Tic-Tac-Toe Solver in Python

Title Page

Project Title: Tic-Tac-Toe Solver in Python
Name: Akhil Pratap Singh
Roll No: 202401100400021
Institution: Kiet Group of Institutions

Introduction

Tic-Tac-Toe is a classic two-player game played on a 3x3 grid. The objective is to place three marks in a row, column, or diagonal before the opponent. This report presents a Python-based Tic-Tac-Toe solver that determines the best move for the AI player and identifies the game outcome.

Methodology

The approach used in this project involves:

1. Creating a board representation as a 3x3 list.
2. Implementing a function to check for a winner by evaluating rows, columns, and diagonals.
3. Designing a move selection function that chooses the first available empty cell.
4. Printing the board after each move.
5. Running a loop until a win condition or a draw is met.

Output/Result

```python
import numpy as np

def check_winner(board):
    """Checks if there's a winner."""
    for row in board:
        if all(cell == 'X' for cell in row):
            return 'X'
        if all(cell == 'O' for cell in row):
            return 'O'

    for col in range(3):
        if all(board[row][col] == 'X' for row in range(3)):
            return 'X'
        if all(board[row][col] == 'O' for row in range(3)):
            return 'O'

    if all(board[i][i] == 'X' for i in range(3)) or all(board[i][2-i] == 'X' for i in
        return 'X'
    if all(board[i][i] == 'O' for i in range(3)) or all(board[i][2-i] == 'O' for i in
        return 'O'

    return None
```

References/Credits

- Python documentation: https://docs.python.org/3/
- AI and game theory concepts from various online sources.