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Connect Four Minimax and Neural Network (possibly)
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Description

Connect Four is a two-player adversarial game. The goal of the game is to connect four of your pieces in either a horizontal, vertical or diagonal line, before your opponent does. We will be implementing the game in PyGame and then first implementing a mini-max algorithm to play against a human player. After implementing a basic version of mini-max, we will then proceed to implementing alpha-beta pruning. If time permits we will then use mini-max to train a neural network to play connect 4 as well.

PEAS for Connect Four:

Performance:

The performance measure we will be using is wins. Firstly we will create a random player and make sure that the Mini-max Algorithm can beat that. The next step from that would be for it to beat a human player.

Environment:

The environment is:

Fully observable (Can see the entire board)

Adversarial multi-agent (two-player game)

Deterministic (Next state is determined by current state and actions taken by players)

Sequential (current state is determined by what the previous state was plus the action taken by the player)

Static (The environment does not change while the algorithm is deliberating)

Discrete (There is only a finite amount of states, precepts and actions)

Actuators:

Its actuators will be outputting to the PyGame GUI.

Sensors:

It will simply be given a board and then make inferences from this.

Milestones

- create playable connect four game using pygame
- implement random player
- implement heuristic to evaluate board
- implement minimax at a base level
- implement alpha beta pruning
- implement a neural network that uses a genetic algorithm to train
- pit the network against our minimax algorithm to train it

