

Experiment 5

Foundations of AI

Alpha beta pruning

By- Shivansh Jain, VIT Chennai

#R version 4.1.0

#rstudio version 1.4.1717

Alpha-Beta pruning is an optimization technique for minimax algorithm. It reduces the computation time by a huge factor. This allows us to search much faster and even go into deeper levels in the game tree. It cuts off branches in the game tree which need not be searched because there already exists a better move available. It is called Alpha-Beta pruning because it passes 2 extra parameters in the minimax function, namely alpha and beta. Alpha is the best value that the maximizer currently can guarantee at that level or above. Beta is the best value that the minimizer currently can guarantee at that level or above.. We will try to find the optimal score from the scores of leaf nodes using alpha beta pruning

- First using `rm(list = ls())` clear the environment before executing the code
- We will make a function `alphabeta` containing 7 arguments
- Depth-> being the current depth of the node which changes every recursion
- Nodeindex->being the index of node in array of nodes
- Maximizingplayer-> a boolean value which showcases if its max players turn or not
- Values-> an array storing all the scores
- Targetdepth-> being the maximum depth code will run till
- Alpha beta represent the max and min values during the algorithm
- If we reach the target depth we will return the score of current node
- If its maximizing players turn we will return the max attainable value of two sets of children of current node
- Else if its minimizing turn we will return the min attainable value of two sets of children of current node
- We will add a pruning condition to both minimizing and maximizing turn that is if $\beta \leq \alpha$ we will break the loop and not check further
- We initialize the scores, Depth=0, nodeindex=0, Maximizingturn=TRUE ,Target depth which can be found by finding the \log_2 of the length of array of scores, alpha=1000 and beta=-1000 outside the function and call the function `alphabeta`