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Bluetooth Data Transmission to the Consumer Smartphone

Introduction

Bluetooth is a technology that allows for the transmission of data over short distances. It is available on most all smartphone devices and it is expected that by 2018 as many as two billion of these devices will have shipped globally [1]. With such widespread accessibility, Bluetooth provides an excellent medium to transmit data to the consumer via a smartphone. This paper is a review of data transfer to a smartphone using Bluetooth as well as some of the transmitters that are used to send the data to the user.

Commercial Applications

Bluetooth at its core is a wireless replacement for data transmission cables. The commercial applications for this involve data transmissions that cover short distances, and replacing cables that are undesirable. A common example is the user streaming music from a smartphone to a Bluetooth capable speaker.

Smartphones are becoming a staple. Due to increase in consumer connectivity, "there is also a fast-growing demand for phone apps that can capture and process new types of information from Bluetooth sensors [1]." The ability to process data and present it to the user in an easily accessible way is very marketable. Additionally, the widespread use of smartphones makes this transfer of data easier than it has ever been. The user has a greater desire to get more information and "interactive applications are increasingly important especially on interaction of people and the environment [2]."

Underlying Technology

Bluetooth wireless technology is a wireless data transmission technology that is intended to replace cables for short-range serial transmission [3]. It has two different forms. The first being Basic Rate (BR) and the other being Lower Energy (LE). Basic rate can transmit at 721.2 kbps and operates in the unlicensed ISM band at 2.4 GHz [3]. This data transmission is performed by Bluetooth receivers and transmitters.

The Bluetooth modules themselves are of little use without accompanying equipment. Often, these transmitters are paired with a microcontroller to process the data to be transmitted. As for the

Bluetooth module itself, they vary greatly in price and quality. With that in mind, the BlueSMIRF Silver Bluetooth modem would be a good example of a midrange transmitter, costing $40 and using the RN-42 Bluetooth transmitter [4]. This is a low power device that can transmit up to 60 feet [5]. Bluetooth transmitters will serve as a wireless alternative to a serial cable for the transmission of data from the device to the consumer on a smartphone.

This paper has already shown that smartphones are widely accessible and that most of them are Bluetooth capable. That being said, Android tends to be an easier medium than other mobile operating systems to use for the process of building software to receive data that has been transmitted. Android is "widely adopted by industry and users [2]." Furthermore, "the android application framework shows access to the Bluetooth functionality through the Android Bluetooth APIs, which permits a wireless device to wireless device…communication [6]."

Building Blocks for Implementations

The tools needed for a Bluetooth system are readily available. For example, a good system, for the purposes of data being transmitted to a smartphone, have some form of sensor or data acquisition device that will send that data to a microcontroller to be processed. That processed data will then be sent to the smartphone via Bluetooth where it will be presented to the user in a meaningful way.

Information needed to build the Android application to communicate with a Bluetooth capable device is readily available. Android is open source [2]. This means that the code to the entire software is available for use by developers. Pertaining to this paper, the code needed to interface with Bluetooth devices is readily available for download and use in application building [7]. Developers merely need to include the correct commands and permissions in their application development to be able to have Bluetooth connectivity in their program.

Conclusion

The modern electronics consumer desires to be more connected to their information. Bluetooth provides a simple way for that data to be transmitted from one capable device to another. The information could be from a data acquisition system to their smartphone. Ease of data transfer will allow for useful data to be transported to the hand of the consumer. Usable information could then be presented to them through an application on their smartphone that will allow that information to be useful to them.

References

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