Workshop on Computational Models for Spatial Language Interpretation and Generation (http://cosli.org)

Joana Hois (joana@informatik.uni-bremen.de)
University of Bremen, Enrique-Schmidt-Straße 5, 28359 Bremen, Germany
Tel.: +49 421 218 64214; Fax: +49 421 218 9864214

Robert J. Ross (robert.ross@dit.ie)
Applied Intelligence Research Centre, Dublin Institute of Technology, Kevin Street, Dublin 8, Ireland
Tel.: +353 1 402 4886; Fax +353 1 402 4985

John Kelleher (john.d.kelleher@dit.ie)
Applied Intelligence Research Centre, Dublin Institute of Technology, Kevin Street, Dublin 8, Ireland
Tel.: +353 1 402 4789; Fax +353 1 402 4985

John A. Bateman (bateman@uni-bremen.de)
English Department, University of Bremen, Bibliothekstr. 3, 28359 Bremen, Germany
Tel.: +49 421 218 68120; Fax: +49 421 218 9868120

Topics of the Workshop

Competence in spatial language modeling is a cardinal issue in disciplines including Cognitive Psychology, Computational Linguistics, and Computer Science. Within Cognitive Psychology, the relation of spatial language to models of spatial representation and reasoning is considered essential to the development of more complete models of psycholinguistic and cognitive linguistic theories [1]. Meanwhile, within Computer Science and Computational Linguistics and Engineering, the development of a wide class of so-called situated systems such as robotics, virtual characters, and Geographic Information Systems is heavily dependent on the existence of adequate models of spatial language use [2].

Achieving competence in spatial language requires that appropriate meanings be assigned to spatial terms used in language, such as location, motion, orientation, perspective, projective, topological, distance, or path descriptive markers. The computational modeling of such spatial language meanings in turn supports the interpretation of an intended spatial meaning as well as the generation of adequate linguistic expressions in certain situations and contexts.

While early computational models for spatial language interpretation and generation primarily focused on a geometric understanding of spatial terms, it is now widely recognized that spatial term meaning depends on functional and pragmatic features in many ways [5]. Competent models of spatial language interpretation and generation must thus draw on complex models of situated meaning [14] by developing heterogeneous approaches with qualitative and quantitative models and by combining geometric, functional, pragmatic, and cognitive features in multi-modal contexts and applications.

Drawing together theories and results in spatial language modeling is a critical research topic for a range of research disciplines. These includes not only Psychology where computational theories can be used to bind experimental results and models, but also disciplines from the wider community, including: Artificial Intelligence [2], Computational Linguistics [7], Human-Robot Interaction [8,9], Ontology Engineering [10], the Semantic Web [11] and Geographic Information Systems [12,13].

Goals of the Workshop

The main objective of the CoSLI-2 workshop is to foster computational formalisms and approaches for interpreting or generating spatial language that take into account cognitive, functional, or embodiment criteria in modeling. In particular, this year's workshop theme is "*Function in Spatial Language: From evidence to execution*", and we welcome in particular any contributions which aim to address the issues of modeling function or pragmatic features in spatial language interpretation or generation.

More generally, the workshop also welcomes contributions that address symbolic and embodied spatial language interpretation and generation. This topic remains an ongoing issue in both natural language processing and cognitive science, and novel work is encouraged. Such work includes both formal and empirical models of spatial language templates and linguistic calculi, corpus-based and statistical methods, combinations of symbolic and sub-symbolic representations, and aspects of sensory-motor and multi-modal information. Contributions to spatial language interpretation and generation that integrate results from empirical and psychological frameworks for spatial language and that can improve and support situated natural language systems are also particularly welcomed.

CoSLI-2 at CogSci 2011

CoSLI-2 focuses on computational processing of spatial language that particularly address cognitive components or empirical models for embodied and functional linguistic aspects. As such, the topics and goals of CoSLI-2 are a firm fit with those of the CogSci 2011 conference. The construction of theories of spatial language use is critically dependent on interdisciplinary work between Psychology, Linguistics, and Computer Science, and can provide notable beneficial feedback to each of these domains. Moreover, at a thematic level, the CoSLI-2 workshop is well matched with the overall 'spatial' theme of CogSci 2011. The consequences of this on one hand will be that the workshop is likely to be of considerable interest to a large number of CogSci attendees, and will hence make an important and significant contribution to the CogSci conference. On the other hand, the interdisciplinary nature of the CoSLI workshop will attract participants to CogSci who might otherwise not have attended the conference.

The organizers of the proposed workshop are experienced researchers in the areas of computational models of spatial language meaning. In addition to publishing within this domain, three of the organizers also together proposed and ran the First Workshop on Computational Models of Spatial Language Interpretation (CoSLI: http://cosli.org/2010), which was held in conjunction with the Spatial Cognition 2010 conference, at Mt.Hood/Oregon, USA.

Speakers & Participation

Prof. Kenny Coventry of Northumbria University in the United Kingdom has agreed to participate as a guest speaker. The audience for this workshop will be multi-disciplinary, including those working in Psychology, Linguistics, and Computer Science, and the more specialized topics therein. 15-20 participants are expected to attend the workshop.

Workshop Format

The workshop will consist of a number of segments. The first section of the workshop consists of an opening session for introducing the workshop topics, goals, participants, and expected outcomes. The invited talk will highlight main contributions and recent research trends in the field related to the workshop theme. Participant contributions and discussions will then be addressed through three sections. An oral presentation section will be used to allow speakers to present novel and significant recent contributions to the community. Then, following on from the first CoSLI workshop, this oral session will be supplemented with short presentations and a poster session to allow a greater number of participants to present work and discuss its implications and details. Finally, a panel discussion section will be used to pull together research strands and discuss possibilities for future research and cooperation.

The workshop proceedings will be distributed at the workshop and published online through CEUR WS[1]. In addition to this, a post-workshop journal special issue or edited book on "Computational Models for Spatial Language Interpretation and Generation" is planned.

Program Committee

1. Marios Avraamides, University of Cyprus, Cyprus
2. Kenny Coventry, Northumbria University, UK
3. Alexander Klippel, Penn State, USA
4. Alexander Koller, University of Potsdam, Germany
5. Gérard Ligozat, University of Paris-Sud, France
6. Amitabha Mukerjee, Indian Institute of Technology Kanpur, India
7. Philippe Muller, Université Paul Sabatier, France
8. David Schlangen, University of Bielefeld, Germany
9. Emile van der Zee, University of Lincoln, UK
10. Joost Zwarts, Universiteit Utrecht, Netherlands

References

1.Jackendoff, R. The architecture of the linguistic-spatial interface, Language and Space, Bloom, P.; Peterson, M.A.; Nadel, L. & Garrett, M.F. (ed.), MIT Press, 1999, 1-30

2.Roy, D. & Reiter, E. Connecting Language to the World, Artificial Intelligence, 2005, 167, 1-12

3.Herskovits, A. Language and Spatial Cognition: an interdisciplinary study of the prepositions in English, Cambridge University Press, 1986

4.Hois, J. & Kutz, O. Counterparts in Language and Space - Similarity and S-Connection. Proceedings of the International Conference on Formal Ontology in Information Systems (FOIS), Eschenbach, C. & Grüninger, M. (ed.), IOS Press, 2008, 266-279

5.Carlson, L.A. & van der Zee, E. (ed.): Functional features in language and space: Insights from perception, categorization and development, Oxford University Press, 2005

6.Aurnague, M. & Vieu, L. A three-level approach to the semantics of space, Semantics of Prepositions: From Mental Processing to Natural Language Processing, Zelinski-Wibbelt, C. (ed.), Mouton de Gruyter, 1993, 393-439

7.Baldwin, T., Kordoni, V., & Villavicencio, A. (eds.) Computational Linguistics Special Issue on Prepositions in Applications, 35(2), 2009.

8.Zivkovic, Z. and Kosecka, J. (eds.) Robotics and Autonomous Systems Special Issue on From Sensors to Human Spatial Concepts, 56(6), 2008.

9.Adams, J.A. & Skubic, M. (eds.) IEEE Transactions on Systems, Man and Cybernetics Part A: Systems and Humans - Special Issue on Human Robot Interaction, 35(4), 2005.

10.Bateman, J., Hois, J., Ross, R. & Tenbrink, T. A Linguistic Ontology of Space for Natural Language Processing. Artificial Intelligence. Elsevier. 174 (2010) 1027–1071.

11.Mani, I., Doran, C., Harris, D., Hitzeman, J., Quimby, R., Richer, J., Wellner, B., Mardis, S., & Clancy, S. SpatialML: annotation scheme, resources, and evaluation. Computers and the Humanities, 44(3), 2010.

12.Fonseca, F. & Rodriguez, R. (eds) Transations in GIS Special Issue on From Geo-Pragmatics to Derivation Ontologies: new Directions for GeoSpatial Semantic Web, 11(3), 2007.

13.Dolbear, C., Hart, G., Goodwin, J.: From Theory to Query: Using Ontologies to Make Explicit Imprecise Spatial Relationships for Database Querying. In: COSIT 2007: International Conference on Spatial Information Theory. LNCS, vol. 4736. Springer, Heidelberg, 2007.

14.Ross, R., Hois, J., Kelleher, J. (ed.): Computational Models of Spatial Language Interpretation (CoSLI'10), CEUR-WS Proceedings, 2010.

[1] http://ftp.informatik.rwth-aachen.de/Publications/CEUR-WS/