million abstracts, the method was found to lead to an improvement of roughly 60% in MAP and 70% in P@10 as compared to state-of-the-art methods.

Long Papers: Fri 10:40–12:20 (cont.)

Parsing II

Biltmore Bowl

Sentiment Analysis

Crystal Ballroom

11:30–11:55

Relaxed Marginal Inference and its Application to Dependency Parsing

Sebastian Riedel and David A. Smith

Recently, relaxation approaches have been successfully used for MAP inference on NLP problems. In this work we show how to extend the relaxation approach to marginal inference used in conditional likelihood training, posterior decoding, confidence estimation, and other tasks. We evaluate our approach for the case of second-order dependency parsing and observe a tenfold increase in parsing speed, with no loss in accuracy, by performing inference over a small subset of the full factor graph. We also contribute a bound on the error of the marginal probabilities by a sub-graph with respect to the full graph. Finally, while only evaluated with BP in this paper, our approach is general enough to be applied with any marginal inference method in the inner loop.

Convolution Kernels for Opinion Holder Extraction

Michael Wiegand and Dietrich Klakow

Opinion holder extraction is one of the important sub-tasks in sentiment analysis. The effective detection of an opinion holder depends on the consideration of various cues on various levels of representation, though they are hard to formulate explicitly as features. In this work, we propose to use convolution kernels for that task which identify meaningful fragments of sequences or trees by themselves. We not only investigate how different levels of information can be effectively combined in different kernels but also examine how the scope of these kernels should be chosen. In general relation extraction, the two candidate entities thought to be involved in a relation are commonly chosen to be the boundaries of sequences and trees. The definition of boundaries in opinion holder extraction, however, is less straightforward since there might be several expressions beside the candidate opinion holder to be eligible for being a boundary.

11:55–12:20

Optimal Parsing Strategies for Linear Context-Free Rewriting Systems

Daniel Gildea

Reduction is the operation of transforming a production in a Linear Context-Free Rewriting System (LCFRS) into two simpler productions by factoring out a subset of the nonterminals on the production's righthand side. Reduction lowers the rank of a production but may increase its fan-out. We show how to apply reduction in order to minimize the parsing complexity of the resulting grammar, and study the relationship between rank, fan-out, and parsing complexity. We show that it is always possible to obtain optimum parsing complexity with rank two. However, among transformed grammars of rank two, minimum parsing complexity is not always possible with minimum fan-out. Applying our reduction algorithm to LCFRS rules extracted from dependency treebanks allows us to find the most efficient parsing strategy for the syntactic phenomena found in non-projective trees.

An Unsupervised Aspect-Sentiment Model for Online Reviews

Samuel Brody and Noemie Elhadad

With the increase in popularity of online review sites comes a corresponding need for tools capable of extracting the information most important to the user from the plain text data. Due to the diversity in products and services being reviewed, supervised methods are often not practical. We present an unsupervised system for extracting aspects and determining sentiment in review text. The method is simple and flexible with regard to domain and language, and takes into account the influence of aspect on sentiment polarity, an issue largely ignored in previous literature. We demonstrate its effectiveness on both component tasks, where it achieves similar results to more complex semi-supervised methods that are restricted by their reliance on manual annotation and extensive knowledge sources.

Information Retrieval and Extraction II

Gold Room

Topic Models for Image Annotation and Text Illustration

Yansong Feng and Mirella Lapata

Image annotation, the task of automatically generating description words for a picture, is a key component in various image search and retrieval applications. Creating image databases for model development is, however, costly and time consuming, since the keywords must be hand-coded and the process repeated for new collections. In this work we exploit the vast resource of images and documents available on the web for developing image annotation models without any human involvement. We describe a probabilistic model based on the assumption that images and their co-occurring textual data are generated by mixtures of latent topics. We show that this model outperforms previously proposed approaches when applied to image annotation and the related task of text illustration despite the noisy nature of our dataset.

Learning about Voice Search for Spoken Dialogue Systems

Rebecca Passonneau, Susan L. Epstein, Tiziana Ligorio, Joshua B. Gordon and Pravin Bhutada

In a Wizard-of-Oz experiment with multiple wizard subjects, each wizard viewed automated speech recognition (ASR) results for utterances whose interpretation is critical to task success: requests for books by title from a library database. To avoid non-understandings, the wizard directly queried the application database with the ASR hypothesis (voice search). To learn how to avoid misunderstandings, we investigated how wizards dealt with uncertainty in voice search results. Wizards were quite successful at selecting the correct title from query results that included a match. The most successful wizard could also tell when the query results did not contain the requested title. Our learned models of the best wizard's behavior combine features available to wizards with some that are not, such as recognition confidence and acoustic model scores.

Long Papers: Fri 2:00–3:40

Machine Translation IV

Biltmore Bowl

Session Chair: Radu Soricut

Summarization

Crystal Ballroom

Session Chair: Ani Nenkova

2:00–2:25

A Direct Syntax-Driven Reordering Model for Phrase-Based Machine Translation

Niyu Ge

This paper presents a direct word reordering model with novel syntax-based features for statistical machine translation. Reordering models address the problem of reordering source language into the word order of the target language. IBM Models 3 through 5 have reordering components that use surface word information but very little context information to determine the traversal order of the source sentence. Since the late 1990s, phrase-based machine translation solves much of the local reorderings by using phrasal translations. The problem of long-distance reordering has become a central research topic in modeling distortions. We present a syntax driven maximum entropy reordering model that directly predicts the source traversal order and is able to model arbitrarily long distance word movement. We show that this model significantly improves machine translation quality.

2:25–2:50

Context-free reordering, finite-state translation

Chris Dyer and Philip Resnik

We describe a class of translation model in which a set of input variants encoded as a context-free forest is translated using a finite-state translation model. The forest structure of the input is well-suited to representing word order alternatives, making it straightforward to model translation as a two step process: (1) tree-based source reordering and (2) phrase transduction. By treating the reordering process as a latent variable in a probabilistic translation model, we can learn a long-range source reordering model without example reordered sentences, which are problematic to construct. The resulting model has state-of-the-art translation performance, uses linguistically motivated features to effectively model long range reordering, and is significantly smaller than a comparable hierarchical phrase-based translation model.

An extractive supervised two-stage method for sentence compression

Dimitrios Galanis and Ion Androutsopoulos

We present a new method that compresses sentences by removing words. In a first stage, it generates candidate compressions by removing branches from the source sentence's dependency tree using a Maximum Entropy classifier. In a second stage, it chooses the best among the candidate compressions using a Support Vector Machine Regression model. Experimental results show that our method achieves state-of-the-art performance without requiring any manually written rules.

Interpretation and Transformation for Abstracting Conversations

Gabriel Murray, Giuseppe Carenini and Raymond Ng

We address the challenge of automatically abstracting conversations such as face-to-face meetings and emails. We focus here on the stages of interpretation, where sentences are mapped to a conversation ontology, and transformation, where the summary content is selected. Our approach is fully developed and tested on meeting speech, and we subsequently explore its application to email conversations.

Semantics II

Gold Room

Session Chair: Benjamin Van Durme

Cross-lingual Induction of Selectional Preferences with Bilingual Vector Spaces

Yves Peirsman and Sebastian Padó

We describe a cross-lingual method for the induction of selectional preferences for resource-poor languages, where no accurate monolingual models are available. The method uses bilingual vector spaces to “translate” foreign language predicate-argument structures into a resource-rich language like English. The only prerequisite for constructing the bilingual vector space is a large unparsed corpus in the resource-poor language, although the model can profit from (even noisy) syntactic knowledge. Our experiments show that the cross-lingual predictions correlate well with human ratings, clearly outperforming monolingual baseline models.

No presentation

Long Papers: Fri 2:00–3:40 (cont.)

Machine Translation IV

Biltmore Bowl

2:50–3:15 **Improved Models of Distortion Cost for Statistical Machine Translation**

Spence Green, Michel Galley and Christopher D. Manning

The distortion cost function used in Moses-style machine translation systems has two flaws. First, it does not estimate the future cost of known required moves, thus increasing search errors. Second, all distortion is penalized linearly, even when appropriate re-orderings are performed. Because the cost function does not effectively constrain search, translation quality decreases at higher distortion limits, which are often needed when translating between languages of different typologies such as Arabic and English. To address these problems, we introduce a method for estimating future linear distortion cost, and a new discriminative distortion model that predicts word movement during translation. In combination, these extensions give a statistically significant improvement over a baseline distortion parameterization. When we triple the distortion limit, our model achieves a +2.32 BLEU average gain over Moses.

3:15–3:40 **Why Synchronous Tree Substitution Grammars?**
Andreas Maletti

Synchronous tree substitution grammars are a translation model that is used in syntax-based machine translation. They are investigated in a formal setting and compared to a competitor that is at least as expressive. The competitor is the extended multi bottom-up tree transducer, which is the bottom-up analogue with one essential additional feature. This model has been investigated in theoretical computer science, but seems widely unknown in natural language processing. The two models are compared with respect to standard algorithms (binarization, regular restriction, composition, application). Particular attention is paid to the complexity of the algorithms.

Summarization

Crystal Ballroom

Quantifying the Limits and Success of Extractive Summarization Systems Across Domains

Hakan Ceylan, Rada Mihalcea, Umut Özertem, Elena Lloret and Manuel Palomar

This paper analyzes the topic identification stage of single-document automatic text summarization across four different domains, consisting of newswire, literary, scientific and legal documents. We present a study that explores the summary space of each domain via an exhaustive search strategy, and finds the probability density function (pdf) of the ROUGE score distributions for each domain. We then use this pdf to calculate the percentile rank of extractive summarization systems. Our results introduce a new way to judge the success of automatic summarization systems and bring quantified explanations to questions such as why it was so hard for the systems to date to have a statistically significant improvement over the lead baseline in the news domain.

Multi-document Summarization via Budgeted Maximization of Submodular Functions

Hui Lin and Jeff Bilmes

We treat the text summarization problem as maximizing a submodular function under a budget constraint. We show, both theoretically and empirically, a modified greedy algorithm can efficiently solve the budgeted submodular maximization problem near-optimally, and we derive new approximation bounds in doing so. Experiments on DUC'04 task show that our approach is superior to the best-performing method from the DUC'04 evaluation on ROUGE-1 scores.

Semantics II

Gold Room

Unsupervised Induction of Semantic Roles

Joel Lang and Mirella Lapata

Datasets annotated with semantic roles are an important prerequisite to developing high-performance role labeling systems. Unfortunately, the reliance on manual annotations, which are both difficult and highly expensive to produce, presents a major obstacle to the widespread application of these systems across different languages and text genres. In this paper we describe a method for inducing the semantic roles of verbal arguments directly from unannotated text. We formulate the role induction problem as one of detecting alternations and finding a canonical syntactic form for them. Both steps are implemented in a novel probabilistic model, a latent-variable variant of the logistic classifier. Our method increases the purity of the induced role clusters by a wide margin over a strong baseline.

Probabilistic Frame-Semantic Parsing

Dipanjan Das, Nathan Schneider, Desai Chen and Noah A. Smith

This paper contributes a formalization of frame-semantic parsing as a structure prediction problem and describes an implemented parser that transforms an English sentence into a frame-semantic representation. It finds words that evoke FrameNet frames, selects frames for them, and locates the arguments for each frame. The system uses two feature-based, discriminative probabilistic (log-linear) models, one with latent variables to permit disambiguation of new predicate words. The parser is demonstrated to significantly outperform previously published results.

Long Papers: Fri 4:00–5:15

Machine Translation V

Biltmore Bowl

Session Chair: Yaser Al-Onaizan

Discourse

Crystal Ballroom

Session Chair: Joel Tetreault

4:00–4:25

Expected Sequence Similarity Maximization

Cyril Allauzen, Shankar Kumar, Wolfgang Macherey, Mehryar Mohri and Michael Riley

This paper presents efficient algorithms for expected similarity maximization, which coincides with minimum Bayes decoding for a similarity-based loss function. Our algorithms are designed for similarity functions that are sequence kernels in a general class of positive definite symmetric kernels. We discuss both a general algorithm and a more efficient algorithm applicable in a common unambiguous scenario. We also describe the application of our algorithms to machine translation and report the results of experiments with several translation data sets which demonstrate a substantial speed-up. In particular, our results show a speed-up by two orders of magnitude with respect to the original method of Tromble et al. (2008) and by a factor of 3 or more even with respect to an approximate algorithm specifically designed for that task. These results open the path for the exploration of more appropriate or optimal kernels for the specific tasks considered.

Detecting Emails Containing Requests for Action

Andrew Lampert, Robert Dale and Cecile Paris

Automatically finding email messages that contain requests for action can provide valuable assistance to users who otherwise struggle to give appropriate attention to the actionable tasks in their inbox. As a speech act classification task, however, automatically recognising requests in free text is particularly challenging. The problem is compounded by the fact that typical emails contain extraneous material that makes it difficult to isolate the content that is directed to the recipient of the email message. In this paper, we report on an email classification system which identifies messages containing requests; we then show how, by segmenting the content of email messages into different functional zones and then considering only content in a small number of message zones when detecting requests, we can improve the accuracy of message-level automated request classification to 83.76%, a relative increase of 15.9%. This represents an error reduction of 41% compared with the same request classifier deployed without email zoning.

4:25–4:50

Accurate Non-Hierarchical Phrase-Based Translation

Michel Galley and Christopher D. Manning

A principal weakness of conventional (i.e., non-hierarchical) phrase-based statistical machine translation is that it can only exploit continuous phrases. In this paper, we extend phrase-based decoding to allow both source and target phrasal discontinuities, which provide better generalization on unseen data and yield significant improvements to a standard phrase-based system (Moses). More interestingly, our discontinuous phrase-based system also outperforms a state-of-the-art hierarchical system (Joshua) by a very significant margin (+1.03 BLEU on average on five Chinese-English NIST test sets), even though both Joshua and our system support discontinuous phrases. Since the key difference between these two systems is that ours is not hierarchical—i.e., our system uses a string-based decoder instead of CKY, and it imposes no hard hierarchical reordering constraints during training and decoding—this paper sets out to challenge the commonly held belief that the tree-based parameterization of systems such as Hiero and Joshua is crucial to their good performance against Moses.

Evaluating Hierarchical Discourse Segmentation

Lucien Carroll

Hierarchical discourse segmentation is a useful technology, but it is difficult to evaluate. I propose an error measure based on the word error rate of Beeferman et al. (1999). I then show that this new measure not only reliably distinguishes baseline segmentations from lexically-informed hierarchical segmentations and more informed segmentations from less informed segmentations, but it also offers an improvement over previous linear error measures.

Semantics III

Gold Room

Session Chair: Dan Roth

Tree Edit Models for Recognizing Textual Entailments, Paraphrases, and Answers to Questions

Michael Heilman and Noah A. Smith

We describe tree edit models for representing sequences of tree transformations involving complex reordering phenomena and demonstrate that they offer a simple, intuitive, and effective method for modeling pairs of semantically related sentences. To efficiently extract sequences of edits, we employ a tree kernel as a heuristic in a greedy search routine. We describe a logistic regression model that uses 33 syntactic features of edit sequences to classify the sentence pairs. The approach leads to competitive performance in recognizing textual entailment, paraphrase identification, and answer selection for question answering.

Syntactic/Semantic Structures for Textual Entailment Recognition

Yashar Mehdad, Alessandro Moschitti and Fabio Massimo Zanzotto

In this paper, we describe an approach based on off-the-shelf parsers and semantic resources for the Recognizing Textual Entailment (RTE) challenge that can be generally applied to any domain. Syntax is exploited by means of tree kernels whereas lexical semantics is derived from heterogeneous resources, e.g. WordNet or distributional semantics through Wikipedia. The joint syntactic/semantic model is realized by means of tree kernels, which can exploit lexical relatedness to match syntactically similar structures, i.e. whose lexical compounds are related. The comparative experiments across different RTE challenges and traditional systems show that our approach consistently and meaningfully achieves high accuracy, without requiring any adaptation or tuning.

Long Papers: Fri 4:00–5:15 (cont.)

Machine Translation V

Biltmore Bowl

Discourse

Crystal Ballroom

Semantics III

Gold Room

4:50–5:15

Model Combination for Machine Translation

John DeNero, Shankar Kumar, Ciprian Chelba and Franz Och

Machine translation benefits from two types of decoding techniques: consensus decoding over multiple hypotheses under a single model and system combination over hypotheses from different models. We present model combination, a method that integrates consensus decoding and system combination into a unified, forest-based technique. Our approach makes few assumptions about the underlying component models, enabling us to combine systems with heterogeneous structure. Unlike most system combination techniques, we reuse the search space of component models, which entirely avoids the need to align translation hypotheses. Despite its relative simplicity, model combination improves translation quality over a pipelined approach of first applying consensus decoding to individual systems, and then applying system combination to their output. We demonstrate BLEU improvements across data sets and language pairs in large-scale experiments.

Reformulating Discourse Connectives for Non-Expert Readers

Advaith Siddharthan and Napoleon Katsos

In this paper we report a behavioural experiment documenting that different lexico-syntactic formulations of the discourse relation of “causation” are deemed more or less acceptable by different categories of readers. We further report promising results for automatically selecting the formulation that is most appropriate for a given category of reader using supervised learning. This investigation is embedded within a longer term project combining methodologies from computational and psycho-linguistics in order to summarise scientific writing for lay readers using appropriate paraphrasing.

Automatic Metaphor Interpretation as a Paraphrasing Task

Ekaterina Shutova

We present a novel approach to metaphor interpretation and a system that produces literal paraphrases for metaphorical expressions. Such a representation is directly transferable to other applications that can benefit from a metaphor processing component. Our method is distinguished from the previous work in that it does not rely on any hand-crafted knowledge about metaphor, but in contrast employs automatically induced selectional preferences. Being the first of its kind, our system is capable of paraphrasing metaphorical expressions with a high accuracy (0.81).

Workshops: Saturday

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<i>Gold</i>	WS2: Workshop on Computational Approaches to Analysis and Generation of Emotion in Text		61
<i>Emerald</i>	WS10: 5th Workshop on Innovative Use of NLP for Building Educational Applications		63
<i>Roman</i>	WS11: Second Louhi Workshop on Text and Data Mining of Health Documents (Louhi '10)		64
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WS15: 6th Web as Corpus Workshop (WAC-6)

Moroccan Room

Organizers: Adam Kilgarrieff, Dekang Lin, and Serge Sharoff

More and more people are using Web data for linguistic and NLP research. This workshop, the sixth in an annual series, provides a venue for exploring how we can use it effectively and what we will find if we do.

Session 1

- 8:30 **Introduction**
- 8:40 **NoWaC: a large web-based corpus for Norwegian**
Emiliano Raul Guevara
- 9:05 **Building a Korean Web Corpus for Analyzing Learner Language**
Markus Dickinson, Ross Israel and Sun-Hee Lee
- 9:30 **Invited talk by Patrick Pantel**

Session 2

- 11:00 **Sketching Techniques for Large Scale NLP**
Amit Goyal, Jagadeesh Jagaralamudi, Hal Daumé III and Suresh Venkatasubramanian
- 11:25 **Building Webcorpora of Academic Prose with BootCaT**
George Dillon
- 11:50 **Google Web 1T 5-Grams Made Easy (but not for the computer)**
Stefan Evert
- 12:15 **Closing session**

WS3: Computational Approaches to Linguistic Creativity (CALC-10)

Moroccan Room

Organizers: Paul Cook and Anna Feldman

It is generally agreed that creativity is an important property of human language. For example, speakers routinely coin new words, employ novel metaphors, and play with words through puns. Indeed, such creative processes take place at all levels of language from the lexicon, to syntax, semantics, and discourse. Listeners are typically able to understand creative language without any difficulties. However, generating and recognizing creative language presents a tremendous challenge for natural language processing (NLP) systems which must be able to recognize instances of linguistic creativity, and compute their meaning. Moreover, models of linguistic creativity are necessary for systems capable of generating stories, jokes, or poetry. Nevertheless, despite the importance of linguistic creativity in many NLP tasks, it still remains unclear how to model and evaluate linguistic creativity. Furthermore, research on topics related to linguistic creativity has not received a great deal of attention at major computational linguistics conferences in recent years. The goal of CALC-10 is to provide a venue for publication of research on automatic detection and understanding of creative language usage, as well as research on the generation of creative language and tools that support people in using language creatively.

1:30–1:45 **Opening remarks**

Understanding creative language

1:45–2:10 **Automatic conjugation and identification of regular and irregular verb neologisms in Spanish**

Luz Rello and Eduardo Basterrechea

2:10–2:35 **Mining and Classification of Neologisms in Persian Blogs**

Karine Megerdooomian and Ali Hadjarian

2:35–3:00 **Comparing Semantic Role Labeling with Typed Dependency Parsing in Computational Metaphor Identification**

Eric P. S. Baumer, James P. White and Bill Tomlinson

3:00–4:30 **Invited Talk**

Engineering Linguistic Creativity: Bird Flight and Jet Planes

Pablo Gervás

Generating creative language

4:40–5:05 **An alternate approach towards meaningful lyric generation in Tamil**

Ananth Ramakrishnan A and Sobha Lalitha Devi

5:05–5:30 **Representing Story Plans in SUMO**

Jeffrey Cua, Ruli Manurung, Ethel Ong and Adam Pease

5:30–5:55 **Computational Creativity Tools for Songwriters**

Burr Settles

5:55–6:00 **Closing remarks**

WS2: Workshop on Computational Approaches to Analysis and Generation of Emotion in Text

Gold Room

Organizers: Diana Inkpen and Carlo Strapparava

The automatic detection of emotions in texts and the generation of texts that express emotions is important for applications such as natural language interfaces, e-learning environments, and educational or entertainment games. These aspects are also important in opinion mining and sentiment analysis, and in the larger area of affective computing. The workshop will provide a forum for discussion between leading names and researchers involved in processing emotions in the context of natural language understanding, natural language generation, or applications in which computational approaches to the processing of emotions are useful.

9:00–9:10 **Opening**

9:10–10:00 **Invited talk**

Emotion analysis as a means of categorizing content

Oren Glickman

10:05–10:30 **Emotion Analysis Using Latent Affective Folding and Embedding**

Jerome Bellegarda

11:00–11:25 **Emotion Detection in Email Customer Care**

Narendra Gupta, Mazin Gilbert and Giuseppe Di Fabbrizio

- 11:25–11:50 **Toward Plot Units: Automatic Affect State Analysis**
Amit Goyal, Ellen Riloff, Hal Daume III and Nathan Gilbert
- 11:50–12:15 **Emotions Evoked by Common Words and Phrases: Using Mechanical Turk to Create an Emotion Lexicon**
Saif Mohammad and Peter Turney
- 2:00–2:25 **A Corpus-based Method for Extracting Paraphrases of Emotion Terms**
Fazel Keshtkat and Diana Inkpen
- 2:25–2:50 **A Text-driven Rule-based System for Emotion Cause Detection**
Sophia Yat Mei Lee, Ying Chen and Chu-Ren Huang
- 2:50–3:15 **Wishful Thinking – Finding suggestions and ‘buy’ wishes from product reviews**
J Ramanand, Krishna Bhavsar and Niranjan Pedanekar
- 3:45–4:10 **Evaluation of Unsupervised Emotion Models to Textual Affect Recognition**
Sunghwan Mac Kim, Alessandro Valitutti and Rafael A. Calvo
- 4:10–5:30 **Poster Session**
- Identifying Emotions, Intentions, and Attitudes in Text Using a Game with a Purpose**
Lisa Pearl and Mark Steyvers
- @AM: Textual Attitude Analysis Model**
Alena Neviarouskaya, Helmut Prendinger and Mitsuru Ishizuka
- Generating Shifting Sentiment for a Conversational Agent**
Simon Whitehead and Lawrence Cavedon
- Emotional Perception of Fairy Tales: Achieving Agreement in Emotion Annotation of Text**
Ekaterina P. Volkova, Betty Mohler, Detmar Meurers, Dale Gerdemann and Heinrich H. Bülthoff
- Experiments on Summary-based Opinion Classification**
Elena Lloret, Horacio Saggion and Manuel Palomar
- Recognizing Stances in Ideological On-Line Debates**
Swapna Somasundaran and Jan Wiebe
- NewsViz: Emotional Visualization of News Stories**
Eva Hanser, Paul Mc Kevitt, Tom Lunney and Joan Condell
- Sentiment Classification using Automatically Extracted Subgraph Features**
Shilpa Arora, Elijah Mayfield, Carolyn Penstein Rosé and Eric Nyberg
- Hierarchical versus Flat Classification of Emotions in Text**
Diman Ghazi, Diana Inkpen and Stan Szpakowicz

WS10: The 5th Workshop on Innovative Use of NLP for Building Educational Applications

Emerald Room

Organizers: Joel Tetreault, Jill Burstein, and Claudia Leacock

NLP-based applications in educational environments are developing at a fast pace using innovative NLP techniques - statistical, rule-based, or some combination of the two. More recently, new technologies have made it possible to include speech in both assessment and intelligent tutoring systems. NLP techniques are also being used to generate assessments and tools for curriculum development as well as tools to support assessment development. As a community we are improving existing capabilities, and identifying and generating innovative ways to use NLP in applications for writing, reading, speaking, critical thinking, and assessment development. The need for, and the rapid development of, language-based capabilities have been driven by increased requirements for state and national assessments, and a growing population of foreign and second language learners. The Workshop on Innovative Use of NLP in Building Educational Applications brings together all aspects of NLP-based educational applications to foster interaction and collaboration among researchers in both academic institutions and industry. It will expose the NLP research community to these technologies with the hope that they will continue to identify novel opportunities for the use of NLP techniques and tools in educational applications.

- 9:00–9:15 **Opening Remarks**
- 9:15–9:40 **Readability Assessment for Text Simplification**
Sandra Aluisio, Lucia Specia, Caroline Gasperin and Carolina Scarton
- 9:40–10:05 **Enhancing Authentic Web Pages for Language Learners**
Detmar Meurers, Ramon Ziai, Luiz Amaral, Adriane Boyd, Aleksandar Dimitrov, Vanessa Metcalfe and Niels Ott
- 10:05–10:30 **AutoLearn’s authoring tool: a piece of cake for teachers**
Martí Quixal, Susanne Preuß, David García-Narbona and Beto Boullosa
- 11:00–11:25 **Annotating ESL Errors: Challenges and Rewards**
Alla Rozovskaya and Dan Roth
- 11:25–11:50 **Search right and thou shalt find ... Using Web Queries for Learner Error Detection**
Michael Gamon and Claudia Leacock
- 11:50–12:10 **Rethinking Grammatical Error Annotation and Evaluation with the Amazon Mechanical Turk**
Joel Tetreault, Elena Filatova and Martin Chodorow
- 1:45–2:10 **Predicting Cloze Task Quality for Vocabulary Training**
Adam Skory and Maxine Eskenazi
- 2:10–2:35 **Generating Quantifiers and Negation to Explain Homework Testing**
Jason Perry and Chung-chieh Shan
- 2:35–3:00 **Leveraging Hidden Dialogue State to Select Tutorial Moves**
Kristy Boyer, Rob Phillips, Eun Young Ha, Michael Wallis, Mladen Vouk and James Lester
- 3:30–3:55 **Towards Using Structural Events To Assess Non-native Speech**
Lei Chen, Joel Tetreault and Xiaoming Xi

- 3:55–4:15 **A Human-Computer Collaboration Approach to Improve Accuracy of an Automated English Scoring System**
Jee Eun Kim and Kong Joo Lee
- 4:15–4:40 **Towards Identifying Unresolved Discussions in Student Online Forums**
Jihie Kim, Jia Li and Taehwan Kim
- 4:40–5:00 **Off-topic essay detection using short prompt texts**
Annie Louis and Derrick Higgins

WS11: Second Louhi Workshop on Text and Data Mining of Health Documents (Louhi '10)

Roman Room

Organizers: Hercules Dalianis, Martin Hassel, and Sumithra Velupillai

The Second Louhi Workshop on Text and Data Mining of Health Documents is a multidisciplinary international workshop, bringing together researchers performing research on health documents. Health documents encompass, but are not limited to, electronic patient records, clinical documentation, discharge letters, care guidelines, scientific text and data related to bio-health, etc. The Second Louhi conference follows Louhi '08, the First Conference on Text and Data Mining of Clinical Documents, Turku, Finland, 2008.

Session I

- 8:45–9:00 **Opening Remarks**
- 9:00–10:00 **Invited Talk**
Creating Training Material for Health Informatics: Toward a Science of Annotation
Eduard Hovy
- 10:00–10:30 **MedEval – A Swedish Medical Test Collection with Doctors and Patients User Groups**
Karin Friberg Heppin

Session II: Paper presentations

- 11:00–11:30 **Extracting Information for Generating A Diabetes Report Card from Free Text in Physicians Notes**
Ramanjot Singh Bhatia, Amber Graystone, Ross A Davies, Susan McClinton, Jason Morin and Richard F Davies
- 11:30–12:00 **Negation Detection in Swedish Clinical Text**
Maria Skeppstedt
- 12:00–12:30 **Using Domain Knowledge about Medications to Correct Recognition Errors in Medical Report Creation**
Stephanie Schreitter, Alexandra Klein, Johannes Matiassek and Harald Trost

Session III: Paper presentations

2:00–2:30 **Assessment of Utility in Web Mining for the Domain of Public Health**
Peter von Etter, Silja Huttunen, Arto Vihavainen, Matti Vuorinen and Roman Yangarber

2:30–3:00 **Reliability and Type of Consumer Health Documents on the World Wide Web: an Annotation Study**
Melanie Martin

Session IV: Poster presentations

3:00–4:00 **Automated Identification of Synonyms in Biomedical Acronym Sense Inventories**

Genevieve B. Melton, SungRim Moon, Bridget McInnes and Serguei Pakhomov

Characteristics and Analysis of Finnish and Swedish Clinical Intensive Care Nursing Narratives

Helen Allvin, Elin Carlsson, Hercules Dalianis, Riitta Danielsson-Ojala, Vidas Daudaravicius, Martin Hassel, Dimitrios Kokkinakis, Heljä Lundgren-Laine, Gunnar Nilsson, Øystein Nytrø, Sanna Salanterä, Maria Skeppstedt, Hanna Suominen and Sumithra Velupillai

Extracting Medication Information from Discharge Summaries

Scott Halgrim, Fei Xia, Imre Solti, Eithon Cadag and Özlem Uzun

Linking SweFN++ with Medical Resources, towards a MedFrameNet for Swedish

Dimitrios Kokkinakis and Maria Toporowska Gronostaj

Measuring Risk and Information Preservation: Toward New Metrics for De-identification of Clinical Texts

Lynette Hirschman and John Aberdeen

A Comparison of Several Key Information Visualization Systems for Secondary Use of Electronic Health Record Content

Francisco Roque, Laura Slaughter and Aleksandr Tkatsenko

Session V: Paper presentations

4:00–4:30 **Machine learning and features selection for semi-automatic ICD-9-CM encoding**

Julia Medori and Cédric Fairon

4:30–5:00 **Extracting Formulaic and Free Text Clinical Research Articles Metadata using Conditional Random Fields**

Sein Lin, Jun-Ping Ng, Shreyasee Pradhan, Jatin Shah, Ricardo Pietrobon and Min-Yen Kan

5:00–5:15 **Closing Remarks and information about the next Louhi workshop**

WS12: Workshop on Semantic Search (SemanticSearch 2010)

Cordoban Room

Organizers: Donghui Feng, Jamie Callan, Eduard Hovy, and Marius Paşca

Information retrieval (IR) research has been actively driven by the challenging information overload problem and many successful general-purpose commercial search engines. While the popularity of the largest search engines are a confirmation of the success and utility of IR, the identification, representation, and use of the often-complex semantics behind user queries has not yet been fully explored. In this workshop we target methods that exploit semantics in search-related tasks. One of the major obstacles in bridging the gap between IR and Natural Language Processing (NLP) is how to retain the flexibility and precision of working with text at the lexical level while gaining the greater descriptive precision that NLP provides. This workshop is meant to accelerate the pace of progress in semantic search techniques by connecting IR and NLP, bridging semantic analysis and search methodologies, and exploring the potentials of search utilizing semantics. We also focus on forming an interest group from different areas of research, exploring collaboration opportunities, providing deeper insight into bringing semantics into search, and provoking or encouraging discussions on all of its potential.

- 9:20–9:30 **Opening Remarks**
- 9:30–10:30 **Invited Talk by Ronald Kaplan**
- 11:00–11:30 **LDA Based Similarity Modeling for Question Answering**
Asli Celikyilmaz, Dilek Hakkani-Tur and Gokhan Tur
- 11:30–12:00 **Experts' Retrieval with Multiword-Enhanced Author Topic Model**
Nikhil Johri, Dan Roth and Yuancheng Tu
- 12:00–12:30 **Query-based Text Normalization Selection Models for Enhanced Retrieval Accuracy**
Si-Chi Chin, Rhonda DeCook, W. Nick Street and David Eichmann
- 1:45–2:15 **A Graph-Based Semi-Supervised Learning for Question Semantic Labeling**
Asli Celikyilmaz and Dilek Hakkani-Tur
- 2:15–3:00 **Panel Discussion**
- 3:30–3:45 **Capturing the Stars: Predicting Ratings for Service and Product Reviews**
Narendra Gupta, Giuseppe Di Fabbrizio and Patrick Haffner
- 3:45–4:00 **Object Search: Supporting Structured Queries in Web Search Engines**
Kim Pham, Nick Rizzolo, Kevin Small, Kevin Chen-Chuan Chang and Dan Roth
- 4:00–4:45 **Workshop Wrap-up Discussion**

WS13: Speech and Language Processing for Assistive Technologies

Tiffany Room

Organizers: Melanie Fried-Oken, Kathleen F. McCoy, and Brian Roark

Assistive technology (AT) supports individuals with disabilities in participating in activities that would otherwise be difficult or impossible for them. AT follows the principles of universal design, permitting access by persons with and without disabilities to make tasks simpler and more intuitive, more flexible and equitable in use, with lower physical effort and higher tolerance for errors. An important and visible category within the AT community is known as Augmentative and Alternative Communication (AAC), which is focused on multi-modal communication, including technologies for those who cannot rely on natural speech and/or writing as the primary means of expression. From providing access to web-based communication for individuals with severe motor impairments, to improving the intelligibility of output in speech generating devices, the range of AAC topics that could or should rely on speech and natural language processing (NLP) technologies is very large. Yet the number of individuals actively working within the two research communities – AT/AAC and speech/NLP – is relatively small. This workshop will bring individuals from both of these research communities together with AAC users to share research findings, and to discuss present and future challenges and the potential for collaboration and progress.

- 8:45–8:50 **Opening Remarks**
- 8:50–9:15 **Using NLG and Sensors to Support Personal Narrative for Children with Complex Communication Needs**
Rolf Black, Joseph Reddington, Ehud Reiter, Nava Tintarev and Annalu Waller
- 9:15–9:40 **Automatic generation of conversational utterances and narrative for Augmentative and Alternative Communication: a prototype system**
Martin Dempster, Norman Alm and Ehud Reiter
- 9:40–10:30 **Invited Talk**
AAC from a user’s perspective
Rick Hohn and Jan Staehely
- 11:00–11:25 **Implications of Pragmatic and Cognitive Theories on the Design of Utterance-Based AAC Systems**
Kathleen F. McCoy, Jan Bedrosian and Linda Hoag
- 11:25–11:50 **Scanning methods and language modeling for binary switch typing**
Brian Roark, Jacques de Villiers, Christopher Gibbons and Melanie Fried-Oken
- 11:50–2:10 **Lunch and Poster/Demo/Exhibit Session**
- Posters**
- A Platform for Automated Acoustic Analysis for Assistive Technology**
Suzanne Boyce, Harriet Fell, Joel MacAuslan and Lorin Wilde
- An Approach for Anonymous Spelling for Voter Write-Ins Using Speech Interaction**
Shanee Dawkins and Juan Gilbert

Using Reinforcement Learning to Create Communication Channel Management Strategies for Diverse Users

Rebecca Lunsford and Peter A. Heeman

A Multimodal Vocabulary for Augmentative and Alternative Communication from Sound/Image Label Datasets

Xiaojuan Ma, Christiane Fellbaum and Perry Cook

Demos

“How was School today...?” A Prototype System that Uses Environmental Sensors and NLG to Support Personal Narrative for Children with Complex Communication Needs

Rolf Black, Joseph Reddington, Ehud Reiter, Nava Tintarev and Annalu Waller

Interactive SIGHT Demo: Textual Summaries of Simple Bar Charts

Seniz Demir, David Oliver, Edward Schwartz, Stephanie Elzer, Sandra Carberry and Kathleen F. McCoy

Project Jumbo: Transcription as an Assistive Technology for Instant Messaging

Ira R. Forman and Allen K. Wilson

COMUNICA – A Voice Question Answering System for Portuguese

Rodrigo Wilkens, Aline Villavicencio, Leandro Wives, Daniel Muller, Fabio da Silva and Stanley Loh

2:10–2:35 **State-Transition Interpolation and MAP Adaptation for HMM-based Dysarthric Speech Recognition**

Harsh Vardhan Sharma and Mark Hasegawa-Johnson

2:35–3:00 **Towards a noisy-channel model of dysarthria in speech recognition**

Frank Rudzicz

3:30–3:55 **Collecting a Motion-Capture Corpus of American Sign Language for Data-Driven Generation Research**

Pengfei Lu and Matt Huenerfauth

3:55–4:20 **Automated Skimming System in Response to Questions for NonVisual Readers**

Debra Yarrington and Kathleen F. McCoy

4:20–5:20 **Invited Talk**

Exploiting Web Content for Augmentative Communication

Greg Lesh

5:20–5:30 **Closing Remarks**

5:30– **Open Discussion on Future Directions**

WS14: Statistical Parsing of Morphologically Rich Languages (SPMRL 2010)

Corinthian Room

Organizers: Djamé Seddah, Sandra Kübler, and Reut Tsarfaty

The availability of large syntactically annotated corpora led to an explosion of interest in statistical parsing methods, and to the development of successful models for parsing English using the Penn Treebank (PTB). When adapted to other language/treebank pairs (such as German, Hebrew, Arabic, Italian or French), these models have been shown to be considerably less successful. Morphologically rich languages (MRLs) are particularly challenging for the application of algorithms primarily designed to parse English. These algorithms focus on learning word order but they often do not take morphological information into account. Another typical problem associated with parsing MRLs is increased lexical data sparseness due to high morphological variation in surface forms. As well as technical and linguistic difficulties, lack of communication between researchers working on different MRLs can lead to a reinventing the wheel syndrome; the prominence of English parsing in the literature reduces the visibility of research aiming to solve the problems particular to MRLs. By offering a platform to this growing community of interests we hope to overcome this potential cultural obstacle.

9:00–9:15 **Opening Remarks**

Statistical Parsing of Morphologically Rich Languages (SPMRL): What, How and Whither

Reut Tsarfaty, Djamé Seddah, Yoav Goldberg, Sandra Kuebler, Yannick Versley, Marie Candito, Jennifer Foster, Ines Rehbein and Lamia Tounsi

9:15–10:30 **Dependency-based parsing of MRLs (Chair: Reut Tsarfaty)**

Improving Arabic Dependency Parsing with Lexical and Inflectional Morphological Features

Yuval Marton, Nizar Habash and Owen Rambow

Two Methods to Incorporate ‘Local Morphosyntactic’ Features in Hindi Dependency Parsing

Bharat Ram Ambati, Samar Husain, Sambhav Jain, Dipti Misra Sharma and Rajeev Sangal

Application of Different Techniques to Dependency Parsing of Basque

Kepa Bengoetxea and Koldo Gojenola

11:00–12:15 **Constituency-based parsing of MRLs (Chair: Djamé Seddah)**

Modeling Morphosyntactic Agreement in Constituency-Based Parsing of Modern Hebrew

Reut Tsarfaty and Khalil Sima'an

Factors Affecting the Accuracy of Korean Parsing

Tagyoung Chung, Matt Post and Daniel Gildea

Direct Parsing of Discontinuous Constituents in German

Wolfgang Maier

1:40–2:30 **Invited Talk (Chair: Reut Tsarfaty)**

Morphology in Statistical Machine Translation: Integrate-in or Tack-on?

Kevin Knight

- 2:30–3:00 **Improved Estimation for parsing MRLs** (Chair: Yoav Goldberg)
Handling Unknown Words in Statistical Latent-Variable Parsing Models for Arabic, English and French
Mohammed Attia, Jennifer Foster, Deirdre Hogan, Joseph Le Roux, Lamia Tounsi and Josef van Genabith
Parsing Word Clusters
Marie Candito and Djamé Seddah
- 3:30–4:45 **Rich Morphology and Lemmatisation: Short Papers and Posters** (Chair: Jennifer Foster)
Lemmatization and Lexicalized Statistical Parsing of Morphologically-Rich Languages: the Case of French
Djamé Seddah, Grzegorz Chrupała, Ozlem Cetinoglu, Josef van Genabith and Marie Candito
On the Role of Morphosyntactic Features in Hindi Dependency Parsing
Bharat Ram Ambati, Samar Husain, Joakim Nivre and Rajeev Sangal
Easy-First Dependency Parsing of Modern Hebrew
Yoav Goldberg and Michael Elhadad
- 4:45–5:45 **Discussion Panel: Dan Bikel, Julia Hockenmaier, Slav Petrov and Owen Rambow** (Chair: Sandra Kübler)
- 5:45–6:00 **Concluding remarks**

Workshops: Sunday

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<i>Cordoban</i>	WS16: Young Investigators in the Americas Workshop		83

WS8: Extracting and Using Constructions in Computational Linguistics

Corinthian Room

Organizers: Magnus Sahlgren and Ola Knutsson

A construction can be defined as a form-meaning pairing in which the components cannot entirely explain the meaning of the whole. Constructional phenomena are a diverse breed ranging from morphemes to argument structure, and constructionist theories do not give a government to any specific level of language. On the contrary, all levels are viewed as equally important. Constructions are currently enjoying considerable attention in linguistic research, and are now widely considered as being much more frequent and central to language than what has traditionally been acknowledged. Constructionist theories emphasize that the human mind seems to prefer to use prefabricated chunks of linguistic elements (i.e. constructions) when possible, instead of generating sentences from scratch as in the generative grammar approach. Constructions are also gaining a central place in different kinds of computational linguistics applications; examples include machine translation, information retrieval and extraction, tools for language learning, etc. Constructions are an interesting and important phenomenon because they constitute a middle way in the syntax-lexicon continuum, and because they show great potential in tackling infamously difficult computational linguistics tasks like sentiment analysis and language acquisition.

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|-------------|--|
| 8:45–9:00 | Introduction |
| 9:00–9:30 | Towards a Domain Independent Semantics: Enhancing Semantic Representation with Construction Grammar
Jena D. Hwang, Rodney D. Nielsen and Martha Palmer |
| 9:30–10:00 | Towards an Inventory of English Verb Argument Constructions
Matthew O'Donnell and Nick Ellis |
| 10:00–10:30 | Identifying Assertions in Text and Discourse: The Presentational Relative Clause Construction
Cecily Jill Duffield, Jena D. Hwang and Laura A. Michaelis |
| 11:00–11:30 | StringNet as a Computational Resource for Discovering and Investigating Linguistic Constructions
David Wible and Nai-Lung Tsao |
| 11:30–12:00 | Syntactic Construct : An Aid for translating English Nominal Compound into Hindi
Soma Paul, Prashant Mathur and Sushant Kishore |
| 12:00–12:30 | Automatic Extraction of Constructional Schemas
Gerhard van Huyssteen and Marelle Davel |

WS1: Active Learning for NLP (ALNLP)

Corinthian Room

Organizers: Burr Settles, Kevin Small, and Katrin Tomanek

Labeled training data is required to achieve state-of-the-art performance for many machine learning solutions to NLP tasks. While traditional supervised methods rely exclusively on existing labeled data to induce a model, active learning allows the learner to select unlabeled data for labeling in an effort to reduce annotation costs without sacrificing performance. Thus, active learning appears promising for NLP applications where unlabeled data is readily available (e.g., web pages, audio recordings, minority language data), but obtaining labels is cost-prohibitive. Ample recent work has demonstrated the effectiveness of active learning over a diverse range of applications. Despite these findings, active learning has not yet been widely adopted for many ongoing large-scale corpora annotation efforts – resulting in a dearth of real-world case studies and copious research questions. Machine learning literature has primarily focused on active learning in the context of classification, devoting less attention to issues specific to NLP including annotation user studies, incorporation of semantic information, and more complex prediction tasks (e.g. parsing, machine translation). The aim of this workshop is to foster innovation and discussion that advances our understanding in these and other practical issues for active learning in NLP.

1:00–1:15 **Introduction**

Burr Settles and Kevin Small

1:15–2:10 **Invited Talk**

Active and Proactive Machine Learning: From Fundamentals to Applications in Language Technologies and Beyond

Jaime Carbonell

Research Papers I

2:10–2:35 **Using Variance as a Stopping Criterion for Active Learning of Frame Assignment**

Masood Ghayoomi

2:35–3:00 **Active Semi-Supervised Learning for Improving Word Alignment**

Vamshi Ambati, Stephan Vogel and Jaime Carbonell

Research Papers II

3:30–3:55 **D-Confidence: An Active Learning Strategy which Efficiently Identifies Small Classes**

Nuno Escudeiro and Alipio Jorge

3:55–4:20 **Domain Adaptation meets Active Learning**

Piyush Rai, Avishek Saha, Hal Daume and Suresh Venkatasubramanian

4:20–4:55 **Parallel Active Learning: Eliminating Wait Time with Minimal Staleness**

Robbie Haertel, Paul Felt, Eric Ringger and Kevin Seppi

4:55–5:30 **Discussion**

WS4: Computational Linguistics and Writing: Writing Processes and Authoring Aids (CL&W 2010)

Roman Room

Organizers: Michael Piotrowski, Cerstin Mahlow, and Robert Dale

Writing today, whether professional, academic, or private, relies heavily on computers or other electronic devices, such as mobile phones. People compose texts in word processors, text editors, content management systems, blogs, wikis, e-mail clients, and instant messaging applications. Each of these tools supports authors in different ways. This workshop provides an overview of current developments in the area of computational linguistics for authoring aids, and an overview of recent advances in writing research. We bring together researchers from computational linguistics and writing research, to identify areas where the two areas could benefit from each other and to stimulate discussion and interdisciplinary cooperation between them.

9:00–9:15 **Opening**

Session 1

9:15–9:40 **Computational Linguistics in the Translator’s Workflow—Combining Authoring Tools and Translation Memory Systems**

Christoph Rösener

9:40–10:05 **Scientific Authoring Support: A Tool to Navigate in Typed Citation Graphs**

Ulrich Schäfer and Uwe Kasterka

10:05–10:30 **Grammaticality Judgement in a Word Completion Task**

Alfred Renaud, Fraser Shein and Vivian Tsang

Session 2

11:00–11:25 **The Design of a Proofreading Software Service**

Raphael Mudge

11:25–11:50 **A Toolkit to Assist L2 Learners Become Independent Writers**

John Milton and Vivying S.Y. Cheng

11:50–12:15 **Learning Simple Wikipedia: A Cogitation in Ascertaining Abecedarian Language**

Courtney Napoles and Mark Dredze

Session 3

1:40–2:05 **Questions Worth Asking: Intersections between Writing Research and Computational Linguistics**

Anne Ruggles Gere and Laura Aull

2:05–2:30 **Exploring Individual Differences in Student Writing with a Narrative Composition Support Environment**

Julius Goth, Alok Baikadi, Eun Ha, Jonathan Rowe, Bradford Mott and James Lester

2:30–2:55 **The Linguistics of Readability: The Next Step for Word Processing**

Neil Newbold and Lee Gillam

3:30–5:00 **Discussion**

WS5: Computational Linguistics in a World of Social Media: #SocialMedia

Gold Room

Organizers: Ben Hachey and Miles Osborne

Social Media (e.g. Twitter, blogs, forums, Facebook) has exploded over the last few years. Facebook is now the second most visited site on the Web, with Blogger being the 7th and Twitter the 13th. These sites contain the aggregated beliefs and opinions of millions of people on an epic range of topics, and in a large number of languages. The workshop is intended to be a venue for people to meet and talk about Social Media and Human Language Technologies.

Session 1: Applications in Social Media

- 9:00 **Invited Talk**
Text-Driven Forecasting
Noah Smith, Carnegie Mellon University
- 9:45 **The “Nays” Have It: Exploring Effects of Sentiment in Collaborative Knowledge Sharing**
Ablimit Aji and Eugene Agichtein
- 9:51 **An Analysis of Verbs in Financial News Articles and their Impact on Stock Price**
Robert Schumaker
- 9:57 **Detecting Word Misuse in Chinese**
Wei Liu
- 10:03 **An Information-Retrieval Approach to Language Modeling: Applications to Social Data**
Juan Huerta
- 10:09 **Towards Automatic Question Answering over Social Media by Learning Question Equivalence Patterns**
Tianyong Hao, Wenyin Liu and Eugene Agichtein
- 10:15 **Posters**

Session 2: Forums and Networks

- 11:00 **Invited Talk**
Google Wave as a Computational Linguistic Platform
Casey Whitelaw, Google
- 11:45 **Modeling Message Roles and Influence in Q&A Forums**
Jeonhyung Kang and Jihie Kim
- 11:51 **Towards Modeling Social and Content Dynamics in Discussion Forums**
Jihie Kim and Aram Galstyan
- 11:57 **Intelligent Linux Information Access by Data Mining: the ILLIAD Project**
Timothy Baldwin, David Martinez, Richard Penman, Su Nam Kim, Marco Lui, Li Wang and Andrew MacKinlay
- 12:03 **Mining User Experiences from Online Forums: An Exploration**
Valentin Jijkoun, Wouter Weerkamp, Maarten de Rijke, Paul Ackermans and Gijs Geleijnse

12:09 **Social Links from Latent Topics in Microblogs**
Kriti Puniyani, Jacob Eisenstein, Shay Cohen and Eric Xing

12:15 **Posters**

Session 3: (Micro)-Blogs and Information Tracking

1:30 **Invited Talk**

The Interaction between News and Social Media

Jochen Leidner, Thomson Reuters

2:15 **Automatic Detection of Tags for Political Blogs**

Khairun-nisa Hassanali and Vasileios Hatzivassiloglou

2:21 **Twitter in Mass Emergency: What NLP Can Contribute**

William J. Corvey, Sarah Vieweg, Travis Rood and Martha Palmer

2:27 **The Edinburgh Twitter Corpus**

Sasa Petrovic, Miles Osborne and Victor Lavrenko

2:33 **Labelling and Spatio-Temporal Grounding of News Events**

Bea Alex and Claire Grover

2:39 **Tracking Information Flow between Primary and Secondary News Sources**

Will Radford, Ben Hachey, James Curran and Maria Milosavljevic

2:45 **Detecting controversies in Twitter: a first study**

Marco Pennacchiotti and Ana-Maria Popescu

2:51 **Posters**

WS6: Computational Neurolinguistics

Moroccan Room

Organizers: Brian Murphy, Kai-Min Chang, and Anna Korhonen

Computational neurolinguistics is an emerging research area which integrates recent advances in computational linguistics and cognitive neuroscience, with the objective of developing cognitively plausible models of language and gaining a better understanding of the human language system. It builds on research in decoding cognitive states from recordings of neural activity, and computational models of lexical representations and sentence processing.

9:00–10:30 **Session I**

Invited Talk by Tom Mitchell

Learning semantic features for fMRI data from definitional text

Francisco Pereira, Matthew Botvinick and Greg Detre

11:00–12:30 **Session II**

Concept Classification with Bayesian Multi-task Learning

Marcel van Gerven and Irina Simanova

WordNet Based Features for Predicting Brain Activity associated with meanings of nouns

Ahmad Babaeian Jelodar, Mehrdad Alizadeh and Shahram Khadivi

Network Analysis of Korean Word Associations

Jaeyoung Jung, Na Li and Hiroyuki Akama

1:30–3:00 **Session III**

Detecting Semantic Category in Simultaneous EEG/MEG Recordings

Brian Murphy and Massimo Poesio

Hemispheric processing of Chinese polysemy in the disyllabic verb/noun compounds: an event-related potential study

Chih-Ying Huang and Chia-Ying Lee

An Investigation on Polysemy and Lexical Organization of Verbs

Daniel Germann, Aline Villavicencio and Maity Siqueira

Tutorial (Part 1)

3:30–5:00 **Session IV**

Tutorial (Part 2)

Acquiring Human-like Feature-Based Conceptual Representations from Corpora

Colin Kelly, Barry Devereux and Anna Korhonen

Using fMRI activation to conceptual stimuli to evaluate methods for extracting conceptual representations from corpora

Barry Devereux, Colin Kelly and Anna Korhonen

5:00–6:00 **Discussion**

WS7: Creating Speech and Text Language Data with Amazon's Mechanical Turk

Emerald Room

Organizers: Chris Callison-Burch and Mark Dredze

Amazon's Mechanical Turk is an online marketplace for work that allows you to pay people small sums of money to do "Human Intelligence Tasks" or HITs. Tasks include anything from labeling images, to listening to short pieces of audio, to researching topics on the internet, to scrubbing database records. A number of recent papers have evaluated the effectiveness of using Mechanical Turk to create annotated data for natural language processing applications. Mechanical Turk's low cost, scalable workforce opens new possibilities for annotating speech and text, and has the potential to dramatically change how we create data for human language technologies. This workshop will explore uses of Mechanical Turk for language processing research. It includes a shared task in which participants are given a budget of \$100 to spend on Mechanical Turk and to describe the results of their experience.

Morning Session

- 9:00–9:10 **Creating Speech and Language Data With Amazon's Mechanical Turk**
Chris Callison-Burch and Mark Dredze
- 9:10–10:10 **Invited Talk**
Quality control strategies for a distributed workforce
Lukas Biewald
- 10:10–10:30 **Corpus Creation for New Genres: A Crowdsourced Approach to PP Attachment**
Mukund Jha, Jacob Andreas, Kapil Thadani, Sara Rosenthal and Kathleen McKeown

Poster Session 1

- 11:00–12:30 **Clustering dictionary definitions using Amazon Mechanical Turk**
Gabriel Parent and Maxine Eskenazi
- Semi-supervised Word Alignment with Mechanical Turk**
Qin Gao and Stephan Vogel
- Rating Computer-Generated Questions with Mechanical Turk**
Michael Heilman and Noah A. Smith
- Crowdsourced Accessibility: Elicitation of Wikipedia Articles**
Scott Novotney and Chris Callison-Burch
- Document Image Collection Using Amazon's Mechanical Turk**
Audrey Le, Jerome Ajot, Mark Przybocki and Stephanie Strassel
- Using Amazon Mechanical Turk for Transcription of Non-Native Speech**
Keelan Evanini, Derrick Higgins and Klaus Zechner
- Exploring Normalization Techniques for Human Judgments of Machine Translation Adequacy Collected Using Amazon Mechanical Turk**
Michael Denkowski and Alon Lavie
- Can Crowds Build parallel corpora for Machine Translation Systems?**
Vamshi Ambati and Stephan Vogel

Turker-Assisted Paraphrasing for English-Arabic Machine Translation
Michael Denkowski, Hassan Al-Haj and Alon Lavie

Annotating Large Email Datasets for Named Entity Recognition with Mechanical Turk

Nolan Lawson, Kevin Eustice, Mike Perkowitz and Meliha Yetisgen-Yildiz

Annotating Named Entities in Twitter Data with Crowdsourcing

Tim Finin, William Murnane, Anand Karandikar, Nicholas Keller, Justin Martineau and Mark Dredze

MTurk Crowdsourcing: A Viable Method for Rapid Discovery of Arabic Nicknames?

Chiara Higgins, Elizabeth McGrath and Laila Moretto

An Enriched MT Grammar for Under \$100

Omar Zaidan and Juri Ganitkevitch

Afternoon Session 1

1:30–1:50 **Using the Amazon Mechanical Turk to Transcribe and Annotate Meeting Speech for Extractive Summarization**

Matthew Marge, Satanjeev Banerjee and Alexander Rudnicky

1:50–2:10 **Using Mechanical Turk to Annotate Lexicons for Less Commonly Used Languages**

Ann Irvine and Alexandre Klementiev

2:10–2:30 **Opinion Mining of Spanish Customer Comments with Non-Expert Annotations on Mechanical Turk**

Bart Mellebeek, Francesc Benavent, Jens Grivolla, Joan Codina, Marta R. Costa-Jussà and Rafael Banchs

2:30–2:50 **Crowdsourcing and language studies: the new generation of linguistic data**

Robert Munro, Steven Bethard, Victor Kuperman, Vicky Tzuyin Lai, Robin Melnick, Christopher Potts, Tyler Schnoebelen and Harry Tily

2:50–3:10 **Not-So-Latent Dirichlet Allocation: Collapsed Gibbs Sampling Using Human Judgments**

Jonathan Chang

Afternoon Session 2

3:30–3:50 **Collecting Image Annotations Using Amazon's Mechanical Turk**

Cyrus Rashtchian, Peter Young, Micah Hodosh and Julia Hockenmaier

3:50–4:10 **Non-Expert Evaluation of Summarization Systems is Risky**

Dan Gillick and Yang Liu

4:10–4:30 **Shedding (a Thousand Points of) Light on Biased Language**

Tae Yano, Philip Resnik and Noah A. Smith

Poster Session 2

4:00–5:00 **Evaluation of Commonsense Knowledge with Mechanical Turk**

Jonathan Gordon, Benjamin Van Durme and Lenhart Schubert

Cheap Facts and Counter-Facts

Rui Wang and Chris Callison-Burch

The Wisdom of the Crowd's Ear: Speech Accent Rating and Annotation with Amazon Mechanical Turk

Stephen Kunath and Steven Weinberger

Crowdsourcing Document Relevance Assessment with Mechanical Turk

Catherine Grady and Matthew Lease

Preliminary Experiments with Amazon's Mechanical Turk for Annotating Medical Named Entities

Meliha Yetisgen-Yildiz, Imre Solti, Fei Xia and Scott Halgrim

Tools for Collecting Speech Corpora via Mechanical-Turk

Ian Lane, Matthias Eck, Kay Rottmann and Alex Waibel

Measuring Transitivity Using Untrained Annotators

Nitin Madnani, Jordan Boyd-Graber and Philip Resnik

Amazon Mechanical Turk for Subjectivity Word Sense Disambiguation

Cem Akkaya, Alexander Conrad, Janyce Wiebe and Rada Mihalcea

Non-Expert Correction of Automatically Generated Relation Annotations

Matthew R. Gormley, Adam Gerber, Mary Harper and Mark Dredze

Using Mechanical Turk to Build Machine Translation Evaluation Sets

Michael Bloodgood and Chris Callison-Burch

Creating a Bi-lingual Entailment Corpus through Translations with Mechanical Turk: \$100 for a 10-day Rush

Matteo Negri and Yashar Mehdad

Error Driven Paraphrase Annotation using Mechanical Turk

Olivia Buzek, Philip Resnik and Ben Bederson

WS9: Formalisms and Methodology for Learning by Reading (FAM-LbR)

Tiffany Room

Organizers: Rutu Mulkar-Mehta, James Allen, Jerry Hobbs, Eduard Hovy, Bernardo Magnini, and Christopher Manning

A long term vision of Artificial Intelligence has been the development of Learning by Reading systems that can capture knowledge from naturally occurring texts, convert it into a deep logical notation, and perform reasoning on it. Such systems will build directly on mature areas of research, including Information Extraction (for picking out relevant information from the text) , Commonsense Reasoning (for deriving inferences from the knowledge acquired) , Bootstrapped Learning (for using the learned knowledge to expand the knowledge base) and Question Answering (for evaluating Learning by Reading systems) . In Natural Language Processing, statistical learning techniques have provided new solutions in various areas over in recent years. In knowledge representation and reasoning, systems have achieved impressive performance and scale. The goal of this workshop is to draw together researchers to explore several central questions. Specifically, what integration is possible between symbolic and statistical techniques for knowledge acquisition? What are the roles of commonsense knowledge and reasoning in language understanding? What are the limitations of each style of processing, and how can each exploit the complementary strengths of the other? What are appropriate evaluation metrics for Learning by Reading systems?

9:00–9:10 **Opening**

Session 1

9:10–9:30 **Machine Reading as a Process of Partial Question-Answering**
Peter Clark and Phil Harrison

9:30–9:50 **Building an end-to-end text reading system based on a packed representation**
Doo Soon Kim, Ken Barker and Bruce Porter

9:50–10:10 **Semantic Enrichment of Text with Background Knowledge**
Anselmo Peñas and Eduard Hovy

10:10–10:30 **Discussion**

Session 2

11:00–11:20 **Large Scale Relation Detection**
Chris Welty, James Fan, David Gondek and Andrew Schlaikjer

11:20–11:40 **Mining Script-Like Structures from the Web**
Niels Kasch and Tim Oates

11:40–12:00 **Open-domain Commonsense Reasoning Using Discourse Relations from a Corpus of Weblog Stories**
Matthew Gerber, Andrew Gordon and Kenji Sagae

12:00–12:20 **Discussion**

Session 3

2:00–2:20 **Semantic Role Labeling for Open Information Extraction**
Janara Christensen, Mausam, Stephen Soderland and Oren Etzioni

- 2:20–2:40 **Empirical Studies in Learning to Read**
Marjorie Freedman, Edward Loper, Elizabeth Boschee and Ralph Weischedel
- 2:40–3:00 **Learning Rules from Incomplete Examples: A Pragmatic Approach**
Janardhan Rao Doppa, Mohammad NasrEsfahani, Mohammad Sorower, Thomas G. Dietterich, Xiaoli Fern and Prasad Tadepalli

Poster Session

- 3:30–4:30 **Unsupervised techniques for discovering ontology elements from Wikipedia article links**
Zareen Syed and Tim Finin
- Machine Reading at the University of Washington**
Hoifung Poon, Janara Christensen, Pedro Domingos, Oren Etzioni, Raphael Hoffmann, Chloe Kiddon, Thomas Lin, Xiao Ling, Mausam, Alan Ritter, Stefan Schoenmackers, Stephen Soderland, Dan Weld, Fei Wu and Congle Zhang
- Analogical Dialogue Acts: Supporting Learning by Reading Analogies**
David Barbella and Kenneth Forbus
- A Hybrid Approach to Unsupervised Relation Discovery Based on Linguistic Analysis and Semantic Typing**
Zareen Syed and Evelyne Viegas
- Supporting rule-based representations with corpus-derived lexical information.**
Annie Zaenen, Cleo Condoravdi, Daniel Bobrow and Raphael Hoffmann
- PRISMATIC: Inducing Knowledge from a Large Scale Lexicalized Relation Resource**
James Fan, David Ferrucci, David Gondek and Aditya Kalyanpur
- 4:30–5:00 **Discussion**

WS16: Young Investigators in the Americas Workshop

Cordoban Room

Organizers: Ted Pedersen and Tamar Solorio

The First Young Investigators Workshop on Computational Approaches to Languages of the Americas will bring together researchers from all of the Americas who are developing human language technologies and who are interested in establishing international collaborations. We believe a more interactive community within the Americas can contribute to the advancement of the field, not only with respect to the improvement of performance on specific areas of NLP but more important, with respect to motivating the growth of its community by providing a conducive collaboration infrastructure that facilitates the active involvement of researchers in the field. The workshop program brings together researchers from Argentina, Brazil, Colombia, Costa Rica, Mexico, Uruguay and the USA. The work to be presented is of three types: research papers, project overviews and opinion papers. All presentations will describe how international collaborations can push research forward by either listing the resources and/or experience sought or what specific resources and experience can be contributed.

Session 1

- 8:45–9:00 **Opening Remarks**
- 9:00–9:30 **Computational Linguistics in Brazil: An Overview**
Thiago Pardo, Caroline Gasperin, Helena Caseli and Maria das Graças Nunes
- 9:30–10:00 **Data-driven computational linguistics at FaMAF-UNC, Argentina**
Laura Alonso Alemany and Gabriel Infante-Lopez
- 10:00–10:30 **Variable-Length Markov Models and Ambiguous Words in Portuguese**
Fabio Natanael Kepler and Marcelo Finger

Session 2

- 11:00–11:30 **Using Common Sense to generate culturally contextualized Machine Translation**
Helena de Medeiros Caseli, Bruno Akio Sugiyama and Junia Coutinho Anacleto
- 11:30–12:30 **Poster Session**
- Human Language Technology for Text-based Analysis of Psychotherapy Sessions in the Spanish Language**
Horacio Saggion, Elena Stein-Sparvieri, David Maldavsky and Sandra Szasz
- Computational Linguistics in Costa Rica: an overview**
Jorge Antonio Leoni de León
- Fostering Digital Inclusion and Accessibility: The PorSimples project for Simplification of Portuguese Texts**
Sandra Aluisio and Caroline Gasperin
- Opinion Identification in Spanish Texts**
Aiala Rosá, Dina Wonsever and Jean-Luc Minel

A Machine Learning Approach for Recognizing Textual Entailment in Spanish

Julio Castillo

The emergence of the modern concept of introspection: a quantitative linguistic analysis

Iván Raskovsky, Diego Fernández Slezak, Carlos Diuk and Guillermo A. Cecchi

Combining CBIR and NLP for Multilingual Terminology Alignment and Cross-Language Image Indexing

Diego Burgos

IRASubcat, a highly parametrizable, language independent tool for the acquisition of verbal subcategorization information from corpus

Ivana Romina Altamirano and Laura Alonso Alemany

The TerminiNet Project: an Overview

Ariani Di Felippo

Automated Detection of Language Issues Affecting Accuracy, Ambiguity and Verifiability in Software Requirements Written in Natural Language

Allan Berrocal Rojas and Elena Gabriela Barrantes Sliesarieva

Recognition and extraction of definitional contexts in Spanish for sketching a lexical network

Cesar Aguilar, Olga Acosta and Gerardo Sierra

Session 3

2:00–2:30 **Computational Linguistics for helping Requirements Elicitation: a dream about Automated Software Development**

Carlos Mario Zapata Jaramillo

2:30–3:00 **Text Generation for Brazilian Portuguese: the Surface Realization Task**

Eder Novais, Thiago Tadeu and Ivandre Paraboni

Session 4

3:30–4:00 **Dialogue Systems for Virtual Environments**

Luciana Benotti, Paula Estrella and Carlos Areces

4:00–5:00 **Panel: Challenges and Opportunities for Conducting Research and Forming Collaborations in the Americas**

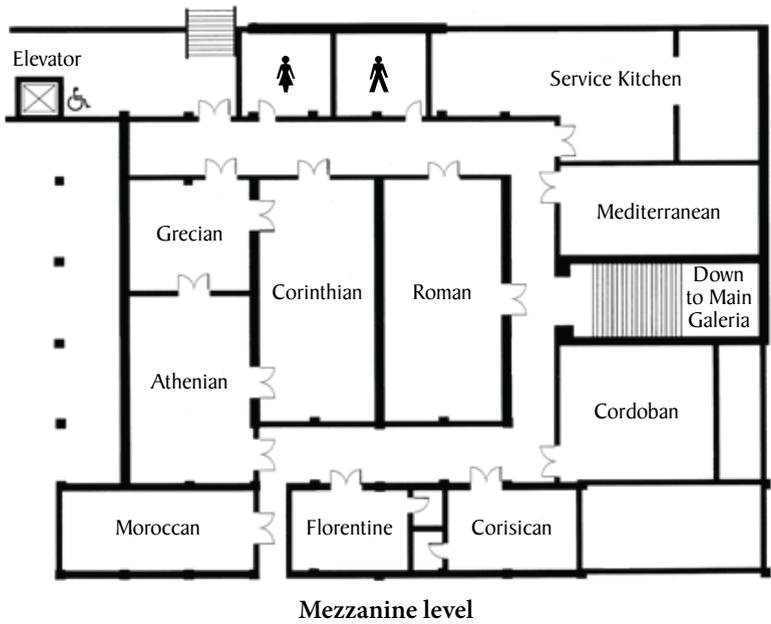
5:00–5:30 **Concluding Discussion**

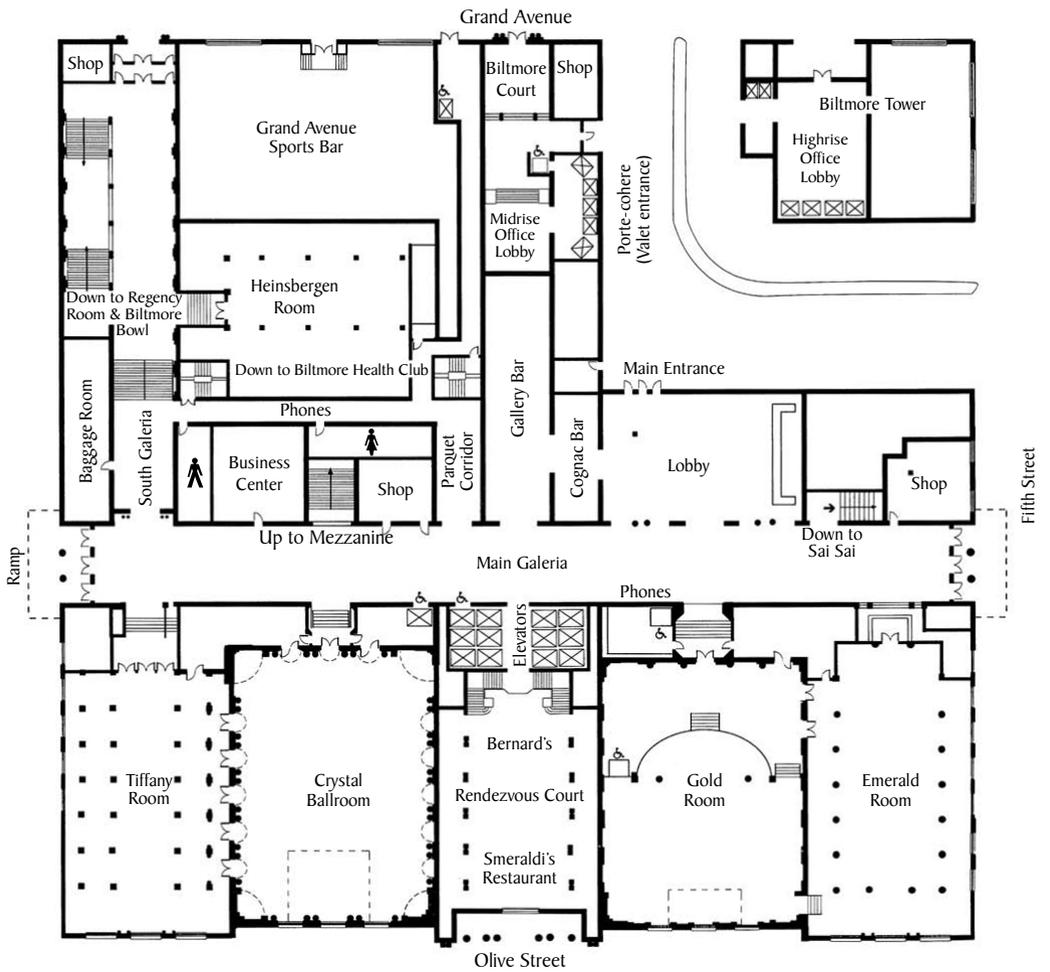
Conference Facilities

Meeting Rooms Main conference events will be held in the meeting rooms on the ground floor as well as the Biltmore Bowl and Regency Room, which are downstairs from the South Galeria. Some smaller workshops will be held on the Mezzanine level, which you can get to by stairs off of the Main Galeria.

Internet Access Wireless Internet access is available in the areas outside the meeting rooms. To access it, connect to the network and open a web browser. You should be directed to a screen saying “Welcome to Millennium Biltmore.” Click on the button which reads “Connect to Internet,” and you will be taken to a “Terms and Conditions” page. After agreeing, you will be able to use the Internet.

Business Center The self-service business center is open 24 hours and offers computer stations with Internet access as well as printers, color photocopy and fax machines.





Ground level

Los Angeles

Downtown Los Angeles is arranged in an easy-to-navigate grid. The layout and names of the most of the streets here date back to the days when this was a Spanish colony (it is said that the odd angle of the street grid was the king's idea, to take full advantage of the weather). See the inside back cover for a map; for a larger and more detailed map, visit maps.cartifact.com.

Below is a list of places to eat, drink, and visit near the conference and beyond. Some are popular destinations, and some are our personal favorites. Your guides are: DC = David Chiang; JM = Jonathan May; JR = Jason Riesa.

You can walk to all of the places listed on pages 87–90. But, as in all major American cities, do walk with friends after dark, and use common sense about where to explore. In the downtown area, the blocks west of Main St and the blocks north of 3rd St should generally be safe.

There are multiple public transportation options. The underground Red and Purple Lines (www.metro.net) both stop at Pershing Square Station, which is very close to the conference. They also stop at 7th Street/Metro Center Station, close to the Milner Hotel. The Red Line goes out to Hollywood and the Purple Line goes out to Koreatown. The fare is \$1.25.

There are two bus systems serving downtown. The DASH bus (www.ladottransit.com/dash) runs every 8 minutes and only costs 25 cents. The DASH A and B lines run on weekdays until 6:30 pm; the DASH Downtown Discovery (DD) line runs on weekends until 5 pm. The bus stops we think you are most likely to use are shown on the map. The Metro bus system (www.metro.net) goes everywhere and costs \$1.25. The red buses (numbers of the form 7nn) are faster and more frequent than the orange ones.

Pershing Square (near the conference)

Smeraldi's Ristorante (in the Biltmore Hotel). Italian. Lunch only. \$15 buffet.

Rendezvous Court (in the Biltmore Hotel). Afternoon tea Wed–Sat 2–5 pm. Italian-style steak at dinner.

Sandwich Shop 531 W 6th St (at Grand). The sandwiches (e.g., bulgogi cheesesteaks) are more interesting than the name. Lunch only. \$10.

Water Grill 544 S Grand Av. High-end seafood. Michelin one-star.

Caravan Book Store 550 S Grand Av. Old-school used bookshop, open since 1954. The last vestige of what was once “Book Row.”

Los Angeles Conservancy 523 W 6th St. Historical tours of downtown Los Angeles on Saturday mornings. \$10. Some tours require reservations.

Loose Leaf 630 W 6th St (at Hope). Build your own salad. \$10.

Library Bar 630 W 6th St (at Hope). Bar with books, just like the name says. Happy hour Mon–Fri 3–8pm.

Cicada Restaurant 617 S Olive St. Italian restaurant in an Art Deco building from the 1920s. Swing dancing on Sunday evenings.

Olive Bistro 619 S Olive St. Inexpensive Italian. \$10. Lunch only.

Bottega Louie 700 S Grand Av. Trendy, noisy Italian restaurant with adjoining gourmet market. Watch them toss the pizza dough nearly up to the 20-foot ceiling. \$30. (DC)

Seven Grand 515 W 7th St (at Grand). 271 whiskies. Challenge Kevin to a game of pool.

Multiple locations

Farmers Market 532 S Olive St (Wed lunch); 7th St and Figueroa St (Thu lunch); 333 S Hope St (Fri lunch). Wide assortment of food, snacks, produce.

Mendocino Farms 300 S Grand Av (in California Plaza); 444 S Flower St. Interesting sandwiches, locally grown ingredients. \$10–15.

Bunker Hill (north)

Casa Cocina y Cantina 350 S Grand Av (in California Plaza). Modern Mexican. Happy hour weekdays 3:30–6:30 pm. Private rooms for groups. \$10–\$20.

Starry Kitchen 350 S Grand Av (in California Plaza). Pan-Asian bánh mì (Vietnamese sandwiches) and wraps. Lunch Mon–Fri only. \$10.

Mixt Greens 350 S Grand Av (in California Plaza). Best salads in LA. Organic, sustainable, local ingredients. Lunch Mon–Fri only. \$10.

Nick & Stef's Steakhouse 330 S Hope St.

Museum of Contemporary Art 250 S Grand Av. Primarily American and European contemporary art from 1940–1980.

Angels Flight Newly-reopened funicular railway, with two cars dating from 1901 that go up and down Bunker Hill. 25 cents. (JM)

Patina 141 S Grand Av. Contemporary French. Michelin one-star.

Walt Disney Concert Hall 111 S Grand Av. The famous Frank Gehry design. The rooftop garden is open to the public.

Music Center 135 N Grand Av. Opera at the Dorothy Chandler Pavilion (currently playing: Wagner's complete Ring cycle) and musicals at the Ahmanson Theatre (currently playing: *South Pacific*; see the registration desk for a discount code).

Financial District (west)

Ciudad 445 S Figueroa St. Tapas from all over the Latin world. Highlights include Peruvian ceviche and Argentine empanadas. \$10 “quick lunch” menu Mon–Fri. Dinner \$25. (JR)

Chaya 525 S Flower St. Japanese-French fusion. \$30–\$40.

Drago Centro 525 S Flower St. High-end Italian. \$30–\$40.

The Standard 550 S Flower St. Go at night to lounge or dance on the roof of this strangely hip hotel. A \$20 cover gets you million-dollar views under the lights of downtown. (JR)

Daily Grill 612 S Flower St. Big menu with American staples. Lunch \$15, dinner \$30.

Engine Company No. 28 644 S Figueroa St (at Wilshire Blvd). A restored former Los Angeles Fire Station built in 1912 serving food based on traditional American firehouse cooking.

George’s Greek Cafe 735 S Figueroa St (in 7+Fig). Good Greek food; gyros, salads. \$10. (JR)

Morton’s The Steakhouse 735 S Figueroa St (in 7+Fig). Posh steak house. \$40. (JM)

South Park (south)

Colori Kitchen 429 W 8th St (at Olive). Italian, small and very casual. Great pasta. Lunch Mon–Fri, dinner Wed–Sat. \$20. (DC)

Gill’s Cuisine 838 S Grand Av (inside the Stillwell Hotel). Decent Indian food. \$15. (JM)

Wood Spoon 107 W 9th St (at Main/Spring). Brazilian. Specialties are Brazilian chicken pot pie and pork burger.

Yojie Japanese Fondue and Sake Bar 501 W Olympic Blvd (between Grand and Hope). Shabu shabu (cook your own soup at the table).

The Original Pantry Cafe 877 S Figueroa St (at 9th St). Classic 24-hour diner open since 1924. Cash only.

Rivera 1050 S Flower St. Latin American. Handmade tortillas “raised to the level of haute cuisine.” Special armchairs designed for drinking tequila.

Grammy Museum 800 W Olympic Blvd (at Figueroa, in L.A. Live). See Michael Jackson’s glove or record your own song.

Lucky Strike 800 W Olympic Blvd (in L.A. Live). 18 bowling lanes, 14 big screens, and up to 12 people per lane.

Historic core (east)

Pitfire Pizza 108 W 2nd St (at Main). Wood-fired ovens, tasty handmade pizzas. \$10.

Grand Central Market 317 S Broadway. A dizzying array of small stalls, with everything from tacos to sushi to Hawaiian BBQ. Ana Maria's and Tacos Tumbros a Tomas are said to have good Mexican food. \$10. (JM)

Lost Souls Cafe 124 W 4th St (Harlem Place Alley). Little cafe that also hosts DJs, art shows, poetry readings.

Blossom 426 S Main St. Vietnamese.

The Gorbals 501 S Spring St. Scottish-Jewish cuisine opened by the winner of *Top Chef*.

Spring for Coffee 548 S Spring St.

The Must 118 W 5th St (at Spring). Wine bar.

Nickel Diner 524 S Main St. 1950s style diner, home of the Maple Glaze Bacon Donut. Closed Mondays and dinner on Sundays.

Cole's French Dip 118 E 6th St (at Main). Claims to have invented the French dip sandwich.

The Varnish 118 E 6th St (at Main, inside Cole's). The little-known bar within a bar. Knock on the black door adorned with a single martini glass and be transported to a smart, classic speakeasy. (JR)

Syrup Desserts 611 S Spring St. Ice cream, coffee & tea, crepes, chocolate, waffles, sweet grilled cheese, all in a variety of interesting flavors. Open until midnight. (JR)

Clifton's Cafeteria 648 S Broadway. Quirky cafeteria with hundreds of food options at very cheap prices, served in uniquely decorated rooms. \$10. (JM)

Paeteria La Michoacana 306 W 7th St (at Broadway). Korean owned Mexican popsicle shop.

Bradbury Building 304 S Broadway. "One of the great interiors of L.A. Outside it doesn't look like much, but when you walk inside, suddenly you're back 120 years."

Little Tokyo/Arts District

You can walk to Little Tokyo in about 25 minutes (go east to Hill St, north to 1st or 2nd St, east until you see signs in Japanese). You can also take the Gold Line or the DASH bus A or DD; or the DASH bus B to Temple St and Los Angeles St and walk a few blocks.

Daikokuya 327 E 1st St (between San Pedro and Central). According to some, the best ramen in the city. Especially if you like pork belly. Best to go in a group of 4 or fewer and be prepared for a wait. \$10. (DC)

Honda Ya Izakaya 333 S Alameda St (inside the Little Tokyo Mall). An izakaya is something like Japanese tapas with beer. Dinner only, open until 1am, closed Mondays. \$20. (DC)

Sushi Gen 422 E 2nd St (at Alameda, in a strip mall). Good sushi, very popular. Closed Sunday. \$30. (DC)

Japanese American National Museum 361 E 1st St. Excellent museum chronicling the history of Japanese Americans particularly in southern California. (DC)

Lazy Ox Canteen 241 S San Pedro St. Gastropub. Try the paleron with kumquat.

Wurstküche 800 E 3rd St (at Traction). Bar serving all kinds of sausages and beers. Get the french fries with curry ketchup. \$15. (DC)

Pueblo/Chinatown

Take the Red/Purple Line to Union Station or the DASH bus B or DD.

Olvera Street Just across Alameda St from Union Station. The birthplace of the city, now a (touristy) Mexican marketplace. (The Chinese-American Museum marks the fact that Chinatown was once located here.)

Philippe The Original 1001 N Alameda St (at Ord, close to Union Station). Claims to have invented the French dip sandwich. Try the lamb, double dipped. \$10. (DC)

JR Bistro 750 N Hill St (between Ord and Alpine). Good mostly Cantonese food. Open late. \$10–15. (DC)

Ocean Seafood 750 N Hill St (between Ord and Alpine). Dim sum at lunch time.

The following restaurants are further north in Chinatown. If you're taking the Metro, you might consider taking the Gold Line to the Chinatown stop.

New Dragon Seafood Restaurant 924 N Hill St (north of College). Known for their wonton noodle soup. The other food is good too. \$10. (DC)

Phở 87 1019 N Broadway (at Cottage Home). Solid bowl of Phở (Vietnamese noodle soup). \$10, cash only. (DC)

Further west

Langer's Delicatessen 704 S Alvarado St (Red/Purple Line: Westlake/MacArthur). Classic Jewish deli. You will not find a better pastrami sandwich elsewhere in this city, and some say it rivals any found in New York or Miami. Lunch only. \$15. (JM) "Now even New Yorkers can discover what pastrami is supposed to taste like" (Jonathan Gold).

A few subway stops west is Koreatown, which has, as one might expect, a lot of Korean restaurants; a couple that are near the Wilshire/Vermont station are:

Soowon Galbi Korean BBQ 856 S Vermont. Grill your own meat at the table.

Kobawoo 698 S Vermont Av. Specializes in bossam, pork belly with turnip kimchi wrapped in lettuce.

Many well-known neighborhoods lie further to the west: the Miracle Mile (museums and shopping), Beverly Hills, Westwood, Santa Monica. Unfortunately the subway does not yet extend that far west, but the 720 bus (picks up at 5th at Grand, northwest corner) goes through all these neighborhoods.

Further east

East Los Angeles, home to a large Latino community, is accessible by the Gold Line. The following restaurants are next to the Mariachi Plaza stop:

La Serenata de Garibaldi 1842 E 1st St. Apparently Mayor Villaraigosa's favorite along the Gold Line.

Birrieria Jalisco 1845 E 1st St. Nothing but birria (goat).

La Placita del D. F. 1859 E 1st St. Pambazos (sandwich on bread dipped in red chile sauce) and more.

Still further east is the San Gabriel Valley, a conglomeration of suburbs that boasts the most authentic Chinese food in the country. Convince a local to take you; or else catch the 770 bus (Olive at 5th, southeast corner) and ride for 40 minutes to Monterey Park. This bus will go along Atlantic then Garvey, passing many excellent restaurants, for example:

Elite Restaurant 700 S Atlantic. Currently regarded to be the best dim sum around. No carts, though—those are so passé.

Mandarin Deli a.k.a. 真好吃 728 S Atlantic. Northern-style handmade dumplings and noodles (try the knife-shaved noodles). (DC)

Happy Family 111 N Atlantic. Chinese vegetarian. Even carnivores will enjoy eating the fake meat. (DC)

JJ Hong Kong Cafe 447 W Garvey Av. Hong Kong style cafe (= hundreds of menu items, both Chinese and Western). Open late. (DC)

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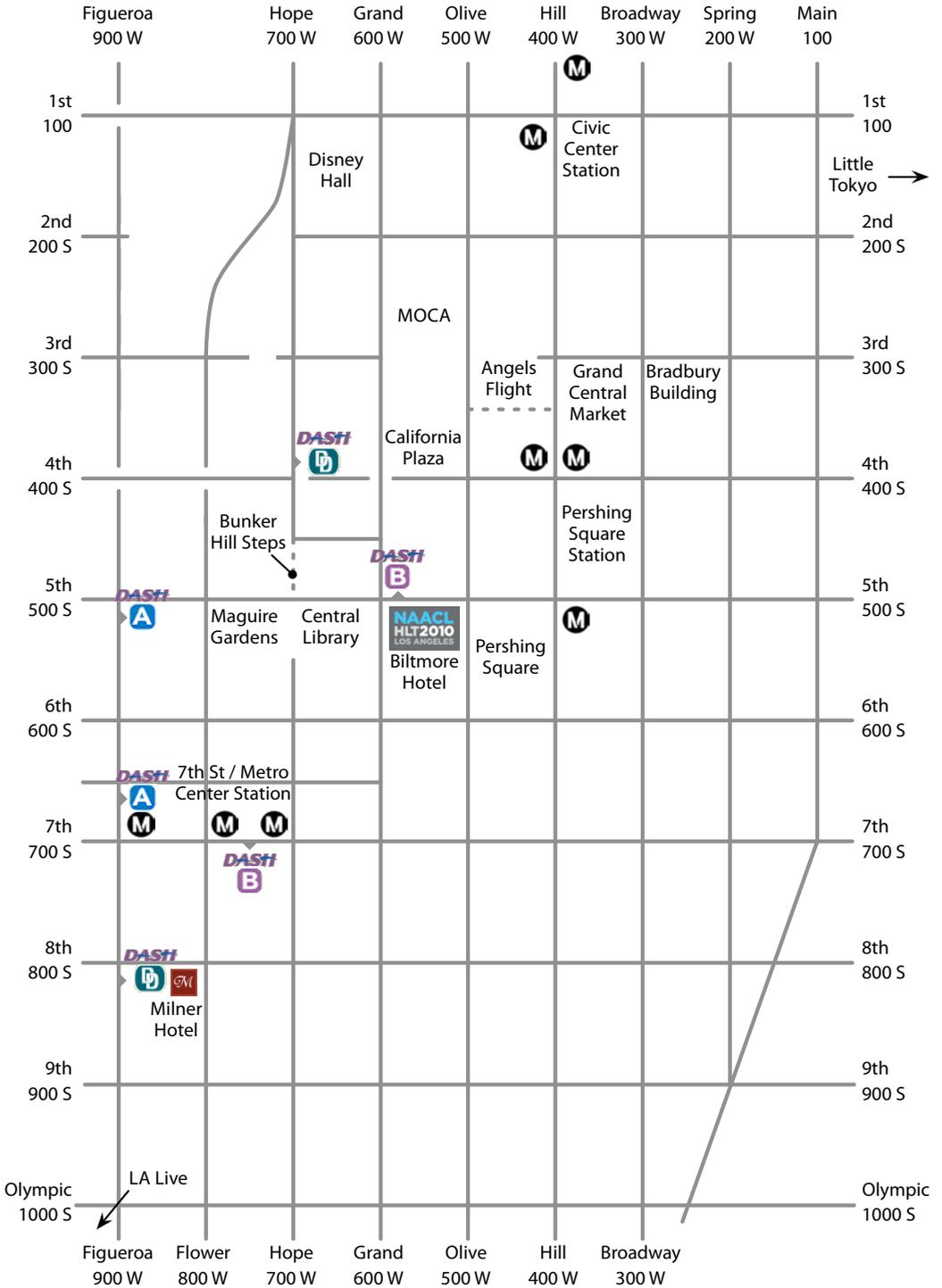


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