

ITSP 2016

TEAM NAME: VIRTUAL JOCKEYS

MEMBERS:

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PROJECT NAME: 2π -mapper



Introduction:

This project will be related to the field of Robotic mapping. We will be making an autonomous robot which will be able to map an unknown environment through navigation and using feedback mechanisms. We will also provide a camera through which the user can take manual control and control the robot through a Laptop.

Components Required:

- Circular Platform for the Base of the Robot
- 3 Omniwheels
- Small Camera (**VC0706 UART VGA Camera**)
- Ultrasonic Range Finder - LV-MaxSonar-EZ1 (alternate Ultrasonic Range Finder XL-AE4 (MB1340) I'll let you know the pros and cons)
- Laptop
- Raspberry Pi
- XBee Wifi module
- Cardboard boxes for building the Maze

Skills Required:

1. Interfacing between Camera Module and Laptop
2. Simultaneous Localization and Mapping implementation in simple environments like a Maze
3. Knowing how to build a Robot that can move in any direction instantaneously using Omni Wheels
4. How to use Raspberry Pi Module for interfacing between sensors and cameras

How are we Going to Implement it:

- Week 1
 - One group starts working on the mechanical aspects of the robot - integrating the omniwheels with the circular platform of the Robot and finishes it in this week.
 - Other group starts learning Raspberry Pi and achieves basic usage (how to program it) and **Wi Fi** communication between Raspberry Pi and Laptop
- Week 2
 - One group starts working on calibrating and integrating sensors with the Raspberry Pi Module. They also decide the positions of the sensors on the Robot
 - Other group starts learning about how to implement SLAM in simple 2D environments with simple block type Obstacles
- Week 3
 - Bring together the mechanical, electronics and programming aspects and work on how to integrate them. Finalize SLAM implementation. Robot is now able to move on its own and able to map and Localize the environment.
- Week 4
 - One group begins work on integrating the camera module and how to wirelessly send the footage to a laptop
 - Other group begins work on how to wirelessly control the bot through a computer. Establish wireless communication between robot and computer and move the robot through laptop input (possibly W, A, S, D).
- Week 5
 - Finalize the integration of camera and control of robot through laptop
 - Apply finishing touches to the project

What do we expect to learn:

- How to use Range finders and implement Kiwi Drive Robot Platform
- Processing sensor input and basic implementation of SLAM
- Technology related to Raspberry Pi and how to integrate different modules with it especially wireless integration with laptop