Artificial Intelligence

Animesh Raj (11940120)
Ishika Jaiswal (11940510)
Puja Bansal (11940910)

Chess App

Introduction

- Chess has been played by the world's greatest minds for centuries, and it is a game that requires a lot of brain thinking.
- So, can a computer be taught to play a mind-boggling game like chess?
- We used the python-chess library for move generation and confirmation.

Board evaluation

- We will use piece square tables to evaluate our board pieces, and the values will be set in an 8x8 matrix similar to chess, with a high value at favourable positions and a lower value at unfavourable positions.
- For example, the probability of the white king crossing the centerline will be less than 20%, so we will place negative values in the matrix.

Move Selection

- To reduce execution time, we adopted the negamax version of the minimax algorithm and afterwards refined it using alpha beta pruning.
- Negamax is a slightly simplified version of minimax, and its code implementation is based on the premise that an opponent utilising a flawless strategy will be trying to perform the inverse of a minimax move, therefore their action will be the NEGAtive of your MAXIMUM move.
- In a nutshell, one player's loss equals another player's gain. Alpha-beta pruning is a minimax variation that runs significantly more efficiently because, rather than considering every single POSSIBLE option, it stops assessing all following moves after it has determined that a move is worse than a prior move.
- For the smartness of our engine , we have used initial moves fas book moves by chess grandmasters.

Quiescence search

- There is a problem with a game search that stops at a defined depth: If a tactical action is in process at the end of the variation, the evaluation function may provide untrustworthy results.
- For example, in a chess search, white's last move could be queen takes knight, and the evaluation function will indicate that white is up a knight.
- If the search searched one move deeper, it would notice that black has the reply pawn captures queen, and it would recognise that black is winning.
- A quiescence search is an additional search, starting at the leaf nodes of the main search, which tries to solve this problem. In chess, quiescence searches usually include all capture moves, so that tactical exchanges don’t mess up the evaluation. In principle, quiescence searches should include any move which may destabilize the evaluation function—if there is such a move, the position is not quiescent.

Thank You!