Project description

And more information regarding the project

Contents

[Introduction 3](#_Toc151472541)

[Problem Definition 4](#_Toc151472542)

[Technology Readiness Level 5](#_Toc151472543)

[Risk 6](#_Toc151472544)

[End Goal 7](#_Toc151472545)

## Introduction

Soccer has been an ever-loved sport in the European world, with it now even spreading more vigorously to other continents. An increasingly popular method of jumping on the “soccer bandwagon”, is robots.

To eliminate the need for athletes, and to allow people who prefer tinkering instead of working out to enjoy soccer; robot soccer has been ‘invented’. These robot soccer matches are played all over the world and are experienced as equally as important as real-life soccer.

This project aims to recreate a soccer robot while using omni-wheel technology. These are specialized wheels which enable movement in a different way than conventional wheels. With this technology we aim to recreate a soccer robot with an aim to precise movement and localization.

## Problem Definition

Due to various factors, the robot currently does not have the ability to determine if the point it was being sent to; is reached. It knows it has been sent to a point, it knows it drove its motors; but it cannot figure out if the destination is reached/reached successfully (no overshoot, slippage etc). This is the main problem of this assignment.

## Technology Readiness Level

The Technology Readiness Level (TRL) indicates in what state the product should be in when it is delivered. It is also used to describe in what state the product is in when the project starts. In total nine levels of TLR can be seen below.

A diagram of a technology readness level

Description automatically generated with medium confidence

Figure 1: Technology readiness levels

The project was handed to us in level 3, though in pieces. This proof of concept showed a remarkable ability to run robots using three omniwheels, though just not perfected yet.

Our goal is to improve our TLR to at least level 5, which is an environment where football robots usually reside. What this means is that the robot should be able to traverse the floor and terrain of an indoor football field without errors.

With this goal in mind, we start at level 2 of the TLR scale because we already have the concept from the product owner. It should end on level 5 on the TLR scale where we tested the product in a relevant environment. This could be a relevant indoor floor, most likely a canvas material. Ideally, we demonstrate the product in a relevant environment so that we finish the product at level 6 on the TLR scale; though it might lack actuators to handle the ball for that.

## Risk

|  |  |  |
| --- | --- | --- |
| Risk | Risk Prevention | Risk Reduction if it happens |
| 1. A member is ill or leaves the group | - | The group members discuss what they are doing. This will reduce the impact of time trouble. |
| 1. In relation to software quality | Test every part independently so not everything will not work | Revise the last version and test more. |
| 1. Hardware is broken | Be careful with the hardware | Simulation could be possible. |
| 1. Software is lost (like not saving) | Upload everything before the end of the day in git | Revise the last backup and redo the stuff that is important. |
| 1. Lack of communication with the team members so that every member has an idea of what others are doing | A stand-up would help | Start a meeting and make rules so it will not happened again. |
| 1. Hardware could not be delivered on time | Order as fast as possible | Search for a new hardware module. |

## End Goal

The end goal of the project is to create a robot which can precisely reach and navigate to a given destination using three omni wheels. The use case for this ability is to utilize the robot as a competitive soccer robot, though no requirements were put in place to make it be compatible with moving/shooting a football. The goal revolves around movement and placement of the robot.