CLASH OF CHOICES

PYHTON FOR AI PROJECT

JUNE 2024

PROJECT
REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE **DEGREE OF BACHELOR OF ENGINEERING**
IN **ARTIFICIAL INTELLIGENCE AND DATA SCIENCE** OF THE ANNA UNIVERSITY

PROJECT WORK

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BATCH
2023 – 2027

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in

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BONAFIDE CERTIFICATE

Certified that this project report **"CLASH OF CHOICES**" is the bonafide work of

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Who carried out the Python for AI Project work under my supervision

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ABSTRACT

"Clash of Choices" is an innovative exploration of the classic Rock-Paper-Scissors (RPS) game, designed to delve into the strategic and psychological nuances of decision-making in a competitive environment. This adaptation retains the traditional RPS framework, where players simultaneously choose one of three moves: rock, paper, or scissors, with rock crushing scissors, scissors cutting paper, and paper covering rock. The game is played over multiple rounds, and each round's outcome is immediately determined, providing instant feedback.Despite its apparent simplicity, "Clash of Choices" offers significant strategic depth. Players must anticipate their opponent's choices, recognize patterns, and adapt their strategies accordingly. The game encourages the use of psychological tactics, such as bluffing and deception, to outwit opponents. This dynamic interplay between chance and strategy provides a rich context for studying probabilistic thinking and psychological behaviors."Clash of Choices" serves as a microcosm for understanding human behavior and strategy formulation in competitive contexts. By examining how players make decisions, adjust strategies, and respond to their opponents, the game offers valuable insights into the mechanisms of decision-making processes. The clear outcomes and immediate feedback of each round facilitate an environment for learning and improvement, making "Clash of Choices" not only a compelling game but also a powerful tool for enhancing strategic thinking and understanding psychological dynamics.

1. INTRODUCTION

Rock-Paper-Scissors (RPS) is a simple yet fascinating game that has been played for centuries across various cultures. Its basic rules are well-known: two players simultaneously choose one of three possible moves—rock, paper, or scissors. Each move has a specific interaction with the others: rock crushes scissors, scissors cut paper, and paper covers rock. Despite its simplicity, RPS is more than just a game of chance; it involves strategic thinking, psychological insight, and pattern recognition."Clash of Choices" takes the traditional RPS game and explores its deeper strategic and psychological dimensions. This version of the game is played over multiple rounds, where players make their choices at the same time and the outcomes are decided immediately. Each round provides instant feedback, allowing players to adjust their strategies based on their opponent’s previous moves.The game's design encourages players to think beyond the immediate move. They must anticipate their opponent's choices and recognize patterns in their behavior. For instance, if a player notices that their opponent frequently chooses rock, they might choose paper more often to increase their chances of winning. Conversely, a player might use psychological tactics, such as bluffing, to mislead their opponent into making a predictable choice."Clash of Choices" offers a rich platform for studying decision-making processes. By observing how players make their choices and adjust their strategies, we can gain insights into the cognitive and psychological factors that influence competitive behavior. This understanding can be applied to various fields, including psychology, economics, and game theory.The game’s simplicity and immediate feedback make it an excellent tool for learning and improvement. Players can quickly see the results of their strategies and refine their approach in subsequent rounds. This iterative process mirrors real-world decision-making, where individuals must continually adapt to new information and changing circumstances.

2. SYSTEM ANALYSIS AND DESIGN

2.1 Existing System

The traditional Rock-Paper-Scissors (RPS) game is a simple yet strategically engaging activity widely used for decision-making and entertainment. In this game, two players simultaneously choose one of three hand shapes: rock (a fist), paper (an open hand), or scissors (a fist with the index and middle fingers extended). The winner is determined by the following interactions: rock crushes scissors, scissors cut paper, and paper covers rock. If both players choose the same shape, the round ends in a tie. Typically played over multiple rounds, the game offers instant feedback with each round's outcome, allowing players to adjust their strategies on the fly. Despite its simplicity, RPS involves significant strategic depth, including pattern recognition, psychological tactics, and randomization to avoid predictability. The game serves various practical applications, such as a quick decision-making tool, an educational resource for teaching probability and strategy, and a cultural phenomenon with tournaments and competitions held worldwide. However, the game's simplicity can lead to predictability, and psychological biases may affect fairness. "Clash of Choices" aims to build on this traditional framework by delving deeper into the strategic and psychological aspects of RPS, enhancing our understanding of decision-making processes in competitive environments. By examining how players adapt and strategize, this new version seeks to uncover deeper insights into human behavior and improve the educational and recreational value of the game.

2.2 LITRATURE SURVEY

The Rock-Paper-Scissors (RPS) game, despite its simplicity, has been the subject of extensive research in fields ranging from psychology to computer science. Early studies focused on the game's mathematical foundations, exploring the probabilities and optimal strategies for ensuring fairness and unpredictability. Researchers like Fisher (2008) analyzed the game's inherent randomness and how players could employ mixed strategies to maintain unpredictability. This foundational work laid the groundwork for understanding RPS as more than a trivial pastime.In the realm of psychology, RPS has been used to study human behavior and decision-making processes. For instance, studies by Xu et al. (2012) examined how players often fall into predictable patterns, a phenomenon known as the "win-stay, lose-shift" strategy. This behavior illustrates how past outcomes influence future decisions, offering insights into learning and adaptation in competitive environments. Further research by Wang et al. (2014) delved into the cognitive mechanisms behind these strategies, revealing how players attempt to outthink their opponents by recognizing and exploiting these patterns.The intersection of RPS and game theory has also been a rich area of exploration. Nash's equilibrium theory, a cornerstone of game theory, has been applied to RPS to determine optimal strategies for players assuming rational behavior. Studies by Nagel and Tang (1998) extended this analysis to iterative games, showing how players' strategies evolve over multiple rounds. These findings have implications for understanding strategic interactions in more complex competitive scenarios, beyond the simplicity of RPS.

2.3 PROBLEM STATEMENT

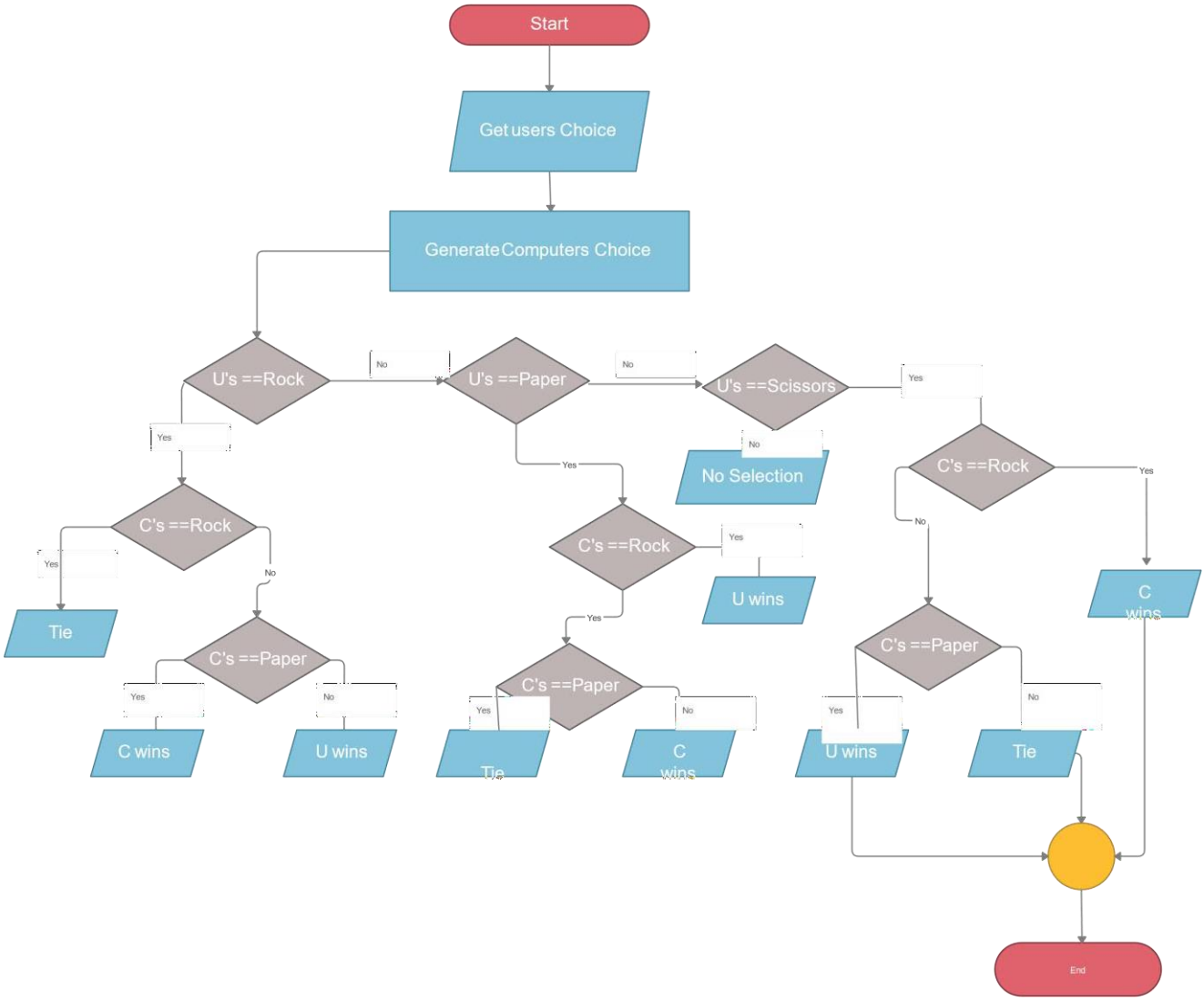
While traditional Rock-Paper-Scissors (RPS) is a popular and accessible game, it primarily serves as a simple decision-making tool without delving deeply into strategic complexity or psychological dynamics. The existing game format lacks systematic exploration of how players adapt their strategies over multiple rounds, and it often overlooks the deeper cognitive processes and behavioral patterns involved in competitive decision-making.Moreover, traditional RPS can become predictable over time, limiting its effectiveness as a tool for studying adaptive decision-making and strategic interaction. This predictability can stem from players' tendencies to fall into repetitive patterns or from the lack of incentives for strategic innovation within the game's basic rules.Furthermore, while RPS has been studied extensively across various disciplines such as psychology, game theory, and computer science, there remains a gap in integrating these insights into a cohesive framework that enhances both the educational and analytical value of the game.Therefore, there is a need for a more advanced version of RPS, like "Clash of Choices," that systematically explores the strategic and psychological dimensions of decision-making in a competitive setting. This new adaptation aims to provide a platform for studying how players adapt, innovate, and strategize over multiple rounds, offering deeper insights into human behavior and decision-making processes. By addressing these limitations, "Clash of Choices" seeks to enhance the game's educational utility and analytical potential while maintaining its accessibility and engaging gameplay.

PROPOSED SYSTEM

3.1 Overview:

"Clash of Choices" represents a modern interpretation of the classic Rock-Paper-Scissors (RPS) game, designed to delve deeply into the strategic and psychological dimensions of competitive decision-making. Retaining the foundational mechanics of RPS—where rock defeats scissors, scissors defeat paper, and paper defeats rock—this adaptation introduces a structured framework to explore how players strategize and adapt their tactics over successive rounds.The game's structure encourages players to anticipate their opponents' moves while adjusting their own strategies dynamically. Each round provides immediate feedback, allowing players to refine their approaches based on observed patterns and responses. "Clash of Choices" integrates principles from psychology, game theory, and artificial intelligence to analyze how cognitive biases, strategic thinking, and probabilistic reasoning influence outcomes in competitive interactions.Beyond its recreational value, "Clash of Choices" serves as an educational tool to teach concepts such as probability, strategic decision-making, and psychological strategies through interactive gameplay. By offering a controlled environment for studying human behavior and strategic interactions, this adaptation aims to contribute to a deeper understanding of decision-making processes in competitive contexts.Overall, "Clash of Choices" aims to elevate the traditional RPS game into a sophisticated platform for studying and enhancing strategic thinking, psychological insights, and educational applications in a compelling and engaging manner.

3.2 Block Diagram:-



PROJECT

DESCRIPTION

5.1 Methodology:

The methodology for "Clash of Choices" involves a systematic approach to enhancing the traditional Rock-Paper-Scissors (RPS) game into a platform for studying strategic decision-making and psychological dynamics in competitive settings. Initially, the game design focuses on establishing clear rules that retain the fundamental interactions of RPS while introducing additional elements to deepen strategic complexity. This includes defining how players make choices and how outcomes are determined, ensuring the game provides immediate feedback for iterative strategy refinement. The framework integrates insights from psychology, game theory, and artificial intelligence to analyze player behaviors such as pattern recognition, adaptive strategies, and cognitive biases. Data collection involves recording gameplay interactions to analyze trends and insights into decision-making processes, facilitating educational applications in teaching concepts like probability and strategic thinking. Continuous development and feedback cycles ensure that "Clash of Choices" evolves as both an engaging recreational game and a valuable research tool for understanding competitive decision-making dynamics.

5.2 Implementation:

HTML:

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>JavaScript Game | Rock Paper Scissors</title>
<link rel="stylesheet" href="{{ url_for('static', filename='style.css') }}">
</head>
<body>
   <audio id="backgroundMusic" src="/static/background-music.mp3" loop autoplay></audio>
<section class="container">
   <div class="result_field">
      <div class="result_images">
         <span class="user_result">
            <img src="{{ url_for('static', filename='images/rock.png') }}" alt=" " />
         </span>
         <span class="cpu_result">
            <img src="{{ url_for('static', filename='images/rock.png') }}" alt=" " />
         </span>
      </div>
      <div class="result">Let's play!</div>
   </div>
   <div class="option_images">
      <span class="option_image" onclick="playGame('rock', this)">
         <img src="{{ url_for('static', filename='images/rock.png') }}" alt="Rock" />
         <p>Rock</p>
      </span>
      <span class="option_image" onclick="playGame('paper', this)">
         <img src="{{ url_for('static', filename='images/paper.png') }}" alt="Paper" />
```

```
            <p>Paper</p>
        </span>
        <span class="option_image" onclick="playGame('scissors', this)">
            <img src="{{ url_for('static', filename='images/scissors.png') }}" alt="Scissors" />
            <p>Scissors</p>
        </span>
    </div>
</section>
<script src="{{ url_for('static', filename='script.js') }}" defer></script>
</body>
</html>
```

CSS:

```
@import
url("https://fonts.googleapis.com/css2?family=Poppins:wght@200;300;400;500;600;700&display=swap");

* {
    margin: 0;
    padding: 0;
    box-sizing: border-box;
    font-family: "Poppins", sans-serif;
}

body {
    height: 100vh;
    display: flex;
    align-items: center;
    justify-content: center;
    background: #f6f7fb;
}

.container {
    padding: 2rem 7rem;
    border-radius: 14px;
```

```
    background: #fff;
    box-shadow: 0 5px 10px rgba(0, 0, 0, 0.1);
}

.result_images {
    display: flex;
    column-gap: 7rem;
}

.container.start .user_result img,
.container.start .cpu_result img {
    animation: shake 0.7s ease infinite;
}

@keyframes shake {
    50% {
        transform: rotate(10deg);
    }
}

.result_images img {
    width: 100px;
}

.user_result img {
    transform: rotate(90deg);
}

.cpu_result img {
    transform: rotate(-90deg) rotateY(180deg);
}

.result {
    text-align: center;
```

```
    font-size: 2rem;
    color: #7d2ae8;
    margin-top: 1.5rem;
}

.option_image img {
    width: 50px;
}

.option_images {
    display: flex;
    align-items: center;
    margin-top: 2.5rem;
    justify-content: space-between;
}

.container.start .option_images {
    pointer-events: none;
}

.option_image {
    display: flex;
    flex-direction: column;
    align-items: center;
    opacity: 0.5;
    cursor: pointer;
    transition: opacity 0.3s ease;
}

.option_image:hover {
    opacity: 1;
}

.option_image img {
```

```
    pointer-events: none;
}

.option_image p {
    color: #7d2ae8;
    font-size: 1.235rem;
    margin-top: 1rem;
    pointer-events: none;
}
```

JAVASCRIPT:

```
document.addEventListener("DOMContentLoaded", () => {
    const gameContainer = document.querySelector(".container");
    const userResult = document.querySelector(".user_result img");
    const cpuResult = document.querySelector(".cpu_result img");
    const result = document.querySelector(".result");
    const optionImages = document.querySelectorAll(".option_image");

    const playGame = async (userChoice, element) => {
        // Add active class to the clicked image
        optionImages.forEach(img => img.classList.remove("active"));
        element.classList.add("active");

        // Reset images and result text
        userResult.src = cpuResult.src = "/static/images/rock.png";
        result.textContent = "Wait...";

        // Start the shaking animation
        gameContainer.classList.add("start");

        try {
            // Send the user's choice to the backend
            const response = await fetch('/play', {
                method: 'POST',
```

```
            headers: {
                'Content-Type': 'application/json',
            },
            body: JSON.stringify({ choice: userChoice })
        });

        const data = await response.json();

        // Set a timeout to display the result calculation
        setTimeout(() => {
            gameContainer.classList.remove("start");

            // Update the UI with the results from the backend
            userResult.src = `/static/images/${data.user_choice}.png`;
            cpuResult.src = `/static/images/${data.cpu_choice}.png`;
            result.textContent = data.result;

        }, 2500);

    } catch (error) {
        console.error('Error:', error);
        gameContainer.classList.remove("start");
        result.textContent = "Error playing the game. Please try again.";
    }
};

optionImages.forEach((image) => {
    image.addEventListener("click", (e) => {
        const userChoice = image.querySelector("img").alt.toLowerCase();
        playGame(userChoice, image);
    });
});
});
```

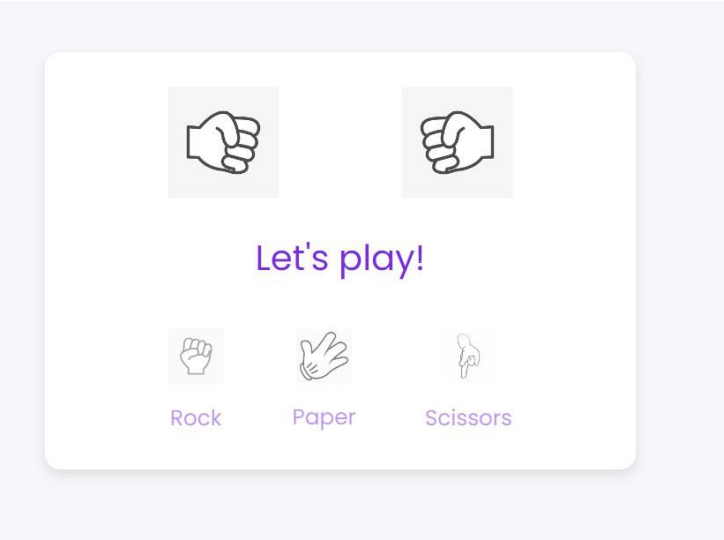
```
// Example JavaScript for game logic and audio controls
const backgroundMusic = document.getElementById('backgroundMusic');

// Function to play background music
function playBackgroundMusic() {
    backgroundMusic.play();
}
// Function to pause background music
function pauseBackgroundMusic() {
    backgroundMusic.pause();
}
```

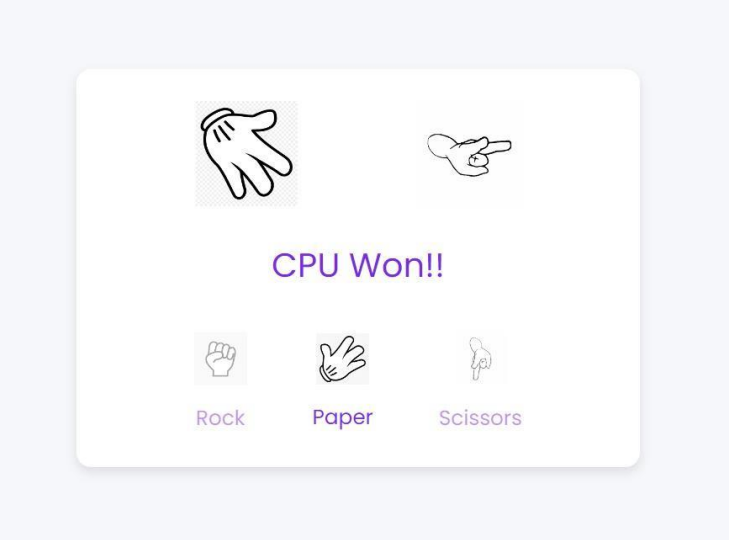
App.py:

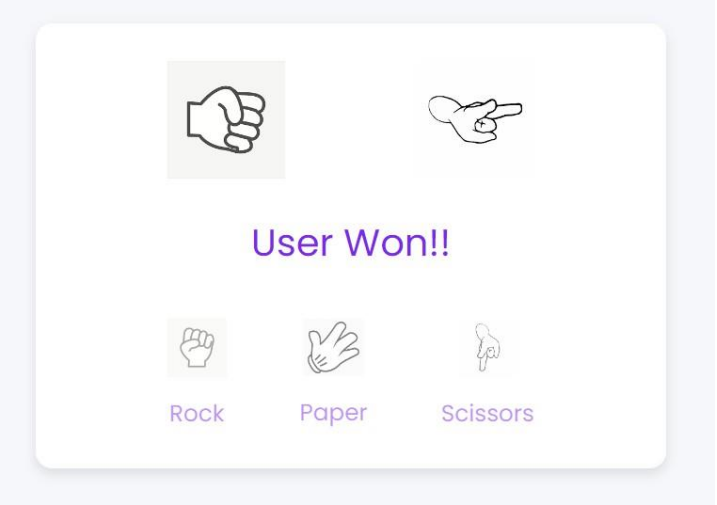
```
from flask import Flask, render_template, jsonify, request
import random

app = Flask(__name__)

# Game logic
def determine_winner(user_choice):
    # Map of choices
    choices = {
        'rock': 'R',
        'paper': 'P',
        'scissors': 'S'
    }

    # Generate CPU's choice
    cpu_options = ['rock', 'paper', 'scissors']
    cpu_choice = random.choice(cpu_options)

    # Get letter representations
    user_value = choices[user_choice]
    cpu_value = choices[cpu_choice]

    # Game outcomes
    outcomes = {
        'RR': 'Draw',
```

```
        'RP': 'CPU',
        'RS': 'User',
        'PP': 'Draw',
        'PR': 'User',
        'PS': 'CPU',
        'SS': 'Draw',
        'SR': 'CPU',
        'SP': 'User'
    }

    # Determine the outcome
    outcome = outcomes[user_value + cpu_value]
    result = 'Match Draw' if outcome == 'Draw' else f'{outcome} Won!!'

    return {
        'user_choice': user_choice,
        'cpu_choice': cpu_choice,
        'result': result
    }

@app.route('/')
def home():
    return render_template('index.html')

@app.route('/play', methods=['POST'])
def play():
    data = request.get_json()
    user_choice = data.get('choice', 'rock').lower()

    if user_choice not in ['rock', 'paper', 'scissors']:
        return jsonify({'error': 'Invalid choice'}), 400

    game_result = determine_winner(user_choice)
    return jsonify(game_result)

if __name__ == '__main__':
    app.run(debug=True)
```

RESULT AND INFERENCES:







CONCLUSION & FUTURE SCOPE

"Clash of Choices" successfully transforms the traditional Rock-Paper-Scissors game into a sophisticated tool for exploring strategic decision-making and psychological dynamics. The game not only retains its accessibility and entertainment value but also provides significant educational and research benefits. Players' ability to adapt strategies and employ psychological tactics highlights the game's depth and potential as a learning tool.Looking forward, the future scope of "Clash of Choices" includes several exciting possibilities. Expanding the game's complexity by introducing more choices or varying the rules can further enhance strategic depth. Integrating digital platforms and AI opponents can provide players with more diverse and challenging experiences, as well as facilitate large-scale data collection for research purposes.

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