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AI CHESS GAME WITH VOICE COMMANDS

Dr.Reeja S R
Department of CSE
DayanandaSagar University,
Karnataka,India
reeja-cse@dsu.edu.in

Shubhashree N
Department of CSE
DayanandaSagar University,
Karnataka,India
shubhashree.n.8752@gmail.com

Chandana A S
Department of CSE
DayanandaSagar University,
Karnataka,India
anuappu.1020@gmail.com

Chethana A S
Department of CSE
DayanandaSagar University,
Karnataka,India
anuappu.138@gmail.com

Thanushree D K
Department of CSE
DayanandaSagar University,
Karnataka,India
thanugowda545@gmail.com

Abstract-The voice chess game is a simple game that plays based on the commands given by the player. Concurrently it is complicated to make decisions while moving the pieces. Voice-Controlled chess is designed for a person who cannot use their arms, due to their disability or if they are preoccupied with something else, perhaps they can deliver voice commands to play the game , Our goal is to provide better options for disables.This paper tells us how python libraries are used in chess games.Here the player has few options to choose the gaming menu, i.e. the player can choose to play the game using mouse clicks or using voice commands. Also the player can choose their opponents. The player can play against the AI nor the player can choose a play with another friend-player.If the player chooses to play against AI then the player can either play with the help of mouse clicks or voice commands.The player can either flip the board each time(the player plays)if the player opts to play against the friend player, or doesn't flip each time the player gets the turn.

Keyword*s* --,Python, AI,VoiceCommands,players,mouse clicks.

I. INTRODUCTION

A chessboard is a sort of board that is utilized to play the chess game. This includes 64 numbers of squares where it has rows and columns in(8x8)
matrix, placed on a board respectively. Each piece has to be placed in their accurate position.Each
constraint has unique rules to play, and that absolutely depends on the moves done by the player, Every piece has its own ability to attack or

retain itself from the opponent.In order to have an optimized move , we have used the minimax
algorithm and the alpha-beta pruning technique to play the chess game.Mini-Max algorithm is an algorithm that uses recursion to search through the game-tree to find the best and optimized move. Here the player can use the mouse clicks nor the voice command option to play the game.The provocation of the project is to make the pieces move with the help of voice recognition.

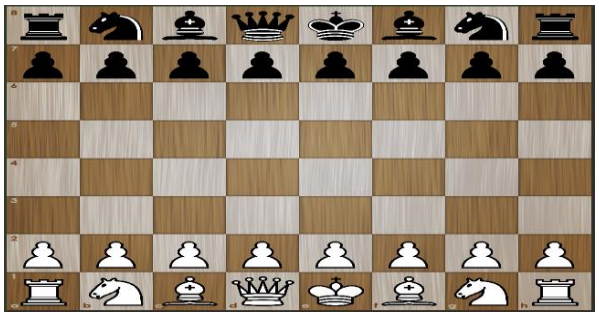


Fig.1 Design of the chessboard

IV.WHY PYCHARM?

Pycharm is an Integrated development environment used for python programming provides code analysis, a graphical debugger,an integrated tester, integration with version control systems (VCSes).Pycharm has various built in developer tools like Speech Recognition and PyAudio which are easy to install.

II. INTENDED AUDIENCE

Chess is a game that is designed for all entities of the people of all the age groups to play the game with their abilities.with this implementation the player can play the game if they are preoccupied with something else, perhaps they can deliver voice commands to play the game.

III. WHY VOICE COMMANDS?

The main aim of our project is to enable means of entertainment to people with disability.
would be more exciting. Just imagine handicaps specially who lost their arms playing chess just by saying what piece they want to move.

The “Voice Recognition” API and “PyAudio” library.It is an uncomplicated method to transform
speech into a text, this requires an internet connection for a play. Thus,Voice recognition is an associative aim of cs that develops strategy and schemes that permits the identification and relocation of oral communication into content by system.This was built using a minimax agent that found the move that would maximize the worst case position reached based on an evaluation function.This game can be entertained anywhere anytime without any consequences.Playing a chess game.

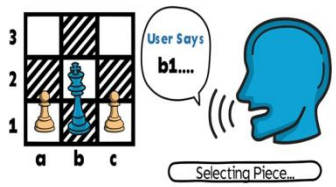


Fig.2 Player selecting the piece using voice commands

V. METHODOLOGY

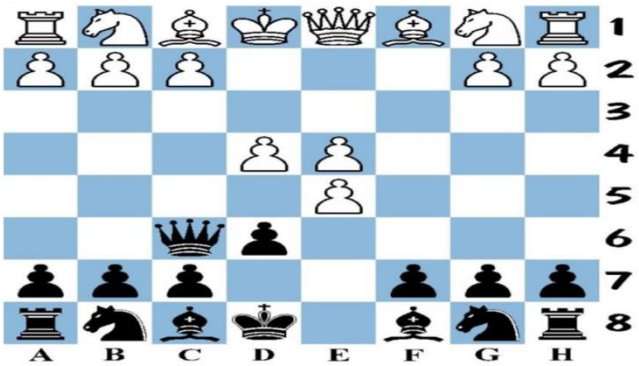
We have utilized certain methods to implement the chess game
1. Alpha-beta pruning: evaluates the position,to give the better move.

2. Transposition table: stores a table of key value and position value for a quick move from the existing evaluation.
3. Opening Book: dictionary that has the positions on board.

We have installed various python libraries in our project that are: pygame ,pyaudio , speech recognition , pycharm.Pygame is easy and user
friendly which includes graphics and sound libraries.
PyAudio is a set of python bindings i.e, converts identifiers into addresses for portAudio(i.e it is an library from audio playback and recording)

VI. ARCHITECTURE

Fig.3 Architecture of Chess Game



VII. LITERATURE SURVEY

We have referred various papers for the project the author has used as follows:

For representing chess board and pieces we have referred in The Chess Board Representation and The Author “Ben Tyers” it is a game plan between a user and ai to draw a board and pieces which allow pieces to make a move with snap and trawl which permits to pick up a piece and place it.

To move the pieces in an optimized way we require various algorithms. For usage of algorithms we referred to ’Design and Implement of Chinese Chess’. The Author “JaiqianWang,HaiLuo”. In this paper we can know about algorithms used like 1.minimax algorithm, which calculates the optimal move. 2.alpha-beta search algorithm,it decreases the no. of optimized nodes by the minimax algorithm and gives out a best move.

Specifications of python modules which is used to create a graphical interface is referred in Exploring the Python Chess Module and The Author "Liam Vallance" in order to test and demonstrate this uncomplicated and clean gui written in python is produced for the m2 chess engine in order to explore the uses of the python language for user interface production along with

the use of modules of pexpect to link the generated gui escorted by m2chess.the overall outcome of the gui is visually pleasant and functional providing the user all the functionality of the terminal base m2 chess engine in a clean and easy to use gui.

For chess pieces recognition.We referred to Chess Position identification using pieces classification The Author named "Rafael Mendes Campello", "Afonso de Sa Delgado". This paper tells about the usage of Python API for the recognition of pieces and image recognition.

The "Voice Recognition" API is an uncomplicated method to transform speech into a text, this requires an internet connection for a play.

VIII. ARCHITECTURE DIAGRAM

IX. ALGORITHM

Alpha–beta pruning is an algorithm that makes use of minimax which helps to evaluate the nodes and decrease their number to get the good move. It always finds the best and optimized move.

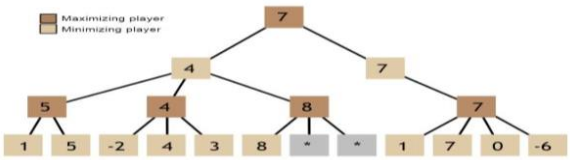


Fig.5 Alpha-beta Pruning Algorithm

The minmax evaluates the greater value that the players equally, this takes the lowest value of another player ,algo is used in resolve making that strives to decrease the rivals score.

Minimax is utilized in making stilted intellect, it decreases the feasible mislaying for a defeat case plot. Whenever it deals with obtains, it is mentioned as "maximin". & it has been prolonged to more complicated diversion. the common firm-level in the residence of unreliability.

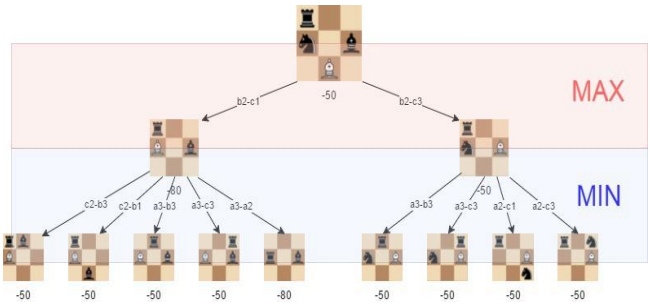


Fig.6 MinimaxAlgorithm

X. IMPLEMENTATION

A 2D array containing details about pieces positions. To represent self.board we have the board values as 0 or 1. If white is chosen then the board value equals 0 else If black is chosen then board value equals 1. Castling precise has a list of king and queen castles, and also reserves the square box which helps to capture. The clock keeps the quantity of irreparable move, which ascertains and declares draw if there is no capture or pawn movement for 50 moves.HMC has a list that reserves a key,position and the value of each keys that shows us how many no. of times the locations was repeated for reaching the destination.Voice detection is essential for audio i/p, & it recovers i/p in a simple way. To move the piece we require microphones and for recognising the voice we use google API and some of the unofficial binaries to install the audio functions.the utility of the voice detection package makes a fantastic alternative for most of the projects in python. It holds up the attributes of API's.Voice detection works in particular cases.

We have imported several python libraries,

- copy library which asks for particular reprints of the lists.
- pickle library is to keep and read dictionaries from a text file
- Random is Used for making odd selections in the available collections.
- default_dict which gives the stored values and default data types from the availability
- Counter is helpful for counting elements efficiently.
- threading allows consideration of artificial intelligence concurrently , GUI is for coloring the board.
- time and speech_recognition.

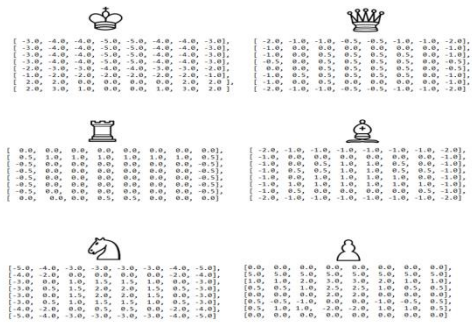


Fig.9 Positions of the Pieces

XI. EXPERIMENTAL RESULT

In start menu it asks the user to choose the opponent to play a gamei.e 1 player or 2 player

Fig.7 The user can play against AI or friend

1-PLAYER

the user can play against AI. The user can select a colour that is black or white.

Fig.8 There are three levels in the game that are EASY,MEDIUM,HARD.

i) Easy **:** In this level the computer considers the player move as the best move and gives more chances for a player to win the game.

ii) Medium **:** in this level the computer considers the players best move and gives a moderate chance of winning the game
iii) Hard **:** in this level the computer considers all the moves of the player as bestest move and gives a very less chance of winning the game.
The user can select the mode of game
Control by Mouse- Play with the help of mouse clicks , by selecting the pieces.
Control by Voice- Play with help of voice commands.
Here the player can use the mouse clicks nor the voice command option to play the game.The provocation of the project is to make the pieces move with the help of voice recognition.
Voice recognition is an associative aim of cs that develops strategy and schemes that permits the identification and relocation of oral communication into content by system.The “Voice Recognition” API is an uncomplicated method to transform speech into a text, this requires an internet connection for a play.

2-PLAYER

When you play against the players , we get an option to enable or disable the flip.

Fig.10 Enable flip:
In enabled flipping the board keeps flipping according to the game play.

Disable flip:In disable flip, the flipping mode is disable then no need to wait for flipping of
the board.
The player can either flip the board each time(the player plays)if the player opts to play against the friend player, or doesn't flip each time the player gets the turn.

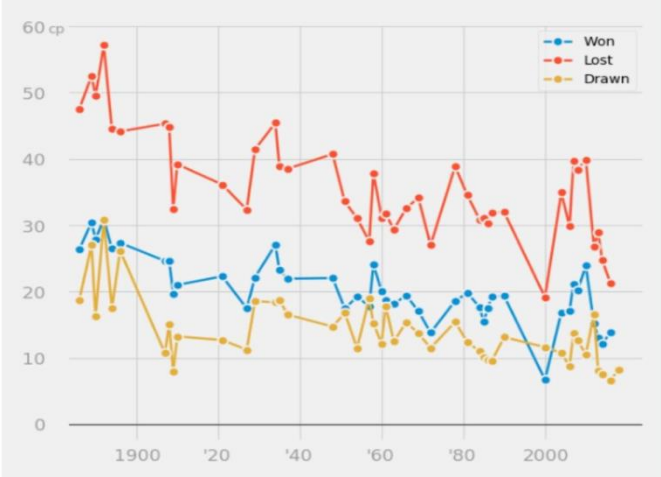


Fig.11 Ratio of difficulty levels against AI
According to fig1.3 the player has chosen extreme hard levels and AI wins the game

XII. CONCLUSION

Voice-Controlled chess is designed for a person who cannot use their arms, due to their disability or if they are preoccupied with something else, perhaps they can deliver voice commands to play the game.The player can choose their opponents.

The voice recognition component transforms the voice command .Player can play against the AI nor the player can choose to play with another friend-player. If the player chooses to play against AI then the player can either play with the help of mouse clicks or voice commands.The player can either flip the board each time(the player plates)if the player opts to play against the friend player, or doesn't flip each time the player gets the turn.

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