

## October, 15-21 Weekly Report

### 1 Progress

- General folder structure is initialized for the Github repository in order for us to use Github more efficiently.
- Business Statement Report is finalized.
- Members started searching possible solutions for the projects.
- Started working on component. Common components are for all projects prioritized.
- Possible concepts that could be applied for the solution of the "Devices trying to extract the plan of their surroundings" project are:
  - A\* Algorithm: A search algorithm that is one of the best and popular technique used in path-finding and graph traversals. This might be used to navigate the robot inside the walls.
  - Wavefront Mapping: A mapping technique that are used in robots to map-out the field they are placed in.
  - Holonomic or Non-Holonomic Motion: Holonomic motion provides the robot to move in any direction immediately. Non-Holonomic motion requires several attempts to move in any direction(like cars).
  - Bumping to objects and walls can be prevented by using sonar distance sensors.
  - Existence of an obstacle can be detected by using IR sensors.
- Possible concepts that could be applied for the solution of the "Vehicles chasing each other around a closed course with varying properties" project are:
  - Physical appearance of the vehicle should be allowing the flow of air like F1 cars.
  - The mass center should not be distributed evenly on front and back wheels as in F1 cars.
  - The main concept of the vehicle is similar to a line follower robot.
  - Besides color sensing, images can be captured with a camera for better turns. (might slow down the car, processing time)
  - Sonar sensors are to be placed on the back and front of the vehicle to obey 3 cm rule.



- The most important task is to be able to drive the motors with high speed and sensitive to turns.
- Possible concepts that could be applied for the solution of the "Devices competing to catch falling balloons" project are:
  - The Arm can be stationary or can be two or even three axis robotic arm
  - The balloon can be caught using a vacuum system at the end of the arm.
  - Or a magnet can be used if the balloons can be covered with magnetic material
  - A top looking camera should be used in order to trace the balloons location as it fell.
  - Image processing should be really fast and accurate
- Possible concepts that could be applied for the solution of the "Vehicles trying to score each others goal" project are:
  - Data transmission can be maintained by RF, Bluetooth or WiFi modules. Some modules are examined.
  - A mechanical kick mechanism with springs can be utilized to hit the pack.
  - Onboard camera and RPi can be used to record video of the field.
  - Some distance sensors can be used to detect the borders of the field
  - Two different wireless transmissions might be needed for monitoring and motion control system.
  - Fast responsive motion control algorithm is needed.

## 2 Plans

- Define problem, find solution methodology will be used on all project.
- Will be study on common components and basics of how to use them.
- The idea of building a small line follower robot to gain familiarity with using sensors is proposed.

## 3 Problems

- We were a little late on create problem-solve them step.
- Defining objectives and weighed priority methods should be utilized more consciously.

