PYTHON PROJECT – V1 Report
AI Chess BOT
GROUP 13

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Initializing SPEED CHESS BOT

For phase V1 we define functions **getBestMove, evalFunc, mateOpportunity, opening and squareResPoints** within the class Engine.

- **getBestMove** – The function returns the best move possible by calling the engine function defined within the class. Since we do not have any past candidate when we initialize the code hence our initial parameters are -> (None,1)

- **evalFunc –** The function evaluates the position by counting the points of all pieces present on the board using the squareResPoints function defined within the class for all 64 squares on the Chess board. We further use random function to randomize the opening development of pieces by the computer and to help in alpha beta pruning .

- **mateOpportunity –** The function is mainly used to determine the mating position if there is any. If the count of legal moves is zero, then we return a large negative value in case the engine is getting checkmated and a large positive value in case the human is getting checkmated. We return large values to make the evaluation parameter very large negative or positive number which would further help us easily define the position as completely winning or completely losing.

- **Opening –** The function helps in the bot to develop pieces before the first 10 moves of the game by reducing the returned value of legal moves which would affect the evaluation parameters as count gets reduced.

- **squareResPoints –** The function assigns the value of points to the chess pieces according to the Hans Berliner's System.

Hans Berliner's Evaluation System

Hans Berliner was an international chess master and also a professor emeritus at Carnegie-Mellon University. During his countless observations and research experiments he established that the precise evaluation of a chess piece also depends on the position of the piece.

Symbol					
Piece	pawn	knight	bishop	rook	queen
Value	1	3.2	3.33	5.1	8.8

There are adjustments for the rank and file of a pawn and adjustments for the pieces depending on how open or closed the position is. Bishops, rooks, and queens gain up to 10 percent more value in open positions and lose up to 20 percent in closed positions. Knights gain up to 50 percent in closed positions and lose up to 30 percent in the corners and edges of the board. The value of a good bishop may be at least 10 percent higher than that of a bad bishop.

Value of pawn advances (multiplier of base amount)

Rank	Isolated	Connected	Passed	Passed & connected
4	1.05	1.15	1.30	1.55
5	1.30	1.35	1.55	2.3
6	2.1	—	—	3.5

Value of non-passed pawn in the opening

Rank	a & h file	b & g file	c & f file	d & e file
2	0.90	0.95	1.05	1.10
3	0.90	0.95	1.05	1.15
4	0.90	0.95	1.10	1.20
5	0.97	1.03	1.17	1.27
6	1.06	1.12	1.25	1.40

Value of non-passed pawn in the endgame

Rank	a & h file	b & g file	c & f file	d & e file
2	1.20	1.05	0.95	0.90
3	1.20	1.05	0.95	0.90
4	1.25	1.10	1.00	0.95
5	1.33	1.17	1.07	1.00
6	1.45	1.29	1.16	1.05