

## Assignment - 1

**A robotic soccer agent that plays on a team composed of 3 robots. The opposing team also has 3 robots and the field is defined as a 3 ft wide and 6 ft long. Assume standard soccer rules apply and the 3 robots may play any position you define.**

**Characterize the environment according to the properties (e.g., Fully Observable vs. Partially Observable; Deterministic vs. Stochastic; Episodic vs. Sequential; Static vs. Dynamic; Discrete vs. Continuous; Single Agent vs. Multi Agent).**

### **Fully Observable vs. Partially Observable**

The environment is Partially Observable.

- ✧ not allow it to see its complete set of state - (each robot may not have complete information about the entire field at all times.).
- ✧ sensors provide limited information based on their field of view and position.

### **Deterministic vs. Stochastic**

The environment is Stochastic.

- ✧ not allow its next state and actions.
- ✧ the robot can be programmed to perform certain actions, there are elements of uncertainty such as mechanical errors, or unexpected interactions with the ball and other robot.

### **Episodic vs. Sequential**

The environment is Sequential.

- ✧ needs to think ahead.
- ✧ the outcome of the game unfolds over time
- ✧ the game progresses over time.

### **Static vs. Dynamic**

The environment is Dynamic.

- ✧ does not change while the performance measure changes.
- ✧ changes over time.
- ✧ the robot and the ball are moving and the robot must adapt their strategies as the game progress.

### **Discrete vs. Continuous**

The environment is Continuous.

- ✧ the robot and the ball can move in a fluid range of motions and positions across the field.
- ✧ continuously changing state

### **Single Agent vs. Multi Agent**

The environment is Multi Agent.

- ✧ There are multiple robots interacting with each other, both cooperatively on the same team and competitively against the opposing team.

**A robotic soccer agent that plays on a team composed of 3 robots. The opposing team also has 3 robots and the field is defined as a 3 ft wide and 6 ft long. Assume standard soccer rules apply and the 3 robots may play any position you define.**

**Select a suitable agent design based upon the agent definitions (e.g., Simple Reflex Agent; Model Based Reflex Agent; Goal Based Agent; Utility Based Agent; Learning Agent). Be certain to justify your choice by indicating how that specific definition fits the problem above.**

According to me a suitable agent design for the robotic soccer problem is a **model-based reflex agent**.

- ✧ Handles partial observability through using percept history.
- ✧ Each agent has a set of sensors, such as cameras, infrared range finders, and microphones, that allow it to perceive its environment and the state of the game.
- ✧ Each agent has a set of actuators, such as wheels, motors, and speakers, that allow it to move and manipulate the ball, and communicate with other agents.
- ✧ Each agent has an internal model of the environment, the game rules, and the strategies of its own team and the opponent's team.
- ✧ The problem has a simple and clear goal, which is to score more goals than the opponent. A model-based agent does not need to plan ahead or consider multiple alternatives, as long as it can achieve its goal based on its model and rules.