

# Natural Language Understanding and Computational Semantics

The presentation on Natural Language Understanding and Computational Semantics will outline recent work on several areas of interest to natural language processing - especially Recognizing Textual Entailment and Natural Language Understanding. The method employed is conversion of natural language (through various approaches such as compositional grammars based on Lambda Calculus, statistical dependency parsers, etc) to a logic based interlingua. In our case we focus on LCC-style logic forms in first order logic and their usage in Discourse Representation Theory. We then show how to reason with the interlingua using automated theorem proving tools and model building tools.

The second part of the talk will focus on independent research into Natural Language Understanding based on breaking the text down and using classifiers, knowledge sources, various NLP software systems, etc to assert additional information (i.e. text markup). The idea is to build chains of proofs to create a system of constraints delineating the possible meanings in context of any textual/document source. Metadata extends to arbitrary knowledge regarding the document and source. The idea is to build a set of tools for literary interpretation that allows us to reason more precisely with the meaning of utterances and to use this information to support persons. A recent project has been undertaken to create annotated documents for all freely available knowledge sources, such as Wikipedia, Gutenberg and Google Books public domain content.

If approved, the concept of the talk will be refined to include all the practical prerequisites required to understand the talk. I would also like to illustrate some of the practical issues involved that others can become involved with immediately, especially the packaging and wrapping of existing NLP software.

Three Things the Audience Will Learn: How to formalize language, how to develop logically consistent metadata and insights, how to contribute to such software.

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## The Automated Lifestyle: Using and Developing Panoply GNU+Linux

This workshop is focused on getting the users familiar with usage and development of Panoply GNU+Linux. Panoply Linux, currently only available as a 20 GB VM image, contains the full FRDCSA system (but without the data files, that would be over 100 GB), covering all of my research into artificial intelligence. There are many systems that are only available with Panoply (until such time as proper Ubuntu packages can be built and CPAN modules created): such as Paperless-Office, Shared Priority System Editor v2, Job-Search, RADAR, and CLEAR, and tools such as FreeKBS2 and UniLang. Many more are not finished but already present in substantial form. I wish to teach the various specialized systems of the FRDCSA, so that users will have a deep understanding of how to use these systems for their application development. The primary systems that they will learn are UniLang,

a multiagent interprocess communication system, and FreeKBS2 - a Semantic Web knowledge-based system for storing and reasoning with assertions in many logics and notations.

In addition to the internal systems, I will also cover a wide variety of external software, mostly in the area of natural language processing and understanding.

We'll then proceed to illustrate basic packaging techniques and also packaging using the Packager system, which helps to semi-automatically retrieve and package software for Debian and Ubuntu. We will actually roll a package in the workshop.

We'll then show how to agentify the packaged software for use with UniLang, or separately under the Org::FRDCSA::System or Org::FRDCSA::Capability namespaces.

The actual workshop will be represented as a pedagogical domain with the SPSE2 system - it will be represented as a series of individual learning activities with specified content dependencies and expected durations. The SPSE2 will then generate a precise schedule and walk us through the completion of the workshop. For more information on this process you can refer to an upcoming and as of yet unfinished paper: "Temporal Planning and Inferencing for Personal Task Management with SPSE2". <http://frdcsa.org/~andrewdo/writings/icaps-2011-paper.pdf>

Lastly, the concepts behind the POSI group will be presented. Users may wish to index and share their capabilities and doing so begin collaboration using the SPSE2 system. I gave a talk on POSI at Flourish 2009 and this will be a follow-up to that talk, now that the POSI systems are mostly working: <http://www.slideshare.net/aindilis/posi-overview>

Three Things the Audience Will Learn: how to package software for Debian&Ubuntu; how to use and develop Panoply GNU+Linux; how to collaborate with others using SPSE2