

NAACL HLT 2018

**Spatial Language Understanding
(SpLU-2018)**

Proceedings of the First International Workshop

June 6, 2018
New Orleans, Louisiana

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Introduction

The SpLU-2018 is the first international workshop on spatial language understanding. One of the essential functions of natural language is to express spatial relationships between objects. Linguistic constructs can encode highly complex, relational structures of objects, spatial relations between them, and patterns of motion through space relative to some reference point. Spatial language understanding is useful in many areas of research endeavors relating to and/or making use of human language, including robotics, navigation, geographic information systems, traffic management, natural language understanding and translation, and query answering systems. Compared to other semantically specialized linguistic tasks, standardizing tasks related to spatial language seems to be more challenging as it is harder to obtain an agreeable set of concepts and relationships and a formal spatial meaning representation that is domain independent, as an example this could be compared to temporal relations. This has made research results on spatial language learning and reasoning diverse, task-specific and, to some extent, not comparable. While formal meaning representation is a general issue for language understanding, formalizing spatial concepts and building formal reasoning models based on those constitute challenging research problems with a wealth of prior foundational research that can be exploited and linked to language understanding. Existing qualitative and quantitative representation and reasoning models can be used for investigation of interoperability of machine learning and reasoning over spatial semantics. Research endeavors in this area could provide insights into many challenges of language understanding in general. Spatial semantics is also very well-connected and relevant to visualization of natural language, central to dealing with configurations in the physical world and motivating a combination of vision and language for richer spatial understanding. This workshop aims to highlight some of the above aspects of computational spatial language understanding including the following four areas: 1) Spatial Language Meaning Representation (Continuous, Symbolic) 2) Spatial Language Learning 3) Spatial Language Reasoning 4) Combining Vision and Language for Spatial Understanding.

This year we accepted eight papers covering various aspects of spatial language understanding, including semantic analysis of the usage of spatial language, metaphorical usage of spatial language, how spatial concepts are formalized in FrameNet, understanding spatial language for environments like block world and spatial description generation in a dialogue system given a multi-modal setting, generation of large-scale annotated corpora with spatial concepts and primitives, machine learning models for spatial information extraction and resolving anaphora in spatial relations. We have invited two internationally recognized speakers and organized a panel including the senior members of our organizing and program committee to discuss the key-points and issues raised during the workshop.

Finally, we would like to thank all programming committee members, speakers, and authors. We are looking forward to seeing you in New Orleans.

Organizers:

Parisa Kordjamshidi, Tulane University, Florida Institute for Human and Machine Cognition
Archna Bhatia, Florida Institute for Human and Machine Cognition
James Pustejovsky, Brandeis University
Marie-Francine Moens, KU Leuven

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Bruno Martins, University of Lisbon
Mari Broman Olsen, Microsoft
Clare Voss, ARL
Umar Manzoor, Tulane University

Invited Speaker:

Anthony G. Cohn, University of Leeds
James F. Allen, Florida Institute for Human and Machine Cognition, University of Rochester

Panelists:

James Pustejovsky, Brandeis University
Marie-Francine Moens, KU Leuven
James F. Allen, Florida Institute for Human and Machine Cognition, University of Rochester
Bonnie Dorr, Florida Institute for Human and Machine Cognition
Anthony G. Cohn, University of Leeds

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Workshop Program

June 6, 2018

Session 1

- 09:00–09:10 *Opening remarks*
Parisa Kordjamshidi
- 09:10–10:10 *Keynote talk: Natural Language Acquisition and Grounding for Embodied Robotic Systems*
Anthony G. Cohn
- 10:10–10:30 *Exploring the Functional and Geometric Bias of Spatial Relations Using Neural Language Models*
Simon Dobnik, Mehdi Ghanimifard and John Kelleher

10:30–11:00 Coffee Break

Session 2

- 11:00–11:20 *Building and Learning Structures in a Situated Blocks World Through Deep Language Understanding*
Ian Perera, James Allen, Choh Man Teng and Lucian Galescu
- 11:20–11:40 *Computational Models for Spatial Prepositions*
Georgiy Platonov and Lenhart Schubert
- 11:40–12:00 *Lexical Conceptual Structure of Literal and Metaphorical Spatial Language: A Case Study of "Push"*
Bonnie Dorr and Mari Olsen
- 12:00–12:20 *Representing Spatial Relations in FrameNet*
Miriam R L Petruck and Michael J Ellsworth

12:20–02:10 Lunch Break

Session 3

02:10–03:10 *Keynote talk: Understanding Spatial Expressions*
James F. Allen

03:10–03:30 *Points, Paths, and Playscapes: Large-scale Spatial Language Understanding Tasks Set in the Real World*

Jason Baldrige, Tania Bedrax-Weiss, Daphne Luong, Srini Narayanan, Bo Pang, Fernando Pereira, Radu Soricut, Michael Tseng and Yuan Zhang

03:30–04:00 Coffee Break

Session 4

04:00–04:20 *Anaphora Resolution for Improving Spatial Relation Extraction from Text*
Umar Manzoor and Parisa Kordjamshidi

04:20–04:40 *The Case for Systematically Derived Spatial Language Usage*
Bonnie Dorr and Clare Voss

04:40–05:30 *Panel*
James Pustejovsky, Marie-Francine Moens, James F. Allen, Bonnie Dorr, Anthony G. Cohn