Soccer Playing AI Agents Using Finite State Machines

1.0 About

This project is to create set of agents which can play a soccer game with few simple rules. An agent is controlled by a finite state machine.

2.0 Implementation

The game has five players for each side. A the purpose of a player is to take the ball through the boundary of the other side (goal) . The state machine of an agent has five states WAIT, FALLOW_BALL, KICK_BALL, RETURN_HOME and GO_OPP. WAIT is the start state. A start position and a random position near opposite side's goals are initially given to a player. Rest of the actions are happening according to the figure 2.0.
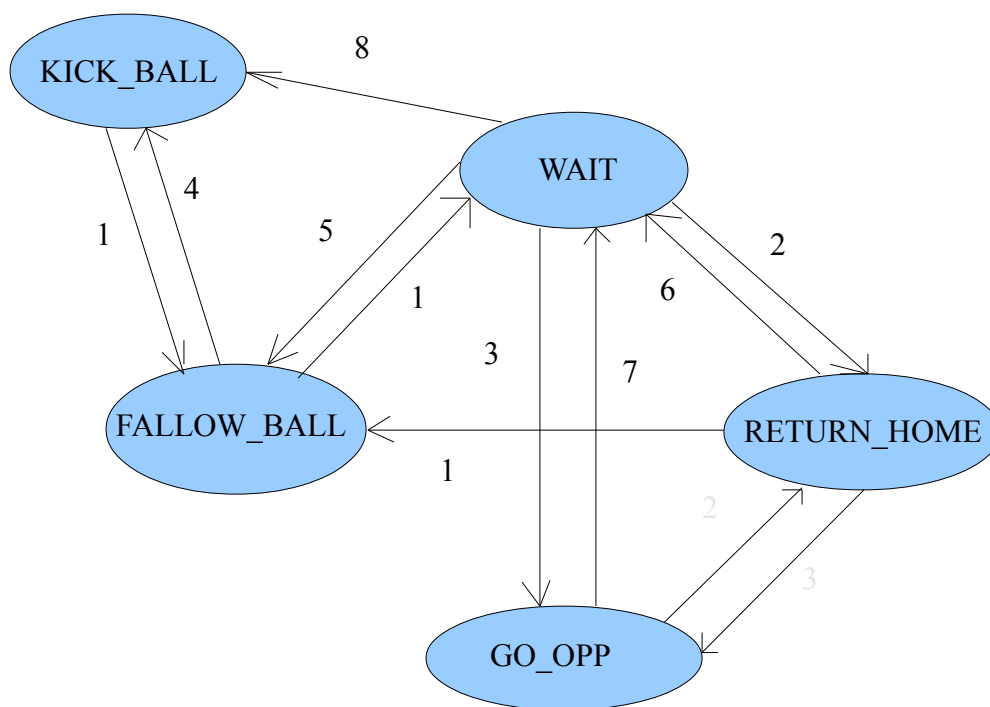

Figure 2.0 Player State Machine

State change conditions for the player are as fallows,

1 – player is the nearest player to the ball.
2 – ball is near to the team's goal and the player is not in its start position. (this is the position which the player is given initially)
3 - ball is near to the opposite team's goal and the player is not in its opposite position. (this is the random opposite position which the player is given initially)
4 - player is the nearest to the ball and the distance between ball and him is less than 20 pixels.
5 - player is not the nearest to the ball and the distance between ball and him is greater than 20 pixels.
6 - Player is on start position.
7 - Player is on opposite position.

The ball is also uses a state machine (figure 2.1). It has STOP, MOVE and QUICK_MOVE states. The initial state will be the STOP state. The ball has a current position and a intended position. When it moves it changes it current position to intended position until it gets there or it is interrupted by a player.
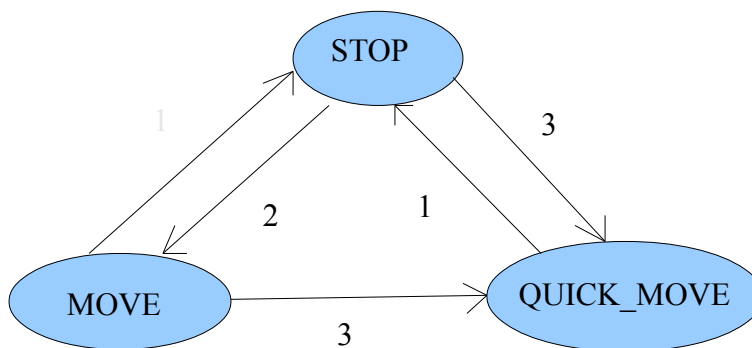

Figure 2.1 Ball State Machine

The state change conditions for the ball are as fallows,

1 – ball is on intended position
2 – ball is not on intended position
3 - Request from player (Player uses this request when ball is at less than 60 pixels from the goal)

Initially players from each side and the ball is created and the state changes begin and game will be played.

3.0 Running

This script is written in python. Install 'python' and 'Tkinter' to run the script. (use synaptic package manager in Ubuntu to install them) .

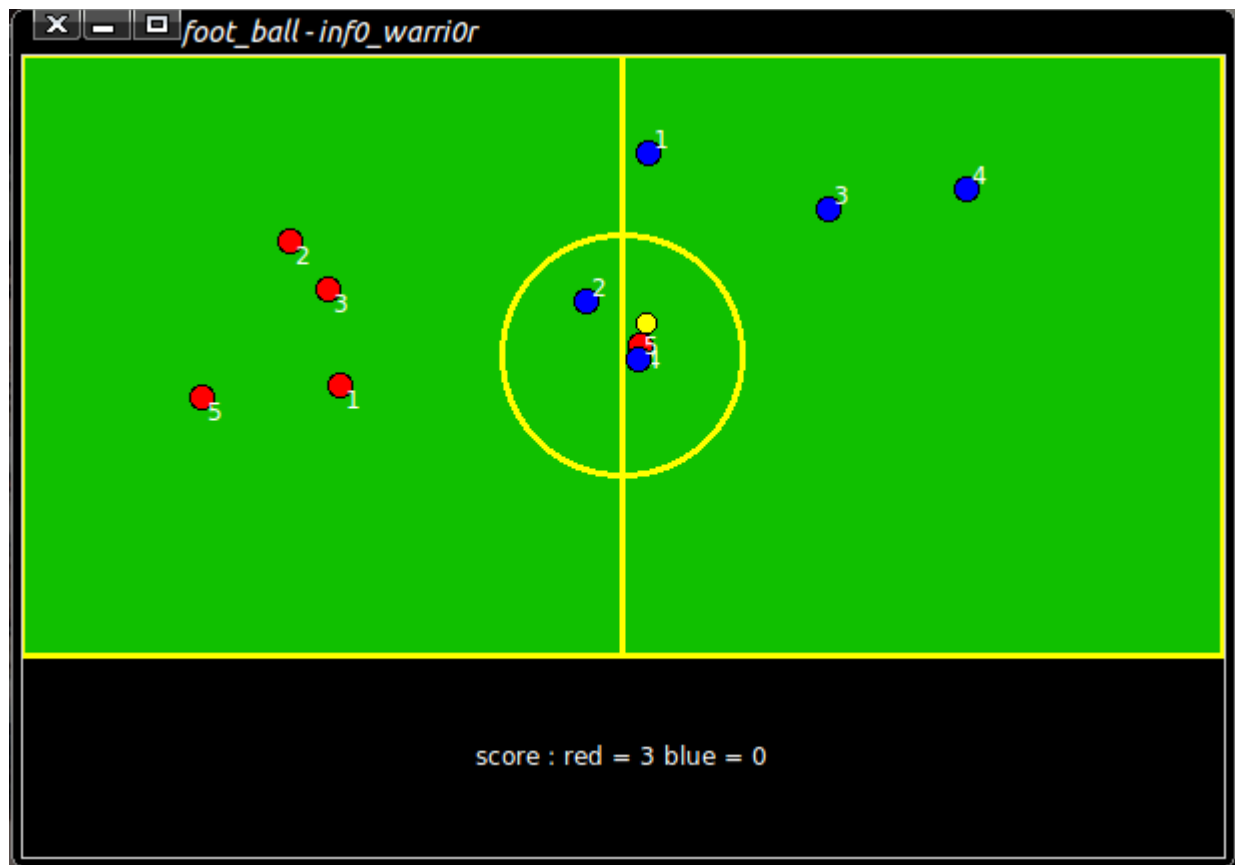use command ,

  python soccer_game.py

4.0 Screen Shots

Figure 4.0

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6.0 Licenses