Concept Visualization for Ontologies of Learning Agents

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Abstract

The purpose of this project is to research, create, and program a concept visualization tool to easily browse small to large scale semantic networks and ontologies of an artificial intelligence. This relates closely to graph theory and graph layout algorithms but adds another factor by taking into account the many relationships between different nodes and elements of an artificial intelligence when drawing the graph.
Keywords: Multiagent, dynamic simulation, artificial intelligence, graph theory, graph algorithm

1 Inroduction

The Disciple Learning Agent is an artificial intelligence that can be adapted for many purposes such as military operations, teaching, and traveling. It is currently being developed at the George Masonm University - Learning Agents Center. The project will be used mainly by those who are not proficient at Computer Science. Therefore, this project aims to distribute information about the artificial intelligence in an easy and usable way.

2 Background

Disciple is an Artificial Intelligence based decision aid which subject-matter experts can train and use when making decisions under stressful, complex, and constrained conditions. The tool was developed and used under the Defense Advanced Research Projects Agency's High Performance Knowledge Base and Rapid Knowledge Formation programs. Some domains in which the tool would be applicable are described, with particular emphasis on military battle planning.

It also describes challenges and similarities in decision making under pressure in the military, medical, and manufacturing domains. Disciple could contribute to enhanced decision-making efficiency as a decision aid in these domains, as demonstrated by its application to military battle planning problems.The paper concludes with a discussion of future trends in decision-support application tools.

3 Procedure and Methodology

The Disciple Learning Agent is currently written in JAVA and called Jdisciple. Eclipse is used to provide a basic organized structure for the entire project. This part of the project will be coded in many different iterations starting with the simplest of cases and gradually moving to more advanced, cases. This will involve an implementation of a basic element picking algorithm such as a Greedy, and a basic graph layout algorithm to place and make space for elements on the screen. Then, the algorithms will improved upon every iteration by modifying the heuristics to make it more efficient, faster, and usable for larger ontologies.

4 Results and Discussion

At this point, most of the basic preparation is complete and work on the algorithmic portion of this research project can proceed. Programming the basic classes has really given me insight on how Object Oriented Programming is useful in real

world applications and why there needs to be strict guidelines for implementing new classes into a larger project.

5 Expected Results The first algorithmic version of my program will involve manipulation of small explanation element lists in a Disciple agent and represent the elements in an understandable, graphical way. Then, after each working iteration, I hope to expand the algorithm for more general and larger test cases.

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