Title: Rock, Paper, Scissor AI Game

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1. Introduction

This project is based on the popular game Rock, Paper, Scissors. It is a simple console-based game where the user plays against the computer. The computer uses basic AI logic to learn from the player's past choices and tries to predict the next move. The main idea is to make the game more interactive and smarter.

2. Objectives

- Develop a console-based Rock, Paper, Scissors game using C++.
- Implement basic AI logic to predict the player's next move.
- Make the game interactive and challenging by learning player patterns.
- Help students understand pattern recognition and decision-making in programming.
- Gain hands-on experience with C++ programming concepts like loops, arrays, and functions.
- Provide a foundation for creating more advanced AI-based games in the future.

3. System Requirements

Hardware Requirements

- Processor: Intel i3 or above
- RAM: 2 GB or more
- OS: Windows, Linux, or macOS

Software Requirements

Any C++ compiler

4. Methodology

1. The user enters their choice — rock, paper, or scissors.
2. The computer stores the player's previous moves in a list.
3. The AI analyzes which move the player uses most often.
4. Based on this, it predicts the player's next move and chooses the counter move.

5. The result (win, lose, or tie) is displayed, and the game continues until the player quits.

5. System Architecture

1. **User Input:**
    - The player enters their move (rock, paper, or scissors).
    - Input is validated to ensure correct choice.
2. **Data Storage:**
    - Stores all previous player moves in a list or array.
    - This history is used by the AI to analyze patterns**.**
3. **AI Logic / Prediction:**
    - Checks the player's move history.
    - Finds the most frequent or likely next move.
    - Chooses the counter move to increase the chance of winning.
4. **Decision:**
    - Compares the player's move and AI's move.
    - Determines the winner of the round (player, AI, or tie).
5. **Output:**
    - Displays the moves of both player and AI.
    - Shows the result of the round.
    - Updates game history and continue until the player quits.
6. **Control Flow:**
    - Loops continuously until the user decides to exit.
    - Integrates all layers: Input → AI Prediction → Decision → Output → Repeat.

6. Results

The game successfully runs in the console. The AI adapts to player patterns and increases its winning chances over time. The output clearly displays both choices and the winner after each round.

7. Future Enhancements

- Add a **Graphical User Interface (GUI)**
- Add **multiplayer mode**, allowing two users to play against each other or over a network.
- Make it a **mobile or web-based game** using cross-platform frameworks.
- Include **adaptive difficulty levels**, where the AI adjusts its strategy based on the player's skill.

8. Conclusion

The Rock, Paper, Scissors AI Game shows how simple AI logic can make a basic game more interesting. It demonstrates how machines can "learn" from user behavior using simple pattern recognition. This project is easy to understand, fun to play, and a great starting point for learning artificial intelligence concepts.