CS 4701:

Practicum in Artificial Intelligence

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Overview

Nature of the course

- CS4700 is a co-requisite for CS4701.
- Organizational meeting (today).
- Nature of the course:

  The main assignment for CS4701 is a course project. Students will work in groups (probably pairs). A project proposal is required.

Request for proposals

A separate project handout with project suggestions, details, and due dates regarding the project proposal, and final project write-up and presentation will be made available from the CS4700 course home page.

Grading

Grading CS4701

20%: Project proposal
80%: Final code, write-up, and presentation

Your job

Your job
To identify:

An AI project that you are passionate about ☺!

A partner who shares the same passion and enthusiasm.

Your job (contd.)

What should you be working on?

- a clear, concise description of what you plan to do
- the general approach you'll use (e.g., heuristic search, learning, rules, belief networks)
- an explicit, coherent plan for quantitatively and/or qualitatively evaluating the system
- a time line for your implementation

Types of projects

Programming project (ideally with principled experimentation).

More research oriented project (perhaps involving programming too).

Research paper. (has to be original!)

Ideas

Puzzles – e.g. Sudoku

Games – e.g. Go

Visualization of interesting algorithms – e.g. A* vs. Shortest path

Character Recognition using Neural Nets

Backgammon

3-D-Tic-Tac-Toe

Edge-detection using Neural Nets vs. CSP

Using Neural Networks to Forecast Dow Jones Industrial Average

Learning to Play Checkers

Ideas

Learning to Play Checkers

Build a system that plays Hearts in which each ``player'' uses a different strategy. E.g., One player uses a random strategy, one uses a set of hand-coded rules, and the others use heuristic methods with different static evaluation functions.

Build a system that uses heuristic search (with minimax and alpha-beta pruning) to play Connect-4. Evaluate it against human players.

Build a generic rule-based system for some domain and compare the effectiveness of forward and backward reasoning.

Build (and train) a system that plays Connect-4 using a neural network.

Ideas

A chess endgame player. An interesting variant is to design a method that learns end-game rules from examples and compare it with hand-generated chess endgame players.

Build a suite of neural network algorithms; test them on selected datasets from the machine learning dataset archive; determine why they did or did not work.

A computer bidding system for the game of bridge. Bridge, unlike chess, is a game of incomplete information, which makes standard game-tree search techniques unusable.

A theorem-proving system for some (small) subset of mathematics.

Ideas

A program that generates automatic crossword puzzles, starting from a dictionary and an empty board.

Recreate from its specifications the reinforcement learning (neural net) system (Tesauro, 1992) that learns to play backgammon by planing games against itself.

A reactive, rule-based system that plays tetris.

Re-implement Samuel's checkers playing program.

A web agent (e.g., for comparing prices)

Mastermind

Music composition

Portraits with dominoes

The End ☺!