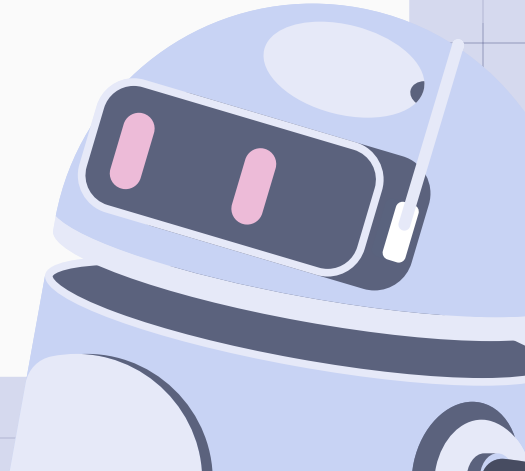
CYPRUS INTERNATIONAL UNIVERSITY

Deep blue (chess computer)

Department of AIE



CYPRUS INTERNATIONAL UNIVERSITY

Table of contents

01 Introduction

02 What is deep blue ?

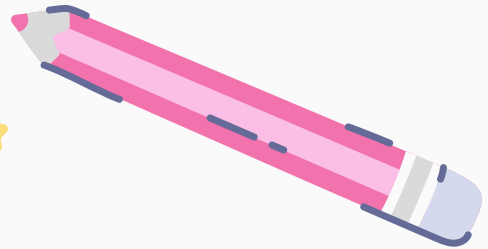
03 The story

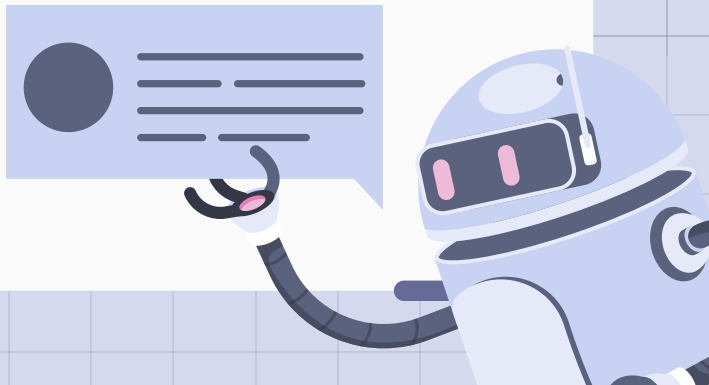
04 The techniques that used to improved the AI

CYPRUS INTERNATIONAL UNIVERSITY

Introduction

For ages, humans were the most powerful chess players on the world. The idea that a machine might ever beat the best human players appeared impossible even in the 1980s. Then, in 1997, the world champion was defeated by a machine. You ask, which computer? Deep Blue.(3)





CYPRUS INTERNATIONAL UNIVERSITY

What is deep blue ?

IBM created the chess computer known as Deep Blue. It is well-known for having defeated GM Garry Kasparov, the chess world champion, in their 1997 match. The success of Deep Blue was seen as a triumph of machine over man and a symbolic example of the development of artificial intelligence.(1)

Originally named ChipTest, the Deep Blue project was developed in 1985 by Feng-hsiung Hsu. To complete the development of Deep Blue, Hsu and his associates joined the IBM team in 1989. (1)

CYPRUS INTERNATIONAL UNIVERSITY

The story

Deep Blue, a chess computer, defeated human world champion Kasparov in two matches in the 1990s. Despite losing 2-4 in the 1996 match, Deep Blue achieved an unprecedented feat. (1)

Garry Kasparov vs. Deep Blue (2)

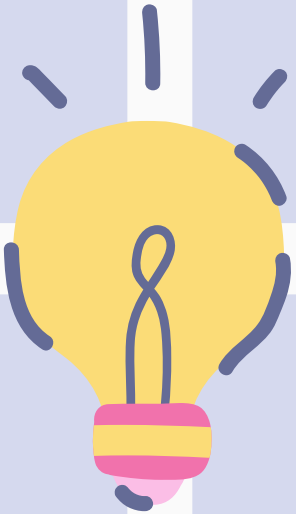
Improvements were made between 1996 and 1997, leading to a 1997 rematch where Deep Blue defeated Kasparov 3.5-2.5 in standard time controls and tournament setting, marking a groundbreaking achievement in artificial intelligence.(1)

CYPRUS INTERNATIONAL UNIVERSITY

The techniques that used to improved the AI

Tree search

The Evaluation Function



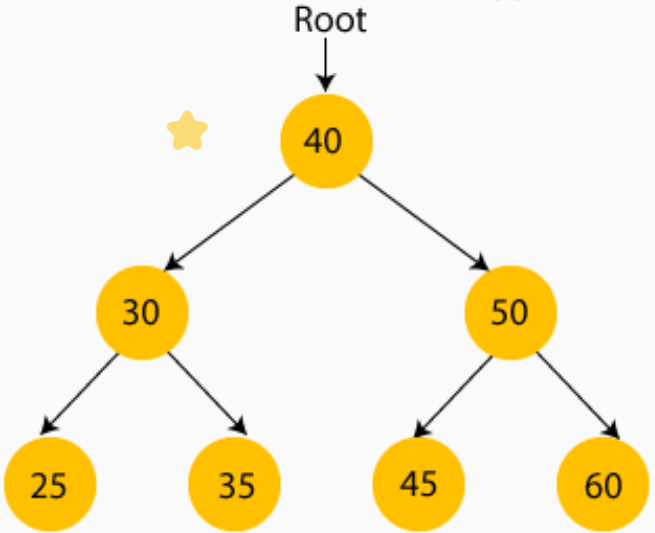
The Minimax Algorithm

Heuristics Optimizations

CYPRUS INTERNATIONAL UNIVERSITY

1- tree search

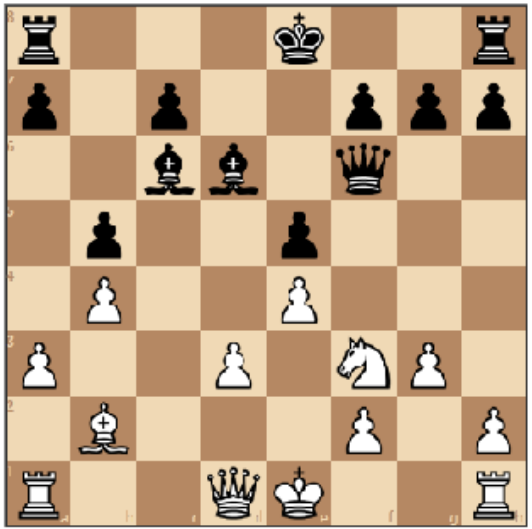
Each state in chess indicates a specific board arrangement, and the possible actions match the player's permitted moves. Chess is a Tree Search issue.(1)



2-The Evaluation Function

The function should assess a game state, such the layout of the board, and give high marks to states in which the player has more pieces than the opposition. This guarantees that the game will be won by the player of interest.(2)

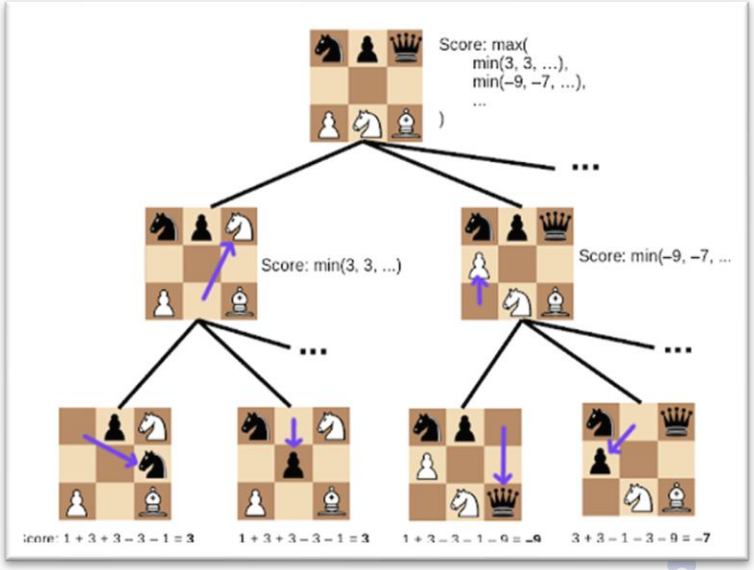
$$f\left(\right) = 5$$



CYPRUS INTERNATIONAL UNIVERSITY

3- Minimax algorithm

The "Minimax algorithm" is a method for selecting the optimal move. It entails reducing the maximum loss by taking into account the opponent's post-move activities. The program calculates the biggest loss the opponent might cause by looking forward as many steps as feasible and taking into account every move the opponent could make in subsequent turns.(2)



CYPRUS INTERNATIONAL UNIVERSITY

4- Heuristics Optimizations

Heuristics and optimizations are used by big time applications to cut down on computation time. Alpha-beta pruning is a common optimization technique that removes moves that are certain to outperform others. This makes playing chess more efficient by reducing the investigation of pathways with crossed edges.(2)

CYPRUS INTERNATIONAL UNIVERSITY

Resources

(1) https://www.chess.com/terms/deep-blue-chess-computer
(2) https://stanford.edu/~cpiech/cs221/apps/deepBlue.html
(3) https://www.britannica.com/biography/Garry-Kasparov