AI Project-01 Report on:

"MiniChess Board Game"

Submitted to:

Dr. Ahmedul Kabir
Associate Professor
Institute of Information Technology
University of Dhaka

Submitted by:

Team: BanglaReboot

Ibne Bin Rafid **(**BSSE **1330**)
Rejaul Karim **(**BSSE **1324**)
Mahir Faisal **(**BSSE **1316**)

Course- Artificial Intelligence (CSE-604)
Institute of Information Technology

Submitted on 13th November, 2024

Minichess AI Overview

The Minichess AI project is a Python library designed to simulate intelligent play in 'Minichess,' specifically the Chess Attack variant. This AI makes strategic moves using the Minimax algorithm with Alpha-Beta Pruning, efficiently exploring possible moves to optimize its decisions based on piece values and board state.

Core Components

- **Game Modes:** The AI offers "AI vs. Human" and "Human vs. Human" modes. With refined turn management, players can seamlessly alternate turns, meeting the core requirement for interactive gameplay.
- **Minimax & Alpha-Beta Pruning:** The AI evaluates moves with the Minimax algorithm, searching a game tree to a specified depth to identify the best move. Alpha-Beta Pruning optimizes this process by eliminating branches that won't affect the final decision, speeding up gameplay and allowing deeper analysis in less time.
- **Piece Evaluation Function:** Each chess piece has a predefined value (e.g., Pawn: 100, Queen: 900, King: 2000). This function enables the AI to gauge board strength accurately and prioritize moves that increase its advantage.
- **User Interface (UI):** The project includes a graphical interface, enabling interactive gameplay. Although functional, the UI has potential for graphical enhancement to improve the player experience.
- **Version Control:** The project is managed with version control, enhancing collaboration, tracking, and iterative improvements over time.

Repository : https://github.com/Juriez/Project-1_AI_miniChess
Used Technologies : Python, Pygame, Tkinter

Summary

The Minichess AI is a well-structured, strategic chess-playing program that leverages the power of Minimax and Alpha-Beta Pruning for intelligent gameplay. With features like piece evaluation and a functional GUI, it provides a solid foundation for both learning and practical AI applications in chess. Future updates could enhance the AI's efficiency and user experience, positioning this project as an insightful blend of game theory and computer science.

•