PROJECT EXHIBITION-2

CHESS GAME

Using Artificial intelligence
(AI)

Group-39

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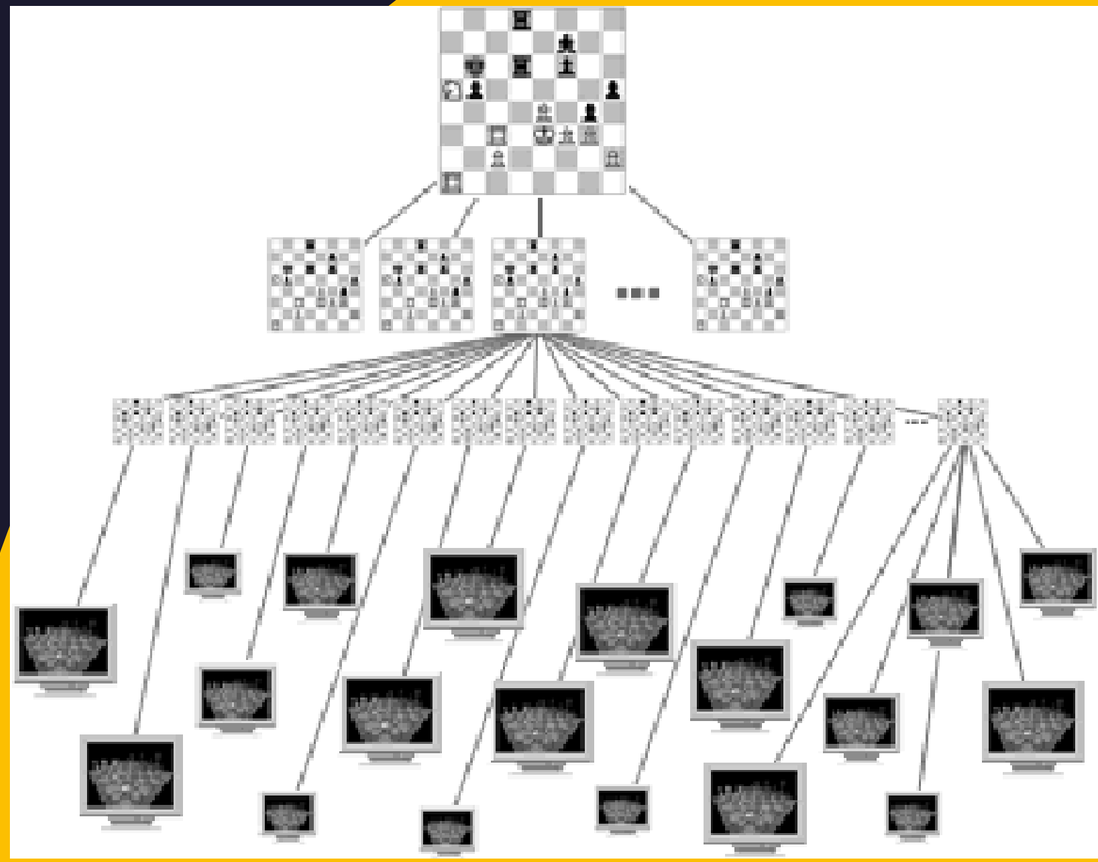
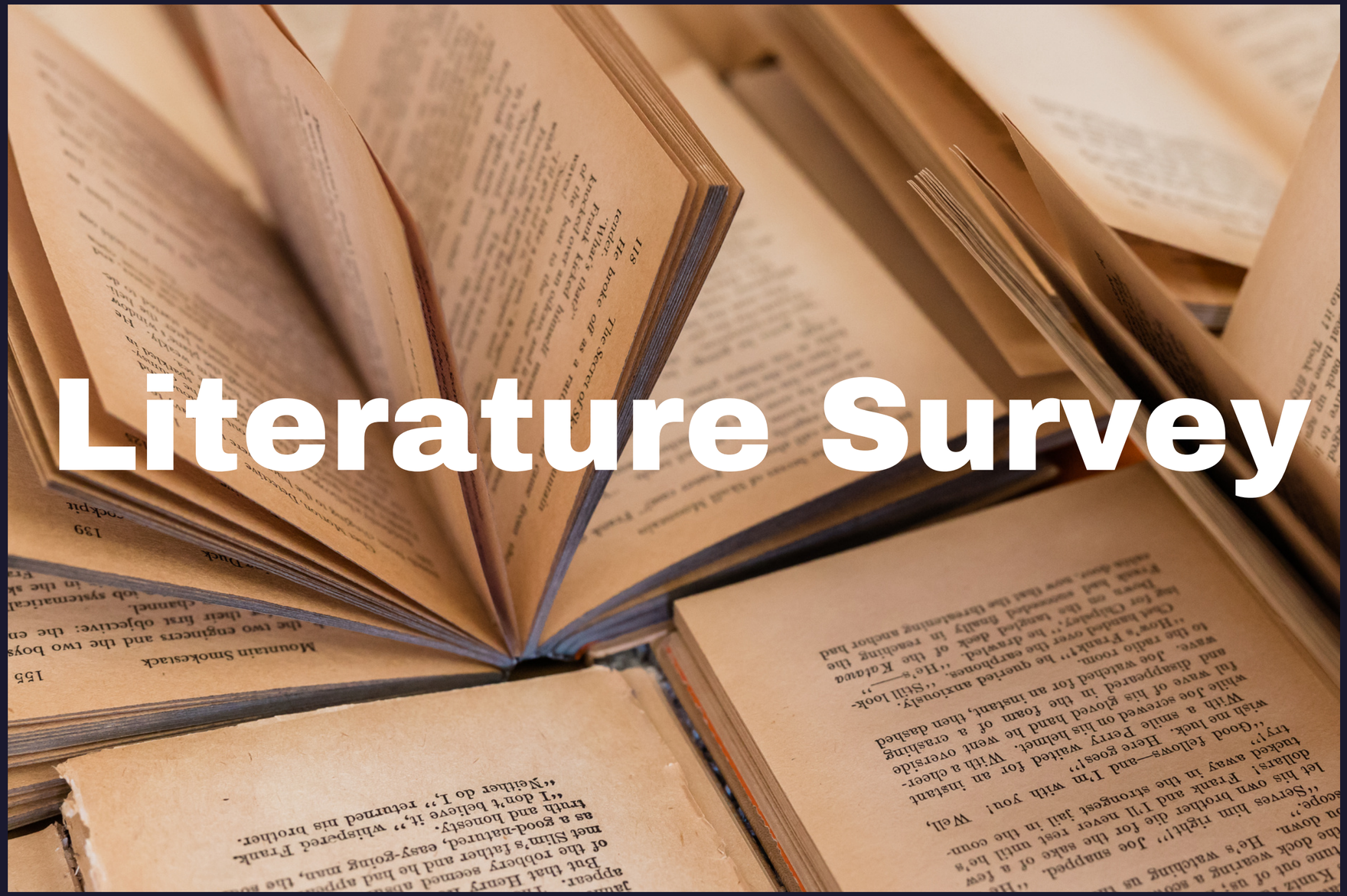
CONTENTS

About PROJECT

We are going to create a chess game using adaptive AI which will try to reach the goal of deafeating a human player. It is worth taking a look into the process by which chess computers like Deep Blue and Hydra calculate moves. These supercomputers use techniques in artificial intelligence to provide a framework to calculate their next best move. The game of chess is a Tree Search problem, whereby the current positions of the chess pieces on the board are considered and the actions that the algorithm can take next is dependent on all the legal chess moves available to the engine . The possible outcomes include win (+1), loss (0), or draw (1/2). Chess is a zero-sum game where the total payoff to all players is equal in any outcome of the game.



Literature Survey



Research Paper-1

CHESS GAME AND METHOD

Publication number: US6446966B1

Abstract: A chess game and method for opposed players includes a six-by-eight checkerboard-style game board, two sets of game pieces, each set including conventional chess pieces, e.g. a King, a Queen, a Bishop, a Rook, a Knight, and six Pawns, and a novel chess piece named the Lord. The Lord may be moved about the game board one square in any direction from its current square. A method is also disclosed wherein the chess game is played for a fixed duration of time, and points are awarded to the players based upon the number of game pieces remaining on the game board at the expiration of the allotted time. The player having the highest cumulative point total at the end of the game is then declared the winner.

Publication year -2000

Inventor: Henri Crozier

Research Paper-2

METHOD AND SYSTEM FOR PLAYING THE GAME OF CHESS

Publication number: 20170103617

Abstract: A computer-implemented method for playing chess between first and second player each of whom in turn moves a selected chess piece across a chess board by following rules. Information relating to a current state of the board is relayed to each respective display device, each player making alternate moves and receiving information representative wherein an identity and source location of a piece moved by either one of the players is revealed to a respective opponent but a destination location of the moved piece is not explicitly relayed to the opponent until immediately after the opponent makes a move. At any stage during play an attempted illegal move that does not conform to the predefined rules is ignored while notifying the player who made the illegal move and prompting him to make a different move.

Publication year -2017

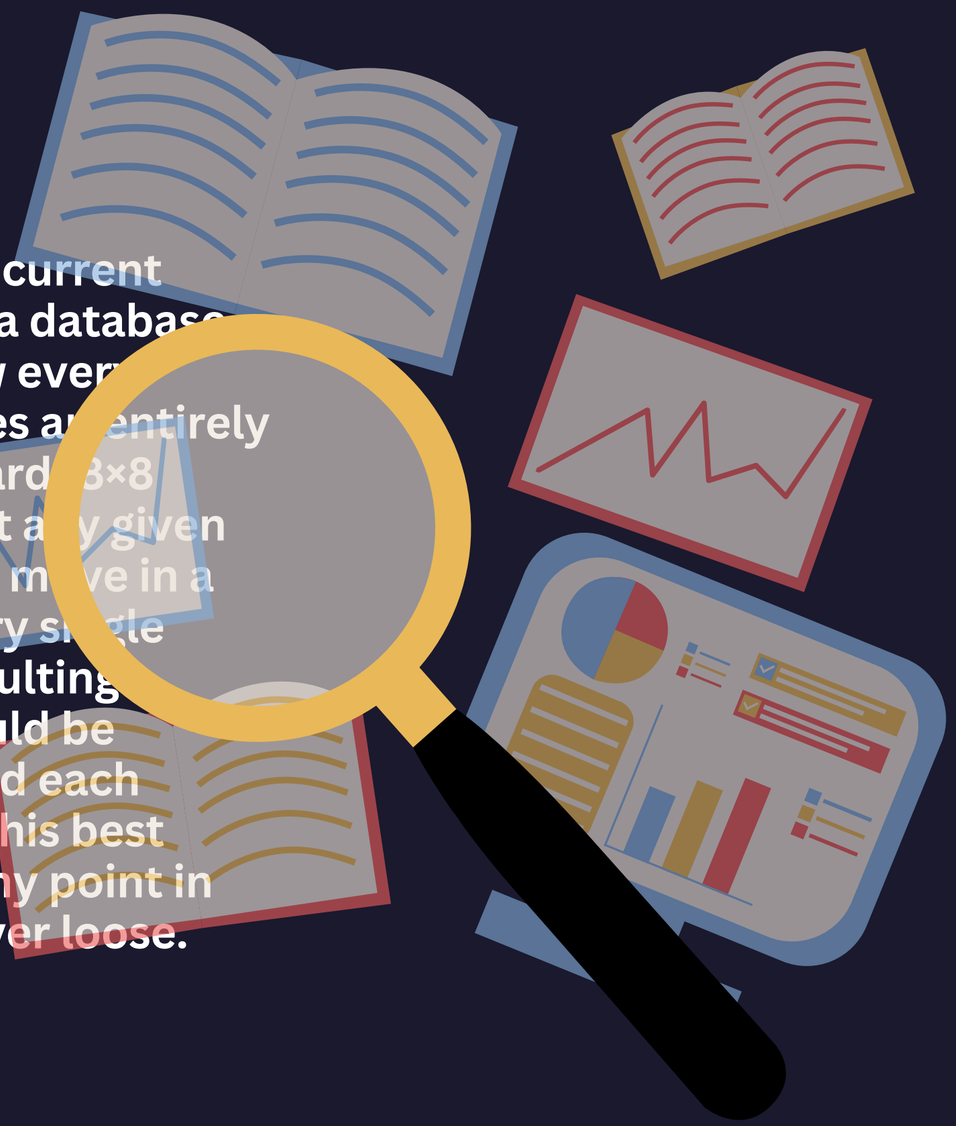
Inventor: Eyal Navon

Research Paper-3

OMNIPOTENT OPPONENT

Publication number: 20060240886

Abstract: Traditionally, a computer chess program will take the current state of the board (the position of the pieces in play) and using a database of moves, it will select what it feels is the best move. This is how every computer chess program works. The Omnipotent Opponent uses an entirely different approach. In a game of chess there is a finite sized board (8×8 squares), and finite number of pieces (16 black and 16 white). At any given time only a finite number of pieces can move and they can only move in a finite number of directions. Therefore, it is possible to plot every single move that could ever be made in a game of chess and every resulting outcome of the game. Once this data has been generated, it could be analyzed in reverse (working from the end game to the start) and each phase of the game could be marked with the best move. Using this best move data, one would always know the best move to make at any point in any chess game. Equipped with this information, one would never loose.



Publication year -2006

Inventor: Scott Patten

How Chess Programmes **WORK**

Now that we have seen the evolution of AI and chess, one must recognize how it works and its roots to further understand the possible impact of AI on the future of chess.. The technologies going to be used in the project have been listed:

- Board representation
- Tree search
- Board Evaluation
- Precalculated Data

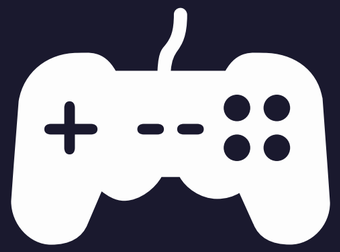
Python libraries we used

```
import pygame as p
```

```
import ChessEngine, ChessAI
```

```
import sys
```

```
Import Process,Queue
```



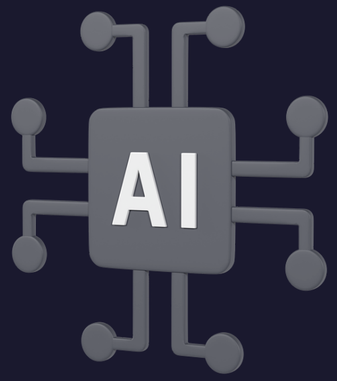
Import pygame as p

pygame is a free and open-source cross-platform library for the development of multimedia applications like video games using Python.

- It comprises PC illustrations and sound libraries intended to be utilized with the Python programming language.
- Pygame was authoritatively composed by Pete Shinners to supplant PySDL.
- Pygame is reasonable to make client-side applications that can be enveloped by an independent executable.
- Before finding out about pygame, we want to get what sort of game we need to create.

import ChessEngine

- In computer chess, a chess engine is a computer program that analyzes chess or chess variant positions
- A chess engine is usually a back end with a command-line interface with no graphics or windowing



ChessAI

- The AI chess program uses the kind of cutting-edge AI behind the best superhuman chess-playing programs
- AI focuses on predicting human moves, including the mistakes they make

import sys

The sys module in Python provides various functions and variables that are used to manipulate different parts of the Python runtime environment. It allows operating on the interpreter as it provides access to the variables and functions that interact strongly with the interpreter.It lets us access system-specific parameters and functions.

The sys modules provide variables for better control over input or output. We can even redirect the input and output to other devices. This can be done using three variables –

- stdin
- stdout
- stderr

From Multiprocessing Import Process,Queue

Multiprocessing refers to the ability of a system to support more than one processor at the same time. Applications in a multiprocessing system are broken to smaller routines that run independently. The operating system allocates these threads to the processors improving performance of the system.

multiprocessing Process:- Python multiprocessing Process class is an abstraction that sets up another Python process, provides it to run code and a way for the parent application to control execution. There are two important functions that belongs to the Process class - start() and join() function.

multiprocessing Queue:-Python Multiprocessing modules provides Queue class that is exactly a First-In-First-Out data structure. They can store any pickle Python object and are extremely useful for sharing data between processes. Queues are specially useful when passed as a parameter to a Process' target function to enable the Process to consume data.

REFERENCES

US Patent for Chess game and method Patent (Patent # 6,446,966 issued September 10,...

A chess game and method for opposed players includes a six-by-eight checkerboard-style game board, two sets of...

justia.com

US Patent Application for Method and System for Playing the Game of Chess Patent...

A computer-implemented method for playing chess between first and second player each of whom in turn...

justia.com

(PDF) The Role of Chess in Artificial Intelligence Research.

PDF | Our eminent researchers including John McCarthy, Allen Newell, Claude Shannon, Herb Simon, Ken...

ResearchGate

Chess game and method

A chess game and method for opposed players includes a six-by-eight checkerboard-style game board, two sets of game pieces, each set including conventional chess pieces, e.g. a King, a Queen, a Bishop, a Rook, a Knight, a...

google.com / Mar 16, 2000

US Patent for Chess system and method of use Patent (Patent # 10,874,935 issued...

A chess game method includes providing a standard chess board having squares of alternating colors; providing a...

justia.com

US Patent Application for Omnipotent Opponent Patent Application (Application...

Traditionally, a computer chess program will take the current state of the board (the position of the pieces in...

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CONTIBUTION

Arpan Biswas	Implementing the code of working chess board and Pieces and also chessmain function
Rahul Ojha	worked in AI and swithced greedy algorithm to min max algo
Gagan Verma	worked on AI and scoring system of the game, PPT
Dakshita Motwani	Implementing the code that'll prevent the pieces from making illegal moves, Literature Survey- searching for new and more advanced techniques for implementation
Sanika Awal	worked on undoing and storing moves and training the model, Report

THANK YOU !

Let's Dive Into The Code !!