
WASP

Wireless Arduino Sensor Protocol

GROUP SW513E15



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1. Project introduction

This is an introduction.

Here is the initializing problem statement:

1.1 Initializing problem statement

How can a sensor network and a protocol be designed, so that data can be relayed throughout the network, enabling an endpoint device to receive the information without being within range of all sensors in the network?

It is a good question and we will analyze it.

Part I

Analysis

The analysis will discuss and look into the different aspects of the initializing problem formulation and the topics therein. The sections in this chapter blah-blah..

2. Context

3. Use case

The purpose of this project is to create a protocol that allows multiple Arduinos to share data to a single endpoint, but a use case is needed to test the protocol.

The chosen use case for this report is soil moisture sensors for use on golf courses. A golf course is usually very large, and covering an entire golf course with cords would be a big task. Furthermore this would make the system hard to extend and almost impossible to make hot pluggable.

This makes this project a good use case for golf courses, as soil moisture is important in determining where it is necessary to water the course.

We shall look at some existing technologies now.

4.1 Networks

This section will contain descriptions of networks and network theory.

An ad-hoc wireless network is a wireless network, comprised of mobile computing devices that use wireless transmission for communication, having no fixed infrastructure [1].

There are different types of network topologies, and here are some examples.

- Ring
- Line
- Bus
- Tree
- Star
- Mesh
- Fully connected

These can be seen in figure xx, that will be put here somewhere. The line network

In the use case purpose,

4.2 Wireless communication

4.3 Communication protocols

A mesh network can use a wide variety of protocols, to manage the route data is transferred. In networking a protocol is a special set of rules and standards for how devices would interact with each other. A well known protocol would be TCP/IP (Transmission Control Protocol/Internet Protocol), which today are used to communicate between anything with an internet connection. The mesh network we are looking at is a radio based network, and therefore some more relevant protocols will be examined. Few existing protocols will be presented in this section.

4.3.1 Time division multiple access

Time division multiple access(TDMA) is protocol that divides a single channel into smaller time slots. Each time slot transmits one byte or a segment of a signal, in a sequential serial data format.

TDMA is as an example used in the T1 telecommunication transmission system. Each T1 channels carry up to 24 voice telephone connections. Where each connection covers 300 Hz to 3000Hz and is digitized at an 8-kHz rate, which is two times the highest frequency component needed to retain all the analog content.

4.3.2 Ad hoc On-Demand Distance Vector Routing

4.3.3 Radio Link Protocol

Radio Link protocol(RLP) is a automatic repeat request(ARQ)¹ fragmentation protocol used over a wireless air interface. Most air interface protocols have a packet loss of up to 1% which is intolerable when handling sensitive data. RLP detects losses in packets and with a retransmission tries to bring down the losses. The retransmission can bring the loss down to 0.1% to 0.0001%. This loss rate is more tolerable when handling sensitive and precise data.

RPL cannot request a certain payload size from the air interface, the air interface scheduler instead determines the packet size, based on changing channel conditions constantly. Most of the other fragmentation protocols, such as 802.11b² and IP, determine a payload of a certain size by the upper layers, and call upon the MAC. These protocols are not as flexible as RLP, and sometime fail transition during small fades in a wireless environment.

¹An error-control method for data transmission that uses acknowledgments and timeouts

²An wireless networking specification that extends throughput up to 11 Mbit/s

5. Problem Statement

Very good problem statement for you, my friend. Special prize.

Make a good sending data network for arduino.

5.1 Requirements

There are some requirements to the system and its software. These are split in two categories: functional and non-functional. This is based on some smart guys work [keylist].

5.1.1 Functional requirements

The list of functional requirements:

1. Actually run is an important part to passing the exam

5.1.2 Non-functional requirements

List of non-functional requirements:

1. Looking good is not a bad thing.

Part II

Implementation

8. Implementation

Part III

Conclusion

10. Reflection

oh..

10.1 What have we done!?

11. Summary

ok..

11.1 It ended like this

12. Future Work

Here's what's missing..

12.1 To be done

- [1] C.S.R. Murthy and B.S. Manoj. *Ad Hoc Wireless Networks: Architectures and Protocols*. Pearson Education, 2004. ISBN: 9780132465694. URL: <https://books.google.no/books?id=U-yLb-9nXyYC>.

Part IV

Appendix