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Introduction

Welcome to IWCS 2015. IWCS is about all computational aspects of natural language semantics, and in this year's meeting we have a good representative subset thereof. This is reflected in the thematic structure of the sessions. On the one side, we have a range of papers on the statistical approaches to language: lexical, probabilistic, and distributional semantics (8 papers in total); on the other side, there are the formal logical and grammatical models of meaning (5 papers in total); we also have a number discussing the dynamic and incremental aspects of meaning in discourse and dialogue (9 papers in total). The short paper selection extends these topics in many different interesting directions, from quantifiers and compounds to multilinguality, crowdsourcing, and the combination of natural language with other modalities such as image and sound.

Our three keynote speakers also embody the range of approaches in today's natural language semantics world: Prof. Bengio's work shows how statistical models can become deeply embedded, with layers of meaning learnt by neural nets; Prof. Copestake shows the state of the art on compositionality in generative logical models and their corresponding automated tools; and last but not least, Prof. Barzilay's work shows how the meaning of language can be grounded in and learnt from tasks in order to control computer programs and guide intelligent software.

In total we accepted 22 long papers (36% of the submissions received) and 12 short papers (72%). The long papers will be presented in eight thematic sessions across the three days, with each day starting with a keynote talk. Along the way, we will also have poster session for the short papers, with each introduced by a lightning talk beforehand. We also have an afternoon for an open space (or "unconference") event, to allow anyone to propose and discuss topics that interest them. We enjoyed this approach at IWCS 2013 and hope you find it equally stimulating this time.

Before the conference, we have five workshops on various aspects of computational semantics: annotation, modality, ontologies, dialogue, and distributional semantics. This year, we also have a Hackathon preceding the main meeting and its workshops. This is a two day event, sponsored by a mix of academia and industry, where programmers from both venues gather to tackle three main tasks, also representative of the topics covered by the main meeting.

On the social side, we have a reception at Queen Mary's own Italian restaurant (Mucci's) at the end of the first day, and a dinner on a river boat cruising the Thames at the end of the second day. We hope you enjoy the conference!

Matthew Purver, Mehrnoosh Sadrzadeh and Matthew Stone

Organisation

Conference Chairs:

Matthew Purver, Queen Mary University of London
Mehrnoosh Sadrzadeh, Queen Mary University of London
Matthew Stone, Rutgers University

Local organization:

Local Chairs: Matthew Purver, Mehrnoosh Sadrzadeh
Website and Hackathon: Dmitrijs Milajevs
Proceedings and Handbook: Dimitri Kartsaklis
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Invited Speakers

Regina Barzilay, Massachusetts Institute of Technology:

Semantics of Language Grounding

Abstract: In this talk, I will address the problem of natural language grounding. We assume access to natural language documents that specify the desired behaviour of a control application. Our goal is to generate a program that will perform the task based on this description. The programs involve everything from changing the privacy settings on your browser, playing computer games, performing complex text processing tasks, to even solving math problems. Learning to perform tasks like these is complicated because the space of possible programs is very large, and the connections between the natural language and the resulting programs can be complex and ambiguous. I will present methods that utilize semantics of the target domain to reduce natural language ambiguity. On the most basic level, executing the induced programs in the corresponding environment and observing their effects can be used to verify the validity of the mapping from language to programs. We leverage this validation process as the main source of supervision to guide learning in settings where standard supervised techniques are not applicable. Beyond validation feedback, we demonstrate that using semantic inference in the target domain (e.g., program equivalence) can further improve the accuracy of natural language understanding.

Yoshua Bengio, Université de Montréal:

Deep Learning of Semantic Representations

Abstract: The core ingredient of deep learning is the notion of distributed representation. This talk will start by explaining its theoretical advantages, in comparison with non-parametric methods based on counting frequencies of occurrence of observed tuples of values (like with n-grams). The talk will then explain how having multiple levels of representation, i.e., depth, can in principle give another exponential advantage. Neural language models have been extremely successful in recent years but extending their reach from language modelling to machine translation is very appealing because it forces the learned intermediate representations to capture meaning, and we found that the resulting word embeddings are qualitatively different. Recently, we introduced the notion of attention-based neural machine translation, with impressive results on several language pairs, and these results will conclude the talk.

Ann Copestake, University of Cambridge:

Is There Any Logic in Logical Forms?

Abstract: Formalising the notion of compositionality in a way that makes it meaningful is notoriously complicated. The usual way of formally describing compositional semantics is via a version of Montague Grammar but, in many ways, MG and its successors are inconsistent with the way semantics is used in computational linguistics. As computational linguists we are rarely interested in model-theory or truth-conditions. Our assumptions about word meaning, and distributional models in particular, are very different from the MG idealisation. However, computational grammars have been constructed which produce empirically useful forms of compositional representation and are much broader in coverage than any grammar fragments from the linguistics literature. The methodology which underlies this work is predominantly syntax-driven (e.g., CCG, LFG and HPSG), but the goal has been to abstract away from the language-dependent details of syntax. The question, then, is whether this is 'just engineering' or whether there is some theoretical basis which is more consistent with CL than the broadly Montogovian approach. In this talk, I will start by outlining some of the work on compositional semantics with large-scale computational grammars and

in particular work using Minimal Recursion Semantics (MRS) in DELPH-IN. There are grammar fragments for which MRS can be converted into a logical form with a model-theoretic interpretation but I will argue that attempting to use model theory to justify the MRS structures in general is inconsistent with the goals of grammar engineering. I will outline some alternative approaches to integrating distributional semantics with this framework and show that this also causes theoretical difficulties. In both cases, we could consider inferentialism as an alternative theoretical grounding whereby classical logical properties are treated as secondary rather than primary. In this view, it is important that our approaches to compositional and lexical semantics are consistent with uses of language in logical reasoning, but it is not necessary to try and reduce all aspects of semantics to logic.

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Regina Barzilay

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11:00–12:30 **Lexical Semantics**

11:00–11:30 *Leveraging a Semantically Annotated Corpus to Disambiguate Prepositional Phrase Attachment*
Guy Emerson and Ann Copestake

11:30–12:00 *Prepositional Phrase Attachment Problem Revisited: how Verbnet can Help*
Daniel Bailey, Yuliya Lierler and Benjamin Susman

12:00–12:30 *From Adjective Glosses to Attribute Concepts: Learning Different Aspects That an Adjective Can Describe*
Omid Bakhshandh and James Allen

12:30–13:00 ***Lightning talks***

13:00–14:00 ***Lunch***

Wednesday 15th (continued)

14:00–15:30 Poster Session (short papers)

Exploiting Fine-grained Syntactic Transfer Features to Predict the Compositionality of German Particle Verbs
Stefan Bott and Sabine Schulte im Walde

Multilingual Reliability and "Semantic" Structure of Continuous Word Spaces
Maximilian Köper, Christian Scheible and Sabine Schulte im Walde

Clarifying Intentions in Dialogue: A Corpus Study
Julian J. Schlöder and Raquel Fernandez

From distributional semantics to feature norms: grounding semantic models in human perceptual data
Luana Fagarasan, Eva Maria Vecchi and Stephen Clark

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Max Kisselew, Sebastian Padó, Alexis Palmer and Jan Šnajder

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Jakub Szymanik and Camilo Thorne

Sound-based distributional models
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Alignment of Eye Movements and Spoken Language for Semantic Image Understanding
Preethi Vaidyanathan, Emily Prud'hommeaux, Cecilia O. Alm, Jeff B. Pelz and Anne R. Haake

From a Distance: Using Cross-lingual Word Alignments for Noun Compound Bracketing
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Unsupervised Learning of Coherent and General Semantic Classes for Entity Aggregates
Henry Anaya-Sánchez and Anselmo Peñas

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Wednesday 15th (continued)

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Daoud Clarke and Bill Keller

17:30–18:00 *On the Proper Treatment of Quantifiers in Probabilistic Logic Semantics*
Islam Beltagy and Katrin Erk

Thursday 16th

09:30–10:30 *Invited Talk 2: Deep Learning of Semantic Representations*
Yoshua Bengio

10:30–11:00 ***Coffee***

Thursday 16th (continued)

11:00–12:30 Distributional Methods

11:00–11:30 *Mr Darcy and Mr Toad, gentlemen: distributional names and their kinds*
Aurélie Herbelot

11:30–12:00 *Feeling is Understanding: From Affective to Semantic Spaces*
Elias Iosif and Alexandros Potamianos

12:00–12:30 *Automatic Noun Compound Interpretation using Deep Neural Networks and Word Embeddings*
Corina Dima and Erhard Hinrichs

12:30–13:30 ***Lunch***

13:30–15:00 Reference and Incrementality

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Julie Hunter, Nicholas Asher and Alex Lascarides

14:00–14:30 *A Discriminative Model for Perceptually-Grounded Incremental Reference Resolution*
Casey Kennington, Livia Dia and David Schlangen

14:30–15:00 *Incremental Semantics for Dialogue Processing: Requirements, and a Comparison of Two Approaches*
Julian Hough, Casey Kennington, David Schlangen and Jonathan Ginzburg

15:00–15:30 ***Coffee***

15:30–18:00 ***Open Space Event***

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Ann Copestake

10:30–11:00 ***Coffee***

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