

Erik David Johnson – Academic Profile

Besides a completed Academy Profession (AP) Degree in Computer Science of 135 ECTS, I also have a BA in English with an elective module in philosophy. This means that I have a thorough understanding of English grammar, syntax and semantics, and also of 'Cognitive Semantics' which was my optional course for the English part of the BA.

In addition to the basic philosophy courses in my elective module in philosophy, I also took a master level course in 'Analytical Language Philosophy' - specializing in the work of Ludwig Wittgenstein.

Finally, MSc in Software Development and Technology, which this thesis will complete, has 'Modern Artificial Intelligence' as specialization, and has been combined with optional, master level courses in language technology and logic from the Copenhagen Centre for Language Technology.

Thesis

The field of 'natural language processing' (NLP) is a branch of artificial intelligence (AI) mainly concerned with human-computer interaction (HCI) using natural languages (i.e. English, German, Spanish, Danish, etc.).

Though much progress has been made in areas such as machine translation, part-of-speech tagging, speech recognition and other areas relying mostly on statistical approaches to NLP, less can be said about the advances made in areas involving natural conversation-level modes of HCI, such as one would expect from an agent that could emulate contextualized conversations or pass the renowned 'Turing Test'.

In many ways, these advances are halted by the need for NLP systems to relate content to human perceptions and representations of the world - in other words, the need for systems to incorporate actual 'world knowledge'.

As a relatively new field in computer science and AI, 'ontology engineering' (OE) sets out to structure a representation of the world or a limited domain within the world. In OE, an 'ontology' is a structural framework that organises information by defining the type of objects or concepts that exist, and their properties and relations. Distinctive to OE, this structural framework is usually aimed at high level AI applications and is often inspired by abstract, human cognition. In this way, OE could just possibly have the potential to take important steps towards solving the problem of world knowledge in NLP.

The question is now: What is OE and how can it be used to improve NLP by adding world knowledge? In other words, how can computer science and language philosophy meet in an attempt to answer basic questions on how we best go about structuring and representing the world in relation to human cognition and language, through ontology engineering aimed at high level NLP systems?

It is the modest ambition of this thesis to suggest one possible approach to this problem, based on an analysis of the work of language philosopher Ludwig Wittgenstein and popular cognitive semantics experts such as Lakoff & Johnson, relying on recent papers and current literature on ontology engineering such as "Ontology Engineering" from 2010 by Corcho & Fernandez-Lopez.

Based on the suggested approach, a proof-of-concept ontology with a limited domain of world knowledge will be implemented and documented using a modern programming platform, with the joint purpose of both demonstrating and evaluating the feasibility of the given approach.