DEVELOPMENT OF WIRELESS VIRAL ADVERTISEMENT SYSTEM FOR LAND PUBLIC TRANSPORTATION VIA WIRELESS COMMUNICATION

Muhammad Firdaus Bin Duanam

Bachelor of Mechatronics Engineering

June 2012

I hereby declare that I have read through this report entitle "Development of Wireless Viral Advertisement System for Land Public Transportation via Wireless Communication" and found that it has comply the partial fulfillment for awarding the degree of Bachelor of Mechatronic Engineering"

Signature : 

Supervisor' Name : MOHD RUSOY BIN YAACOB

Date : 28/6/12

DEVELOPMENT OF WIRELESS VIRAL ADVERTISEMENT SYSTEM FOR LAND PUBLIC TRANSPORTATION VIA WIRELESS COMMUNICATION

MUHAMMAD FIRDAUS BIN DUANAM

A report submitted in partial fulfillment of the requirements for the degree of Mechatronic Engineering

Faculty of Electrical Engineering

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2012

I declare that this report entitle Development Of Wireless Viral Advertisement System For Land Public Transportation Via Wireless Communication the result of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : 

Name : MUHAMMAD FIRDAUS B. DUANAM

Date : 27/06/2012

ACKNOWLEDGEMENT

I would like to thank my family, friends and fellow lecturers who have given me such a big morale support while I am doing this project. Special thanks to my supervisor; Mr Rusdy bin Yaacob for all his guidance during my time completing progress report for PSM 1. He has made available his support in number of ways to help me completing this report.I also would like to thank Mr. Nik Syahrim bin Nik Anwar who has teach me methods on how to do this progress report in his mechatronic design class.

I would like to show my gratitude to my fellow classmate who has shared their extraordinary knowledge in giving thoughts and ideas for this project. This report would not been complete if my fellow seniors that help me to fill the missing content of the report.

I am also indebted to my practical training supervisor in NIPPO mechatronics; Mr Goh who is always trains me to do my work properly. This progress report would not be possible unless the people who have helped me in so many ways involved.

ABSTRACT

Advertisements are by definition a notice or info that is promoting some sort of product, service or an event to the public but the problem of the advertisements nowadays are it is not in real time making peoples always find it outdated. Besides, the advertisement systems these dayS is not flexible and unreliable causing the peoples or customers did not trust the reliability of the advertisements. More importantly, the info related to the advertisements that are provided by the system does not satisfy the customers need such as how to go to the place? , which bus you have to take? .These kinds of information were always being left behind in nowadays advertisements.

Hence the purpose of this project is develop an advertisement system that are in real time so that it always updated, to built a flexible and reliable advertisement system so the info given is not being misunderstood by the peoples and also to design an advertisement that can give enough info the people. To achieve these purposes certain methods are being applied, that is by sending the display advertisements to public transportation (bus) and bus stops via ZIGBEE wireless device.

The system will be programmed using microC compiler software and the controller use is dsPic30f4011. As for the data (advertisement), a particular template will be design so that an organize and smart advertisement can be display. Moreover, these templates are design to help the sender to easily send the advertisement. Regarding the displays for this project, there will be two types of display that are suggested in the project that is LED and LCD display. Simulations also have to be done in this project; the software that is used is PROTEUS. These simulations are done to check the coding and algorithm; it is the expected for the project.

ABSTRAK

Iklan dengan definisi ialah memberi notis atau informasi yang mempromosikan beberapa jenis produk, perkhidmatan atau acara kepada org ramai tetapi masalah iklan hari ini ialah ia tidak dalam masa sebenar yang membuat pengguna sentiasa mendapati ia bukan yang terbaru. Selain itu, sistem iklan hari ini tidak fleksibel dan tidak boleh dipercayai yang menyebabkan pengguna meragui kebolehpercayaan iklan ini. Lebih penting lagi, informasi yang berkaitan dengan iklan yang disediakan oleh sistem iklan terdahulu tidak memberi informasi yang secukupnya kepada pengguna.

Oleh itu, tujuan projek ini adalah membangunkan sistem yang dalam masa nyata supaya ia sentiasa dikemaskini, untuk membina sistem pengiklanan yang fleksibel dan boleh dipercayaisupaya informasi yang diberikan adalah tidak disalahfaham oleh pengguna dan juga reka bentuk iklan yang boleh memberi informasi yang cukup dan memenuhi kehendak pengguna. Untuk mencapai tujuan ini kaedah tertentu sedang digunakan, iaitu degan menghantar iklan kepada paparan untuk pengangkutan awam (bas) dan perhentian bas melalui peranti tanpa wayar Zigbee.

Sistem ini akan diprogramkan menggunakan perisian microC pengkompil dan penggunaan pengawal Pic16f77A. Bagi data (iklan), template tertentu akan reka bentuk supaya iklan yang teratur dan kemas boleh dipaparkan .Selain itu, template ini adalah direka bentuk untuk membantu penghantar dapat menghantar iklan dengan mudah. Mengenai paparan untuk projek ini, akan ada dua jenis paparan yang dicadangkan dalam projek iaitu paparan LED dan paparan LCD. Simulasi juga telah dilakukan dalam projek ini, perisian perisian yang digunakan ialah Proteus.Simulasi ini adalah keputusan awal bagi projek ini.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

m	-	Meter
B/s	-	Bite per second
Hz	-	Hertz
mA	-	mili Ampere
PIC	-	Peripheral Interface Controller
UWB	-	Ultra Wide Bandwidth
LOS	-	Line Of Sight
LCD	-	Liquid Crystal Display

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 Project Background

Development of Wireless Viral Advertisement for Public Land Transportation Via Wireless Communication system is a project designated for final year student of electrical engineering faculty in UTeM; supervise by Mr. Rusdy bin Yaacob**.** Over the past few years the development of wireless advertisement has gain its momentum due to the growth of the wireless technology worldwide. The capability of the wireless advertisement system in giving the fastest information the people really does improve the quality of life. For example, an advertisement can always being sent as long as the user or customer is in the range of the wireless communication.

However there are some weaknesses that most of the common wireless advertisement nowadays, most likely is the reliability, flexibility and the capability to show the advertisement in real time. Hence in this project will be developing methods that can counter these weaknesses. This thesis will investigate into the suitability and the performance of the Zigbee module that act as the wireless device for data transfer in this project.

The initial part of the project had been structured by designing a suitable algorithm followed by choosing the right hardware and also software development. The experiment that has been done is to investigate the performance of the system by checking the capability of the Zigbee module to receive simultaneous data from other different Zigbee device.

The system will use bus as the public transportation because it is suitable for the project. Also the heart of the system would be Pic16f77A microcontoller that would be integrated with Zigbee module. A program are design and to be burn in the microcontroller and the data would be send through Zigbee device, every time a data is received the displays module will show the advertisement. The displays for the project would be LCD display and LED display.

1.2 Problem Statement

The advertisement system nowadays are not in real time hence the people does not have an up to date information, this Wireless Viral Advertisement for Land Public Transport via Wireless Communication system can solve this problem by sending the advertisement to the people as information is being advertised. The bus passenger with gain benefits as they can receive the information quickly.

Wired communication between transportation is not flexible and unreliable. It is because of the data transfer method is not suitable and need a lot of requirements, the wireless data transfer is the best solution for this problem as this project uses the technology so that the flexibility and reliability of the advertisement system can be upgrade.

The information that is provided by existing advertisement system nowadays was not enough. The Wireless Viral Advertisement for Land Public Transport via Wireless Communication project is design to have specified templates so that there no important information in the advertisement is being left out

1.3 Project Objectives

- To develop a real time advertisement system.
- To design a flexible and reliable advertisement system.
- To develop an advertisement templates
- To analyze the performance between zigbee modules for line of sight and obstacle environment in term of signal strength and data transfer size.

1.4 Scope

- My project also will concentrate in UTeM's bus network due to its appropriate and suitable facilities.
- In my project there are suitable templates that are design to limit the content of the advertisement according to type of the advertisement.
- Since there are many type of public transportations, my project will only focused in buses because bus is the main public transportation in UTeM.

Figure 3.0 below show how the project is done by considering the scope and objective of the project

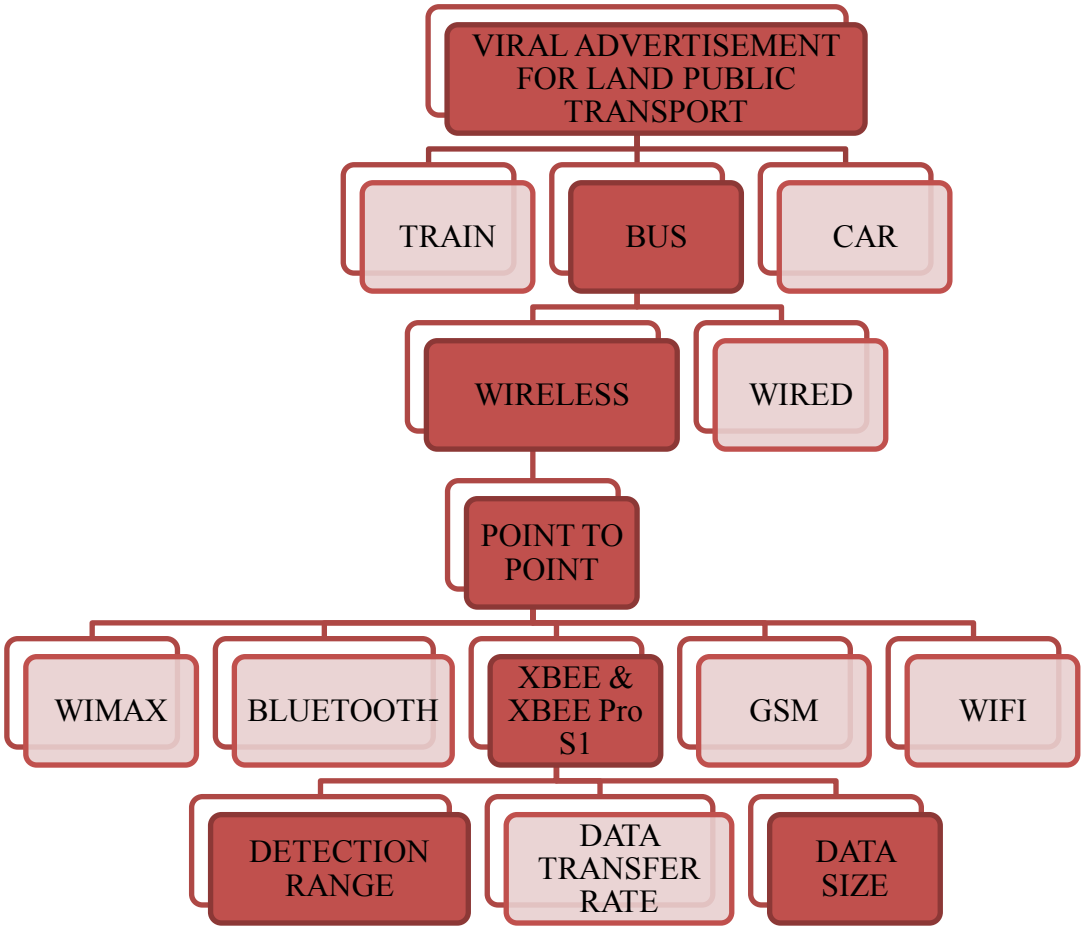

Figure 1.1 K-chart for the project

2.0 LITERATURE REVIEW

2.1 Introduction

Literature review is the important part where the research on the existing development of Viral Advertisement for Land Public Transport via Wireless Communication is acknowledge. The information and methodologies from these previous studies can be used as reference and benchmark for this project. This chapter provides the summary of literature review on the previous Viral Advertisement for Land Public Transport via Wireless Communication system. The fundamental of the research is the medium of the communication that is between wired and wireless. Wireless communication is chosen and three most common and similar type of wireless technology is selected which is Zigbee , UWB , Bluetooth.

2.2 Literature Review on previous study of Viral Advertisement for Land Public Transport via Wireless Communication

The pros and cons of wired and wireless communication is being in table 2.1 below where we can see that wireless communication is suitable for this project.

Table 1.1: Comparison between wired and wireless communication

Communication medium	**Applications**	**advantages**	**disadvantages**
Wired	Fiber-optic cable: LAN USB: Data communication Rs232: Interface and data communication.	Mass data transfer Faster and more efficient data transfer/transmission Secure network	high cost(big building) small in range
wireless	Zigbee: Home automation Bluetooth: Wireless headphone Gsm: Mobile phone Wi-Fi: internet	Increased efficiency: Improved data communications lead to faster transfer of information. Better coverage: Because wireless technology enables the user to communicate while on the move Flexibility: Office-based wireless workers can be	Security: Wireless transmission is more vulnerable to attack by unauthorized users. Installation problems Coverage: In some buildings getting consistent coverage can be difficult.

		networked without sitting at dedicated computers, and can continue to do productive work while away from the office. Cost savings: Wireless networks can be easier and cheaper to install.	Transmission speeds Wireless transmission can be slower and less efficient than 'wired'.

Wireless communication is proven to have more advantages in terms of this project design. Hence it is decided that to use wireless communication system for this project.

.

2.21 Zigbee:

Zigbee is a wireless transceiver that meets the unique needs of sensors and control devices because sensors and controls require low latency instead of high bandwidth [1]. Besides zigbee also is also low energy consumption for battery lives and for large device arrays that is suitable for sensors and controls.

.

2.22 Bluetooth:

Bluetooth is a short range, low cost and IQW power wireless communication standard. bluetooth operates in the 2.4 GHz Industrial, Scientific and Medical (ISM) band at a maximum data rate of 720Kbps. It uses Frequency Hopping Spread Spectrum that divides the frequency band yielding 79 channels [2]. The elementary Bluetooth network, termed as the Piconet, is an ad hoc connection between at least two devices as shown in figure 1. When a device connected to two or more Piconet it is known as the Scatternet .

2.23 UWB:

UWB is an indoor short-range high-speed wireless communication. One of the vital features of UWB is its bandwidth that ranges from 110Mbps to 480Mbps which is why UWB would satisfy most multimedia application such as an audio and video data transfer. UWB other feature is low power consumption because of its small range of detection.UWB uses IEEE standards of 802.15.4 [3].

Table 2.2 Comparison of wireless device[3]

Standard	Zigbee	Bluetooth	UWB
IEEE specsification	802.15.4	802.15.1	802.15.3a
Max data rate (Mbit/s)	4	1.39	110
Max data payload(bytes)	102	339(DH5)	2044
Max overheat(bytes)	31	158/8	31
Frequency band	868/915 MHz; 2.4 GHz	2.4 GHz	3.1-10.6 GHz
Nominal range	10-100m	10 m	10m
Max signal rate	250KB/s	1 Mb/s	1 10 Mb/s
Power consumptions	>1microwatt	>1miliwatt	
advantages	Low power Many devices Low overhead	Dominating PAN Easy synchronization	Very low power Very high bandwidth
disadvantages	Low bandwidth	Consume medium power	Small range

Based on the research that though journals and books, there is no project or system that is exactly the same as my project especially in terms of using Zigbee as the wireless device but still there are some similarities that is found.

Hence, there are already researches and developments that are similar to my project have been documented in journals and papers. Here are the journals that I have found:

This paper shows a research on The Flexible Bus System (FBS) using low power wireless device zigbee as the communication medium. This project is an enhancement of the traditional bus system that Demand Responsive Technology (DRT) to encounter problems that DRT had that is installation cost, maintenance cost ,high power consumption and availability of the long range wireless technology used(3G, WiMax) signals. The zigbee technology was added up to create a 2 way communication between bus and the bus stops hence any information from the control central (internet connections with bus stops) can be easily being updated to the bus or the bus stops. The data that is being transferred in FBS is solely about the bus routes and number of passenger [4]. The algorithm of the system is shown in figure 4.

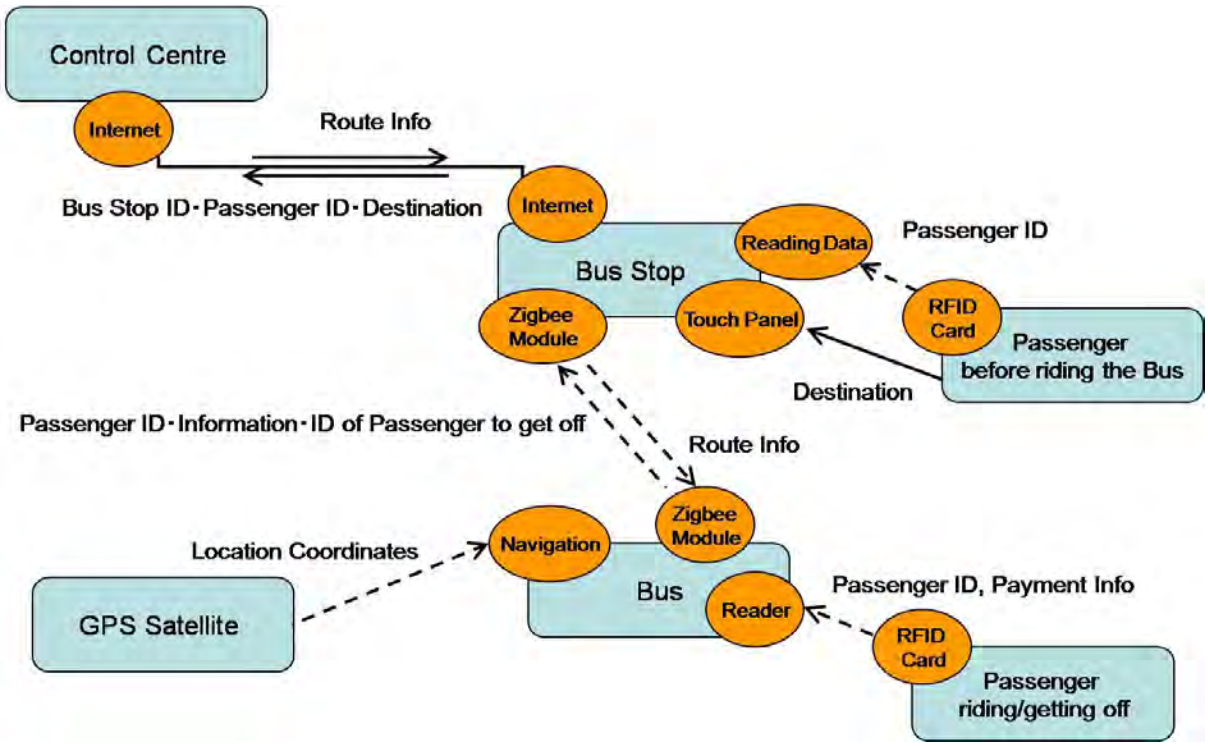

Figure 2.1: Algorithm of the The Flexible Bus system [4]

The experiment that is conducted in this intelligent bus system project is related to some of my project's control parameters. The parameters are detection range and data transfer. The results of the experiment in this paper can be made a good comparison to my project's future experiment.

The concepts of the FBS and my project are similar except in my project, the data transferred is an advertisement that is sent by the shops or mall that sends any advertisement regarding sales or an event.