# TIC-TAC-TOE USING REINFORCEMENT LEARNING

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# AGENDA

- Statement of Project Objectives
- Approach
- Deliverables
- Evaluation Methodology
- Conclusion

# STATEMENT OF PROJECT OBJECTIVES

- The Objective is to create an intelligent system that can optimally play Tic-Tac-Toe.
- Reinforcement Learning could be used to meet this objective.
- Training phase: Two different AI agents can play against each other.
- Test phase: The trained AI Model will play against a human being.

# APPROACH



Reinforcement Learning is the chosen approach.

- State
- Action
- Reward

→ **Reward** the agent based on the **Action** it has taken on a **State**.

1. Train the Model
2. Allow it to play against a human being.

# REINFORCEMENT LEARNING EXPLAINED...

- Reinforcement learning works in the following way.
- There are certain number of states of any problem to be solved. One of these states is the 'goal' state, which is to be ideally achieved.
- Then there is another factor called an action, which is taken over a state. The system is supposed to take an action on the current state, which may not may not lead to the goal state.
- While training, our system takes action, and receives a reward based on whether that action leads to the goal state or not.
- Based on these rewards, the system learns what actions should be taken on what state.

# APPROACH

## STEPS INVOLVED IN SETTING-UP TIC-TAC-TOE

- TWO AGENTS PLAY AGAINST EACH OTHER
- REWARDS ARE PROVIDED BASED ON ACTION
- POLICY IS SETUP BASED ON THIS REWARD
- MODEL BECOMES READY TO PLAY AGAINST HUMAN
- HUMAN BEING PLAYS AGAINST THE MODEL

# APPROACH

- Realm of Artificial Intelligence used: Reinforcement Learning
- Technologies used: Python
- IDE used: VS Code
- Version Control: GitHub

# DELIVERABLES

Submission of GitHub Link having the repository with entire code, Documentation(User manual), and Demo.

Link to YouTube video which will contain demonstration of our running code along with slides and output showcase.

# EVALUATION METHODOLOGY

The project can be evaluated based on following criteria:

- Accurate Functioning of AI agent without any failures during the game.
- The final goal and actions of the agent should be based on defeating the opponent agent while training and the human/user while actual implementation.
- The agent should be trained in such a way that while playing with a human player, it should seem as if two human brains are playing.
- Correct implementation of Reinforcement Learning and algorithms based on it.

# CODE DEMONSTRATION