

CSE 5361 - *Artificial Intelligence II*

Project - Spring 2013

For the project you can either choose one of the options listed below or give me a short proposal for a different project. In either case you have to write a short document (> 3 pages), detailing and justifying the design choices made and the techniques used for your agent. It should also include a short discussion of your experiences with the agent and the problems encountered. On the due date, you will also have to give a short presentation (≈ 15 minutes) of your agent (and be prepared for questions).

You should Email to me (huber@cse.uta.edu) a tar archive containing all your code. If your code requires any special compilation instructions, let me know. Be sure your code is well-documented.

1 A Reinforcement Learning Agent

Based on Homework 3, build an agent that uses one of the approximate learning approaches for Partially Observable MDPs (Q_{MDP} or linear Q-learning) to learn a utility function for an agent navigating in a 5×5 world with a known goal but under the assumption that actions only succeed probabilistically (using the same model as the one in Homework 2) and that the only location feedback is the bump sensation when hitting a wall.

2 Simple statistical Image identification

Build a system that, given a set of images (they should be relatively small), extracts a vector of feature statistics and uses this to classify the image as one of the original training categories.

3 Hidden Markov Model Misspelling Correction

For a small vocabulary, build a Hidden Markov Model (you can use a HMM package) For this project you will be implementing multiple agent that will cooperatively search for the gold and carry it out of the cave.

4 Genetic Algorithm

Build a genetic algorithm that can find the optimal solution for the agent navigation problem from Homework 3 where the state of the agent is observable by the agent (i.e. it always knows where in the 5×5 area it is).

5 Sampling-Based Belief State Calculation

Use sequential Monte-Carlo estimation (Particle Filter) to track the belief state of an agent moving in a 20×20 grid world according to the transition probabilities from Homework 2.