Introduction

I started the brain storming for this project almost immediately after returning from the CWSF last year. However, the actual work started around September. The idea originally was to build on to my last year's project (AIML Robots), but after a few good days of brainstorming I realised that what I had done last year was pushed to the limit and I could not improve on it using the same technology. Therefore, I began looking for a technology that could go further than I was able to do last year. I found it: the Semantic Web. The idea was to take information and organize it in “ontologies” that could be inferred upon, queried, and verified automatically. I wanted to use these specific features of the technology to give a computer the ability to use logic on a problem and figure it out. In my case this was about verifying many paths to a solution and determining which ones were valid, and the shortest.

Purpose

The purpose of this science fair project it to explore the abilities of the semantic web and its applications for artificial intelligence.

Hypothesis

I think it is possible to create an application that can use semantic technologies to solve logic puzzles, and thereby assessing their application in the field of artificial intelligence.

Materials

1. OntoStudio
2. Notepad++
3. Eclipse
4. Microsoft Office OneNote 2007

Procedure

The basic structure for all of my test were the same: create the ontology, add concepts, instances, and attributes and then finally create rules that will be run on the ontology as a whole and figure out the answer by validation.

Results/Observations

While performing the tests there were many cases where I had to do a trial and error type process. After many tries, I was able to get all the tests to run properly. The last test was the one that had an interesting result; it was positive but with an asterisk; I was able to find the answer by validating paths to the solution, however, I had to implement some outside programming to create all my instances.

Conclusion

I found that semantic web technologies are able to solve logic puzzles.

Applications

After performing the test on this technology I have undoubted faith that this technology will be the future. It can be applied anywhere from cancer research to financial services to military tactics. In fact the National Cancer Research Institute is already creating ontologies and running reasoners on a huge database of information to find connections that a human might have missed.

> *"The National Cancer Institute cancer ontology,(Paper - pdf link) is an OWL Lite ontology with over 17,000 classes in ontology with close to 500,000 triples."- OWL Implementations as of December 2003 (Historical)*

And the financial application:

> Already many efforts are made to implement semantic technologies in banks and financial statistic databases. A presentation has been made by Daniela Barbosa to the Wells Fargo Bank/Wachovia to present the benefits of semantic technologies:
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> http://taxonomy2watch.blogspot.com/2010/02/semantic-technology-uses-for-financial.html