CSCI 446 Artificial Intelligence Project 2 Design Report

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1 Introduction

Logic and the Wumpus World is an artificial intelligence problem first proposed by Michael Genesereth, and described in detail by his student Stuart Russel[1].

2 Problem Statement

3 Software Design

The software will center around an object denoted the `Environment_engine`. This class will be responsible for

3.1 Wumpus World Generation

The wumpus world will be represented

3.2 Environment Engine

3.3 Reasoning Agent

3.3.1 Inference Engine

Our inference engine will use the function PL-Resolution(KB, α) described by Russel and Norvig in Figure 7.12 [1] to perform *resolution*. Resolution allows the inference engine to use a knowledge base of facts to ascertain new details about the wumpus world. The function PL-Resolution accepts a knowledge base, KB and α, the query to be checked. Of course, PL-Resolution is based on propositional logic clauses, but according to Section 9.5.2 of Russel and Norvig, we can adapt it to operate using first order logic clauses if we we modify the function PL-Resolve(C_i, C_j) to find two variables complementary if one unifies with the negation of the other. To perform the unification algorithm, we can use the function Unify(x, y, θ) provided in Figure 9.1 of Russel and Norvig.

3.4 Knowledge Base

3.5 Pathfinding

3.6 Reactive Agent

4 Experiment Design

To analyze the performance of our agents, we are asked to vary various parameters of the wumpus World. These parameters include: the size of the board, and the number of wumpi, pits, and barriers.

References

[1] Stuart Russel and Peter Norvig. *Artificial Intelligence: A Modern Approach.* Pearson Education, 3rd edition, 2010.