CSC 384 Project Proposal

Title of Project: Connect Four

Type of Project: Game Tree Search

Number of Team Members: 3

Project Description:

Our project will use game tree search to play the game *Connect Four*, where the game consists of two players and a game board with size 7x6. Players drop colored discs from the top all the way down to an empty slot. Whoever connect four slot in a role horizontally, vertically or diagonally wins the game. This problem satisfied all basic properties of a game: two-players; discrete; finite; zero-sum; deterministic and perfect information. For each leaf node of the game search tree, positive value represents Max wins, negative value represents Min wins, and 0 for a tie. We will use game tree search to implement an AI. The player can choose easy, normal, and hard for different difficulty by using different heuristic functions and depth limit for the game tree. Alpha and beta pruning can be applied during each step of the game to determine the slot of board that will be chosen by the players(or AI).

Evaluation Plan:

We will run the game tree search for this game, to get the path that both player always choose their best choice(minimizing the opponent's winning chance), which is the same as the Minimax strategy. We keep track of the time consumed and maximum memory occupied and compared it by whether alpha-beta pruning is applied or not. We will make an “easy” AI play with a “hard” AI to make sure the AI works as expected and the “hard” AI always wins the “easy” AI.

Roles for team members:

For our project, one team member will be responsible the structure and the properties of the tree node. One team member will be responsible for the game search algorithm, to find the case that both players choose their best way for the next step of the game for using alpha-beta pruning or not. Another team member will design different heuristic function and depth for different difficulties.