

Problem Formulation:

The problem is to create an AI-based system that can play the game of tic-tac-toe (X-O) against a human player. The system should be able to make intelligent moves and aim to win the game or at least achieve a draw if winning is not possible. The objective is to develop an algorithm that can play the game effectively and provide a challenging opponent for the human player.

PESA (Performance, Environment, Sensors, Actuators) for X-O Game:

Performance:

The AI system should aim to win the game against the human player or achieve a draw if winning is not possible.

The system's performance can be evaluated based on the number of wins, losses, and draws against human players.

The system should make intelligent and strategic moves to maximize its chances of winning.

Environment:

The environment is the tic-tac-toe game board consisting of a 3x3 grid.

The game board has nine cells where players can place their symbols (X or O).

The game progresses turn by turn until a player wins or the game ends in a draw.

Sensors:

The system needs to sense the current state of the game board to make informed decisions.

It should be able to detect the positions of X and O symbols on the board.

The system should be aware of the current player's turn (AI or human).

Actuators:

The system should be able to make moves on the game board by placing its symbol (X) in an empty cell.

It needs to select a suitable cell based on its AI strategy to maximize its chances of winning or achieving a draw.

The system should provide the chosen move to update the game board and continue the game.

PESA provides a framework for understanding the key aspects of the problem and designing the AI system for the X-O game. It helps identify the performance objectives, the game environment, the required sensing capabilities, and the necessary actions to be taken by the AI system.