Milestone 2 Individual Report

Michael Johnson   s0825874   Alpha Team (Group 8)

For this milestone I worked with Paul on the AI and also prototyped a design for a new kicker.

AI

Working on the AI, I implemented the methods for the robot to do various tasks. These included:

- Chasing the ball
- Detecting if it was possible to shoot from current position
- Aiming at the goal if it was visible

The algorithms were mostly successful with it being able to go to the ball 10/10 times when it was placed in front of it. It was less successful at getting to the ball placed anywhere on the pitch with it only reaching the ball 8/10 times. The two times it failed was due to there being no special case for when the ball is near a wall. When the robot attempts to go to a ball near the wall, it sometimes runs into the wall and ends up facing directly at the wall. The current algorithms don't account for this situation and so the robot just keeps driving into the wall. A possible quick fix is to make the robot reverse a small amount if the ball is not within an 80° angle of its forward direction.

Kicker

My work on the kicker has been mainly to help with a possible strategy for the AI. At the start of the match, it seems like a good strategy would be to sprint to the ball, turn to the wall and kick it into the goal by bouncing it off a wall. This seems like it would work assuming the enemy robot will always try sprinting for the ball as well. Because both robots will probably be close to the ball, a direct kick into the goal might not be possible. However to bounce the ball of a wall requires a powerful kicker and our current design just wasn't up for the task.

The initial idea for the kicker came from a paper on the RoboRoos RoboCup robot developed by the University of Queensland.

If instead of powering the kicker directly with the motor, the motor stored energy in elastic bands, then a single motor should be able to supply a lot more power to the kick.

After making a quick prototype of the design we did some tests comparing it to the current design by measuring the time it took the ball to travel across the pitch after a kick.

Times	Current Design	Prototype
1	3.4	1.1
2	3.7	1.6
3	3.8	1.5
4	3.1	1.6
5	3.2	1.2
6	2.7	1.6
7	3.2	2.0
8	2.8	1.9
9	2.9	1.2
10	2.9	1.7
Avg.	**3.17**	**1.54**

This table shows that the new kicker can kick the ball more than twice as fast as the current design. The new kicker was also tested by kicking it against the wall and it has enough power to bounce off it, however the speed afterwards, although sufficient, could still be better.