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Team 20

Lab number 6

End to End Prototype

April 7th, 2013

Version 1.0

By signing below, each group member approves of this document and contributed fairly to its completion.

Raymond Tang, Andrew McMillion, Archit Rupakhetee, Tyler Lenig

On our honors, as students of the University of Virginia, we have neither given nor received unauthorized aid on this assignment.

Raymond Tang, Andrew McMillion, Archit Rupakhetee, Tyler Lenig

On our honors, as students of the University of Virginia, we pledge that we followed the required procedure in completing this lab.

Raymond Tang, Andrew McMillion, Archit Rupakhetee, Tyler Lenig

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Prototype Goals

Our goals for our prototype were as follows:

Robot movement: The robot responds to WASD keys with movement in the appropriate direction for each.
Communication: Bluetooth connection can be established with robot.
Telemetry: Base station can receive, interpret, and display robot sensor data.
User interface: The platform displays telemetry through the GUI and sends commands from the GUI to the robot.
Macro Features: Key macros (e.g. 'T' = 180 degree spin)

For this end-to-end prototype, we were able to complete appropriate robot movement, communication with the robot and develop an appropriate user interface. The other aspects will be completed for the delivered code for the enhanced prototype.

Schedule and Milestones

Below is a list of our milestones to be able to complete the desired functionality. For this end-to-end prototype, we were able to establish connection to the robot, complete all movement except for the combination movements (i.e. WA moves the robot in a left arc), displaying speed and Q/R/P keys and other key macros. These will be completed for the delivered code.

Communication:

- Establish connection with robot from base station.
- Send ping to robot.
- Receive ping on robot.
- Robot replies with an acknowledgement to the base station.
- Base station receives ack message.

Robot Movement

- Move forward when W key is pressed.
- Stop moving forward when W is depressed.
- Turn left at a certain rotation speed when A key is pressed.
- Stop turning left when A key is depressed.
- Turn right at a certain rotation speed when D key is pressed.
- Stop turning right when the D key is depressed.
- Move backwards when the S key is pressed.
- Stop moving backwards when the S key is depressed.
- Enable at most two combination of any movements. WA, WD, AS, SD.

Telemetry

- Receive telemetry data
- Decode the information to present on the GUI.

User Interface

- Change color of keys when WASD buttons are pressed and depressed.
- Display Q/R/P keys as well.
- Display speed.
- Display telemetry data.
- Display connection status.

Key macros

Our testing schedule for this part of the prototype is as follows:

April 1st

Complete basic movement and connection code for upcoming test
(This includes dividing up the coding work for the upcoming test)

April 4th

Complete our integration of separate coding components and test our code using our test client

April 5th

Complete initial basic movement and connection test with Group 19
(Summarized in the next section of this document)

April 7th

Complete the advanced movement test with Group 19
(Summarized in the next section of this document)

Testing Report

Basic Movement

What: Basic robot movement (Forward/Backward) and connection to the robot

When: April 5th at 3:30 PM

By Whom: Groups 19 and 20

Outcome: We were able to successfully integrate both systems and move the robot both forward and backward. We were also able to ensure that our connection to our robot was secure and successful. This test was the basis for our other tests that we completed later.

Advanced Movement

What: Advanced movement

When: April 5th at 4:30 PM

By Whom: Groups 19 and 20

Outcome: This test was also a successful one. After completing our basic movement test, we split up into our separated groups to work on the requirements for advanced movement. We were able to ensure that our robot moves forward/backward/turns continuously when a button is pressed and then stops when the button is de-pressed.