Controlling a Mobot using Android, Arduino and the Pebble Smartwatch

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# Project Description

The project aims to explore into the world of wearable technology and its possible applications by using the Pebble Smartwatch coupled with Android and Arduino to control a Mobot.

Using foldedtoad’s PebblePointer from GitHub as base for both Android and Pebble applications, we modified the Android source code to include a functionality to connect to an HC-05 Bluetooth Module set to Slave Mode as well as send the data from the Android phone to the Arduino, which shall then receive the data, parse it properly and sends the directional commands to the Mobot.

There are 4 commands that we were able to send to the Mobot – forward, reverse, turn left and turn right. Each command has its corresponding range of accelerometer values as well as the important values – whether all of the {x,y,z} data will be used or only certain sets such as {x,z}, {x,y} or {y,z} data – to be considered for each command.

The Pebble application is coded to toggle between enabling and disabling the streaming of accelerometer values through a “tap event” – this was done through a brisk shake of the Pebble. A successful “tap event” triggers the vibrator, indicating that the “start” or “stop” request has been recognized. The accelerometer values are sent as a vector to the Android application wherein a PebbleDataReceiver, courtesy of the Pebble SDK, was set up to receive and acknowledge the receiving of the accelerometer values.

# Observations / Limitations

This project assumes that you have an Android phone running Android 4.4.2 Kitkat onwards and have the Pebble application installed. This project also assumes that the Pebble Smartwatch has been previously paired and set up to the Android phone before said project.

The original goal was to do away with the Android component and directly connect the Pebble Smartwatch with the Arduino – to which we succeeded in doing so. However we discovered later on that there was little to no available – official and unofficial – documentation regarding connections and data transmission between third-party hardware such as microcontrollers. So we added in the Android component to facilitate in the data transmission.

This introduced a minor problem – while during the final stages of the project, the connections between hardware on Bluetooth was seamless and of little hassle, there were times when these would refuse to cooperate. This was remedied by first disabling the Pebble’s Bluetooth connection and connecting the Android application to the Arduino board, before enabling it again. This is to be done every time this is encountered

Lastly, a small limitation of the project requires that the Arduino board also be previously paired to the Android phone – this is to ensure that the device will be included when the Android will prompt for the location to send the accelerometer values.

# Results and Discussion

We were able to successfully implement the connections between the 3 hardware as well as the 4 directional commands. This can be seen in the video linked below:

**https://www.youtube.com/watch?v=EAPra6VzlOA&feature=youtu.be**

# Sources and Credits

We would first like to thank Sir Carlos Oppus for giving us the opportunity to make this project a reality. We would also like to thank foldedtoad’s work on the PebblePointer as well as wingoodharry of wordpress, who supplied us with the necessary knowledge (and code) to be able to add in the Bluetooth connection functionality as well as transmitting data from the Android phone to the Arduino board. We would also like to thank Google for providing us with thousands of articles and documentation to aid us in this project.

The source code of our project shall be released on GitHub as well.

<https://wingoodharry.wordpress.com/?s=arduino>

<https://github.com/foldedtoad/PebblePointer>