



Master's Thesis proposal

General Information

Master's Thesis Title: **Learning to Map Sentences into Meaning Expressions**

Orientation: professional
 research

M.Sc. Th. Advisor's Dept. & University: LSI, UPC

M.Sc. Th. Advisor: Xavier Carreras

M.Sc. Th. Advisor e-mail: carreras@lsi.upc.edu

Observations: The master thesis is partially involved in a project

Student's Name:
(if already known)

M.Sc. Thesis Description

Main issues / Brief Description:

The goal of this project is to design algorithms that learn to recover the meaning of sentences in natural language.

Detailed Description:

Semantic parsing is a classic application in Natural Language Processing. The goal is to map a sentence in natural language into some formal expression of its meaning. There are multiple applications. For example the “meaning” of a sentence could be expressed in some logical form, and we could use the output of a semantic parser to make logical inferences of information described in texts. Another application are natural language interfaces to a databases, where the “meaning” of a sentence would be some query, and the semantic parser would transform a query in natural language into SQL.

In this project we will take a machine learning approach to semantic parsing. The starting point will be recent methods for learning to recover the syntactic structure of sentences, following [CCK08]. How can we extend these methods to compute semantic expressions for sentences? Can we design computer programs that learn the mappings from syntactic structure to meaning? What is the most effective way to supervise this learning process.

The core of this project will exploit techniques of machine learning, natural language, combinatorics and optimization. We will follow recent work on learning to recover the semantics of sentences [ZC05,CGCR10,BCZB09,KZGS10], and explore new ideas.

References:

[KZGS10] Tom Kwiatkowski, Luke Zettlemoyer, Sharon Goldwater, and Mark Steedman. Inducing Probabilistic CCG Grammars from Logical Form with Higher-order Unification . In Proceedings of the Conference on Empirical Methods in Natural Language Processing (EMNLP), 2010.

[CGCR10] James Clarke, Dan Goldwasser, Ming-Wei Chang and Dan Roth. 2010. Driving Semantic Parsing from the World's Response. In Proceedings of the Fourteenth Conference on Computational Natural Language Learning (CoNLL-2010), pages xx–yy. Uppsala, Sweden.

[BCZB09] S.R.K. Branavan, Harr Chen, Luke Zettlemoyer and Regina Barzilay "Reinforcement Learning for Mapping Instructions to Actions", Proceedings of ACL, 2009.

[CCK08] Xavier Carreras, Michael Collins and Terry Koo. TAG, Dynamic Programming, and the Perceptron for Efficient, Feature-rich Parsing. In Proceedings of CoNLL, 2008.

[ZC05] Luke S. Zettlemoyer and Michael Collins. Learning to Map Sentences to Logical Form: Structured Classification with Probabilistic Categorical Grammars. In Proceedings of the Twenty First Conference on Uncertainty in Artificial Intelligence (UAI), 2005.