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Team 20

Lab number 7

Enhanced Prototype

April 14th, 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

Contents

Prototype Goals

Our goals for our enhanced prototype were as follows. The table is used to give an assessment of each goal and what the status of each goal is as well:

Goal	Assessment	Implementation Status
Communication		
Establish connection with robot from base station	Goal met. Basic connection needed to be established for any form of testing	Implemented, tested and working
Send ping to robot	Goal met. Robot successfully received ping.	Implemented, tested and working
Receive ping on robot	Goal met. Robot successfully received ping.	Implemented, tested and working
Robot replies with an acknowledgement to the base station	Goal met. Robot send acknowledgement to base station.	Implemented, tested and working
Base station receives acknowledgement message	Goal met. Base Station indicates reception of acknowledgment.	Implemented, tested and working
Movement		
Move forward when W key is pressed	Goal met. Robot moves forward indefinitely when W key is pressed and held down.	Implemented, tested and working
Stop moving forward when W is depressed.	Goal met. Robot stops moving once W key is released.	Implemented, tested and working
Turn left at a certain rotation speed when A key is pressed	Goal met. Robot turns left indefinitely in place when A key is pressed and held down.	Implemented, tested and working
Stop turning left when A key is depressed	Goal met. Robot stops moving once A key is released.	Implemented, tested and working
Turn right at a certain rotation speed when D key is pressed	Goal met. Robot turns right indefinitely in place when D key is pressed and held down.	Implemented, tested and working
Stop turning right when the D key is depressed	Goal met. Robot stops moving once D key is released.	Implemented, tested and working
Move backwards when the S key is pressed	Goal met. Robot moves backward indefinitely in place when S key is pressed and held down.	Implemented, tested and working
Stop moving backwards when the S key is depressed	Goal met. Robot stops moving once S key is released.	Implemented, tested and working
Enable at most two combinations of any movements. WA, WD, AS, SD	Goal not met. We were unable to handle the key-presses in the correct fashion.	Implementation not complete
Telemetry		
Receive telemetry data	Goal not met. We were able to receive telemetry data for the	Implemented, tested and not working

	touch sensor but not the other sensors	
Decode the information to present on the GUI	Goal not met. We are able to do this for only the touch sensor and not all of the other sensors.	Implemented, tested and not working
User Interface		
Change color of keys when WASD buttons are pressed and depressed.	Goal met. When keys are not pressed they are blue on the GUI and when pressed they are orange. They revert back to blue once released.	Implemented, tested and working
Display speed	Goal not met. GUI displays a section for speed, but it displays a static value that is hard-coded.	Implementation not complete
Display telemetry data	Goal not met. We were only able to display the values for the touch sensor but not the others	Implemented, tested, not working
Display connection status	Goal met. GUI successfully displays connection status.	Implemented, tested and working
Key macros		
Key macros	Goal not met. Currently the only macro in the system is pressing the T key to get the robot to turn 180 degrees.	Implementation not complete

Schedule and Milestones

Below is a list of our milestones to be able to complete the desired functionality for ONLY the enhanced prototype. Some of the milestones from our enhanced prototype are repeated here in order to demonstrate that they were completed at this stage of our prototype.

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 speed.
- Display telemetry data.
- Display connection status.

Key macros
- Ensure pressing T turns the robot 180 degrees.

Ensure code is up-to-date and delivered to the other group.

Following these milestones is the schedule we used to accomplish the milestones.

April 8th

Ensure required functionality for lab 7 is working and able to be demonstrated to the TA.

Some binary derivatives of this are:
Robot is able to maneuver the course
Robot is able to receive telemetry data from the touch sensor
GUI is able to display telemetry data from the touch sensor.

April 11th

Ensure robot can receive telemetry data for other sensors.
Ensure GUI can display telemetry data for other sensors.
Ensure the software is able to send a Move Arc command

This entails:

Ensuring the correct method is called when the correct keys are pressed
Ensuring the method encodes and sends the correct Move Arc command
Ensure that the acknowledgement received from the robot is handled and validated.

Ensure the GUI displays:

A button for terminating the connection
A button for refreshing all of the sensors
A refreshing each individual sensor
A field for setting the speed of the motors
A 'T' field that changes color when the 'T' key is pressed and sends a turn 180 degrees command to the robot.

April 14th

Ensure all telemetry data is being received from the robot
Ensure the telemetry data received is displayed on the GUI
Ensure the terminate connection button closes the connection to the robot

This is accomplished by the GUI window closing and the robot rebooting.

Have each group member review the code and sign-off on our personal confirmation sheet.

Testing Report

Advanced Movement (First pre-lab test)

What: Advanced movement (movement that a normal user would do)

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.

Touch Sensor (Second pre-lab test)

What: Ensure the touch sensor can be accessed and its information can be printed to the GUI

When: April 7th, 4:00 PM

By Whom: Groups 19 and 20

Outcome: This test was also successful. We attempted to test all of the sensors but the one we focused on for this test was the touch sensor. We were able to have our GUI recognize when the touch sensor was enabled (i.e. touching something) and when it was not.

Sensor Data (post-lab test)

What: Ensure that all sensors are able to be accessed and displayed on the GUI. We also implemented a termination button that closes all streams, disconnects the GUI and the robot and resets the robot.

When: April 14th, 3:00 PM

By Whom: Groups 19 and 20

Outcome: This test was also successful. We were able to receive telemetry data and display it to the GUI. We also implemented our termination button correctly and will have a much easier time connecting and disconnecting from the robot. In addition to the test, we used this time to discuss the tests we will need to

complete in the upcoming weeks to ensure that our implementation is as complete as possible.