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Team 19 Requirements Document

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***Work Product***

**Enumeration of user tasks, use cases, and functional requirements.**

**User tasks entail everything the user should be able to do from the GUI. Use cases specify the sequence of events the user must go through to perform those tasks. Functional requirements specify what the system must be able to do to perform the user tasks.**

***Document Revision Information***

**Version 1**

**Approval Sheet**

**All group members whose names are listed below approve of the document and contributed fairly.**

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**Pledge**

**On my honor, as a student, I have neither given nor received unauthorized aid on this assignment.**

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# User Tasks

What should the user be able to do from the GUI?

* control direction of robot (front, back, right, left)
* control speed of robot (speed up, slow down)
  + speed modes (low, medium, high)
* view data from sensors
  + touch
  + light
  + sound
  + camera view
* view location of robot on map
* view robot status
* view motor status (3 motors)
* change robot status (turn on/off)
* view data log (info about robot movement)
* turn on/off autopilot
* set robot route

Additional functionality:

Set route

Autopilot

Map of current location-possibly including where it has been

# Use Cases

## Set Route

* 1. Goal: Create sequence of steps for robot to follow from current position
  2. Actors: driver, robot
  3. Success Scenario:
     1. Enter Set Route mode
     2. Set starting speed and direction
     3. Set distance (or time) for robot to continue current movement (speed and direction)
     4. Set change in motion (change in speed or direction) once distance/time is reached
     5. If necessary: set changes in sensors
     6. Repeat iii., iv., and v. for every step, until intended destination is reached
  4. Possible Failure Scenarios:
     1. Robot does not follow steps indicated
     2. Obstacles in robot’s path
     3. Robot loses communication
     4. Software or hardware failure

# Functional Requirements

## Base station control system

1. The system shall support a base-station control system.
   1. The system shall allow the user to control robot movement
      1. The system shall allow the user to control robot speed (floating point, m/s)
         1. The system shall allow the user to set robot speed manually
         2. The system shall allow the user to increase or decrease robot speed
         3. The system shall allow the user to choose robot speed from predetermined options
            1. High (\_\_ m/s)
            2. Medium (\_\_ m/s)
            3. Low (\_\_ m/s)
      2. The system shall allow the user to control robot direction (String)
         1. The system shall allow the user to make the robot move forward
         2. The system shall allow the user to make the robot move backward
         3. The system shall allow the user to turn the robot to the left
         4. The system shall allow the user to turn the robot to the right
   2. The system shall display data from robot sensors
      1. The system shall display sensor status (Boolean: on/off)
      2. The system shall display data from touch sensors
         1. The system shall display whether touch sensor has been touched (Boolean)
      3. The system shall display data from light sensors
         1. What data will this display?
      4. The system shall display data from sound sensors
         1. The system shall display decibels being picked up (floating point)
   3. The system shall display image from onboard camera
   4. The system shall store images from onboard camera
   5. The system shall display map of robot’s location
      1. The system shall display robot’s current location
      2. The system shall display path robot has taken
      3. The system shall display known objects near robot’s location
   6. The system shall display robot status (Boolean)
   7. The system shall allow the user to change robot status
   8. The system shall display the status of each motor
   9. The system shall allow the user to set a route for the robot to take
      1. The system shall allow the user to create sequence of steps for robot to follow
         1. The system shall allow the user to set robot speed
         2. The system shall allow the user to set robot direction
         3. The system shall allow the user to set when robot will change motion
            1. Distance (meters)
            2. Time (seconds)
      2. The system shall allow the user to repeat requirements 1.9.1.1 – 1.9.1.3 until all steps have been created
   10. The system shall display data log of robot’s activities
       1. The system shall display changes in speed
       2. The system shall display changes in direction
       3. The system shall display changes in robot status
       4. The system shall display changes in motor status
       5. The system shall display changes in sensor status
   11. The system shall support autopilot function
       1. The system shall allow user to change autopilot status (Boolean)