# 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 that can be used for all projects are 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 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.