

**WIRELESS DATA COMMUNICATION (FINGERPRINT IMAGES)**

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**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**  
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**BORANG PENGESAHAN STATUS LAPORAN**  
**PROJEK SARJANA MUDA II**

**Tajuk Projek** : WIRELESS DATA COMMUNICATION (FINGERPRINT IMAGES)  
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I would like to dedicate this thesis to my beloved parents, family members and friends, whose encouragement and support was a great help in completing it.

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## ABSTRACT

The purpose of this project is to transmit fingerprint image from the PDA to the PC wirelessly. The PDA will be equipped with Graphical User Interface that developed by using Microsoft Visual Basic.NET. The system for the transmitting process that will be used is Wireless Local Area Network. The modulation scheme is Direct-Sequence Spread Spectrum by using 802.11g protocol. Microsoft Visual Basic.NET will be used again in generating the process of transmitting the fingerprint image from the PDA to the PC. D-Link DI-624 Wireless 108G Router will be used as the transmitting device to transmit the fingerprint image to the PC. Meanwhile, D-Link DWL-G132 Wireless 108G USB Adapter will be used as the receiving device to receive the fingerprint image from the PDA.

## ABSTRAK

Projek ini bertujuan menghantar imej cap jari daripada PDA ke PC yang dikehendaki tanpa mengguna wayar. PDA tersebut akan dilengkapi dengan 'Graphical User Interface' yang dibangun dengan menggunakan Microsoft Visual Basic.NET. Sistem yang digunakan dalam proses penghantaran ialah 'Wireless Local Area Network'. Teknik modulasi yang akan diguna ialah 'Direct-Sequence Spread Spectrum' dengan menggunakan protokol 802.11g. Microsoft Visual Basic.NET akan diguna bagi menjana proses penghantaran imej cap jari daripada PDA ke PC. D-Link DI-624 Wireless 108G Router akan diguna sebagai alat penghantar bagi menghantar imej cap jari ke PC. D-Link DWL-G132 Wireless 108G USB Adapter pula akan diguna sebagai alat penerima bagi menerima imej cap jari dari PDA.



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## LIST OF ABBREVIATION

ATM	- Asynchronous Transfer Mode
BASIC	- Beginner's All-Purpose Symbolic Instruction Code
DSSS	- Direct-Sequence Spread Spectrum
GUI	- Graphical User Interface
Hz	- Hertz
IDE	- Integrated Development Environment
IEEE	- Institute of Electrical and Electronics Engineers
IP	- Internet Protocol
IPv4	- Internet Protocol version 4
IPv6	- Internet Protocol version 6
LAN	- Local Area Network
LLC PDU	- Logical Link Control Protocol Data Unit
MAC	- Medium Access Control
Mbps	- Mega bit per second
OSI	- Open Systems Interconnection
PC	- Personal Computer
PDA	- Personal Digital Assistant
RF	- Radio Frequency
TCP	- Transmission Control Protocol
USB	- Universal Serial Bus
UTEM	- Universiti Teknikal Malaysia Melaka
VB	- Visual Basic

- VB.NET - Visual Basic.NET
- Wi-Fi - Wireless Fidelity
- WLAN - Wireless Local Area Network



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## CHAPTER I

### INTRODUCTION

#### 1.1 OVERVIEW

Everyone is known to have unique and immutable fingerprints. Fingerprints are one of many forms of biometrics used to identify an individual and verify their identity. Fingerprint verification is one of the most reliable security systems. Since decades, this knowledge has been used in crime investigation and banking business.

#### 1.2 PROJECT BACKGROUND

Fingerprints contain sufficient individual characteristics that enable positive identification with unquestionable exclusion of any other person in the world. Fingerprint images will be transmitted from a PDA to a PC. The PDA transmits the fingerprint images to the PC and the PC receives it. User on the PC will then retrieve the identity of the fingerprint images.

### **1.3 OBJECTIVES**

The objectives of the project consist of:

- a) To familiarize with the use of wireless communication in sending the fingerprint images.
- b) To expand knowledge in programming skill using Microsoft Visual Basic.NET.

### **1.4 PROBLEM STATEMENTS**

Usually, the user has to be at both location of PDA and PC to make sure which fingerprint images that the user wants to send and in what directory of the PC that the PC receives the fingerprint images whenever the user wants to send fingerprint images. With this project, the user can send the fingerprint images to the desired PC at anywhere as long as the transmitting of fingerprint images from the PDA to the PC is in the range of transmission.

Scanner and either a laptop or desktop have to bring along everywhere in order to retrieve the user's identification. With the existence of this product, the user can send fingerprint images to be identified at anywhere without taking the scanner and PC from place to place.

With this project, the user need to key in his matric number and password in order to send his fingerprint image. The enhancement of this security function can prevent others from misusing the fingerprint image of the user.

### **1.5 SCOPE OF WORKS**

In the beginning of the project development, several factors were considered to determine the limitation or final outcome of this project. Only user that has the fingerprint image and details of him can use it while not for those which do not has identity in the database. Range of bandwidth is very wide in order to transmit effectively in a desired distance from 2.4GHz to 2.5GHz.

Once the PC is shut down, the PDA cannot 'communicate' with it and will lead to failure in sending the fingerprint images over to it. Furthermore, if the directory of the PC is non-existence, the PDA cannot send the fingerprint images to the PC and this will also happen once the Internet Protocol (IP) address of the PC varies.

#### **1.6 PROJECT SIGNIFICANCE:**

This project is designed for the user to send fingerprint images to the desired directory of the PC and saving it without heading to the particular PC to save it later. It will definitely eliminate the waste of precious time.

The user need to key in his matric number and password in order to send his fingerprint image. The enhancement of this security function is to prevent others from misusing the fingerprint image of the user as fingerprint image is a unique self identification.

This project can be applied as an attendance checking for student in UTEM. Students in UTEM can sign for their attendance immediately and efficiently without the need to pass the attendance sheet around that can affect the lecturers. In addition, some students might miss out in signing the attendance. At the same time, it is impossible for students to forge signature of their classmate.

## 1.7 THESIS OUTLINE

This thesis contains five chapters that will explain details about this project. The first chapter is about the introduction of the project. This chapter will explain about the overview, project background, project objectives, problem statements, scope of works and project significance. The explanation is just the basic explanation of the project.

Chapter II will be based on the literature review of the project. It is mainly focused on Wireless Local Area Network, Wireless Access Points, Direct-Sequence Spread Spectrum, Transmitting Device and Receiving Device, Microsoft Visual Basic.NET, Graphical User Interface and TCP/IP. Most of the literature reviews is referred to the articles from the internet about the transmitting device and receiving device. This chapter will show the theory of each aspect of the projects.

Chapter III will explain about the project methodology. Here all of the actions taken to make this project are showed such as studies about the wireless transmission and Microsoft Visual Basic.NET. Operation of TCP/IP, operation of transmitting device and operation of receiving device are explained here too. Besides, the reason of choosing these methods to be used in this project is mentioned here. All of the steps understands clearly and will be explain in detail in this chapter.

Chapter IV is mainly focused on the result and discussion successfully done. The result is showed in Microsoft Visual Basic.NET interface. Besides, the project planning, Gann Chart is shown here.

Chapter V is a complimentary of previous four chapters. It describes on the overall project and suggestions for the project. The overall conclusion of my project is showed here with the suggestion to improve my project

## CHAPTER II

### LITERATURE REVIEW

This chapter will show the theory of each aspect of the projects such as Wireless Local Area Network, Wireless Access Points, Direct-Sequence Spread Spectrum, Transmitting Device and Receiving Device, Microsoft Visual Basic.NET, Graphical User Interface and TCP/IP.

The literature review is done by reviewing sources from books, web pages, journal, anonymous reference and publication of international bodies/ agencies.

#### 2.1 WLAN

WLAN (Wireless Local Area Network) becomes increasingly popular and are being widely deployed in academic institutions, corporate campuses and residences. WLAN hotspots are now a common sight at airports, hotels and shopping mall in many parts of the world.

WLAN is a wireless local area network, which is the linking of two or more

computers without using wires. Wireless LANs provide high-speed, cable-free access for computer-to-computer information transfer, typically within a building. They pose all the functionality of wired LANs, but without the physical constraints of the wire itself. Wireless LANs transmit and receive data over the air by using radio frequency (RF) technology [4].

The major wireless LAN standard today is the IEEE 802.11, more widely known by the "Wi-Fi" (Wireless Fidelity) logo. Wi-Fi base stations (access points) are commonly built into broadband routers, providing both wired and wireless connectivity for a small network.

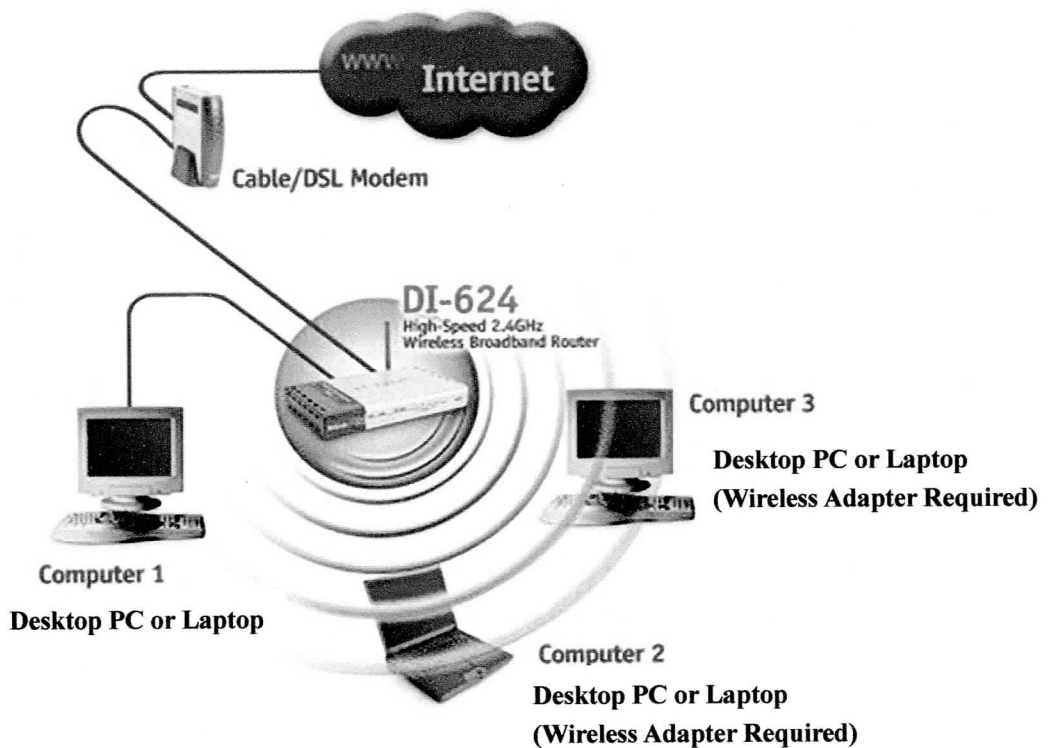


Figure 2.1: Wireless LAN

Table 2.1: Protocol of 802.11

Protocol	Release Date	Op. Frequency	Throughput (Typ)	Data Rate (Max)	Range (Indoor)	Range (Outdoor)	Modulation scheme
Legacy	1997	2.4-2.5 GHz	0.7 Mbit/s	2 Mbit/s	~Depends on walls	~75 feet	Via IR/Frequency Hopping/Direct-sequence spread spectrum.
802.11a	1999	5.15-5.25/5.25-5.35/5.49-5.725/5.725-5.85 GHz	23 Mbit/s	54 Mbit/s	~35 feet	~75 feet	OFDM. Using 5GHz band.
802.11b	1999	2.4-2.5 GHz	4.5 Mbit/s	11 Mbit/s	~40 feet	~150 feet	DSSS(Direct-Sequence Spread Spectrum)
<b>802.11g</b>	<b>2003</b>	<b>2.4-2.5 GHz</b>	<b>20 Mbit/s</b>	<b>54 Mbit/s</b>	<b>~40 feet</b>	<b>~150 feet</b>	<b>DSSS below 20 Mbps and OFDM above 20 Mbps. Adding MIMO.</b>
802.11y	March 2008 (estimated)	3.65-3.7 GHz	23 Mbit/s	54 Mbit/s	~32 feet	~5000 feet	
802.11n	March 2009 (estimated)	2.4 GHz and/or 5 GHz	74 Mbit/s	248 Mbit/s = 2x2 ant	~70 meters	~160 meters	