

CIS 730 Artificial Intelligence
CIS 530 Principles of Artificial Intelligence
Fall 2007

Homework 8 of 10: Machine Problem (MP8)
Term Project Experiments

Assigned: Sat 17 Nov 2007
Due: Fri 30 Nov 2007 (before midnight)

The purpose of this assignment is to help you with your final project implementation phase.

This homework assignment is worth a total of 20 points.

Upload a copy of your solution to your K-State drop box before the due date.

1. **(20 points for 530, 12 points for 730) Experiment Replication Script.** Write a script in any scripting language (e.g., Unix shell script, Tcl/Tk, Perl, Ruby, Python, Lua, or VB.net) to automate the collection of experimental results for your final project report. Alternatively, write a data generator or preprocessor using a scripting language or a high-level imperative language such as C++ or Java. Examples include:
 - a) A Perl script to run Angband using different levels of training (the basic APWborg, trained with 1000 turns of combat data, trained with 2000, 4000, 8000, 16000)
 - b) A Python driver for training a TAC-Classic agent and then bringing them into new games on a running server
 - c) A Java program to generate test data for benchmarking the import module you write to map data from a particular protein database format into the unified protein interaction format. Measure the ontology reasoner and I/O costs separately.

Turn in a standalone table of results produced by this program along with your source code.

2. **(730 only, 8 points) Machine Vision.** Run the Edge Detection applet at:
<http://www.luberth.com/java/StillImageSegmentation/Segmentation.html>

Find the best edge detection thresholds for the Prewitt and Sobel templates, by experimentation, on the "face", "fruit", and "castle" examples (use File: Open to open the images). Explain what the difference between the templates is. Take screenshots of the results for your empirically determined best thresholds (there should be six total).

Finally, try applying a Gaussian blurring pre filter to the edge-detection stage for the noisy chessboard.

Class participation (required). Think about the following question and post your answer to CIS730-L by Fri 30 Nov 2007: Under what circumstances would an expanded operator set be required for symbolic regression using genetic programming? What operators would be added, and how would you change the fitness case evaluation to minimize overfitting?