NETWORK INTERFACING AND GUI DEVELOPMENT OF SPEECH RECOGNITION SYSTEM

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This report is submitted in partial fulfillment of the requirements for the award of Bachelor of Electronic Engineering (Telecommunication Electronics) with honors

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Dedicated to my beloved mom, dad and family…

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ABSTRACT

This project is related to establish wireless connection between client computer and a server in a real time operation. The idea is to provide interface path to perform speech recognition at client side and visualizing the result at server side. By doing this a large size of recognition engine used for better recognition accuracy. The aim of this project is to design and develop a system that can demonstrate the capability of exchanging speech data trough wireless connection. The term wireless refers to communication medium use to transfer data from one device to another like a notebook or laptop and server. The wireless technology to implement this project is Wi-Fi network. Server computer will use GUI manager for implementing speech recognition system. The systems developed using Microsoft Visual Basic.net software. The speech recognition software used is Microsoft Speech (SAPI). The server engine will have good recognition accuracy for continuous speech and superior computing power than client.

ABSTRAK

Projek ini berkaitan dengan membangunkan sistem perhubungan tanpa wayar antara komputer pengguna dan komputer pangkalan data secara langsung. Ideanya adalah menyediakan laluan antara muka untuk memudahkan pengecaman suara di pihak pengguna komputer dan hasilnya ditunjukkan di komputer pangkalan data. Untuk mewujudkan sistem ini, satu pengecam suara berkapasiti besar akan digunakan untuk prestasi pegecam suara yang baik. Tujuan utama projek ini adalah untuk membangunkan satu sistem yang mampu membuat pertukaran data suara melalui perhubungan tanpa wayar. Perhubungan tanpa wayar merujuk kepada medium yang digunakan memindahkan data antara komputer pengguna dan komputer pangkalan data. Teknologi tanpa wayar yang digunakan dalam projek ini adalah Wi-Fi. Komputer pengguna menggunakan antaramuka grafik (GUI) untuk melakukan system pengecam suara. Sistem tersebut dibangunkan dengan perisian Microsoft Visual Basic.net manakala sistem pengecam suara dibangunkan dengan Microsoft Speech (SAPI). Enjin pangkalan data akan mempunyai ketepatan pengecam yang lebih baik untuk suara berterusan dan kuasa pemprosesan yang lebih tinggi daripada komputer pengguna .

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ADO	-	ActiveX Data Objects
API	-	Application Programming Interface
CLR	-	Common Language Runtime
COM	-	Component Object Model
D-AMPS	-	Digital Advanced Mobile Phone Service
DAO	-	Data Access Object
GSM	-	Global System for Mobile Communication
GUI	-	Graphical User Interface
IDE	-	Integrated Development Environment
I/O	-	Input/Output
OLE	-	Object Linking and Embedding
PC	-	Personal Computer
PCS	-	Personal Communications Service
PDA	-	Personal Digital Assistants
SAPI	-	Speech Application Programming Interface
TTS	-	Text-To-Speech
VBA	-	Visual Basic for Applications
UI	-	User Interfaces
RAD	-	Rapid Application Development
RDO	-	Remote Data Objects
WAN	-	Wide Area Network
WEP	-	Wireless Encryption
WLAN	-	Wireless Local Area Network

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CHAPTER I

INTRODUCTION OF PROJECT

1.1 Introduction

Network interfacing and GUI development of speech recognition system is applied between two computer (a server and a client) and perform in a real time communication system. This system consists of three main parts, the server computer, the client computer and the wireless network interfacing. A wireless communication system that utilizes a remote voice recognition server system to translate voice input received from serviced client computer into a symbolic data file (e.g. alpha-numeric or control characters) that can be processed by the clients computer. The translation process begins by establishing a wireless voice communication channel between the client side computer and the voice recognition server. A user of the client computer then begins speaking in a fashion that may be detected by the voice recognition server system. Upon detecting the user's speech, the voice recognition server system translates the speech into a symbolic data file, which is then forwarded to the user through a separate data communication channel. The user, upon receiving the symbolic data file at the server computer, reviews and edits the content and further utilizes the file as desired.

1.2 Objectives

There are several objectives established to be achieves so that this project is finished successful. The primary objective of this project is to enable user to have easy access to the full range of computer services and communication systems, without the need for all of us to be able to type, or to be near a keyboard.

In order to do that, network interfacing system between client computer and server computer via wireless network is developed and design using Microsoft Visual Basic.Net. The speech interface should be accurate for high performance.

The Graphical User Interface is developed for server computer for easy access and monitors the output. The GUI will be user friendly (little or no training should be required to use it).

Besides that, the wireless network is set-up for both client and server where the system should act in real-time and benefits the user. The wireless technology that will be use is Wi-fi network.

Lastly, it is necessary to learn and understand how to use programming language. The coding and command of such software need to be learn and familiarize. The programming language involved is Microsoft Visual.Net for GUI development.

1.3 Problem Statement

Although some computer has already been offered the speech recognition and character recognition, those systems still have many rooms to improve their User Interfaces (UIs) for easy access, low cost realization and various applications. Besides that, the computer is usually activating using mouse and keyboard which is limited for disable person.

In medical field, unhealthy human also have problem to control their home appliance if they cannot move from their bed. This system will be disabled people assistance, assisted rehabilitation (e.g., automatic exercises for recovering from speech disorders). It also very convenient for home surveillance device which help to monitor and safe living cost.

Besides that, current Bluetooth and wired technologies have limited power and coverage to interface one PC to another PC. Bluetooth technologies also have low speed of data transfer or data rate which limited for small size file. The technology also offers low security for it coverage where the data is not encrypted which may lead to disclosure of personal data.

1.4 Scope

This project will discover certain area of development which stated in the scopes below:

1. Design client-server communication based on Wi-Fi wireless network with transmission distance up to 45 meter for indoor and Outdoors Up to 90 meters.(router specification)

2. Design GUI for server computer using Microsoft Visual Basic.Net.

3. Setup wireless communication system which operates in frequency (band) range of 2.4-2.4835GHz.

4. Link the speech recognition with GUI.

5. Design systems that only perform a point-to-point voice communication (not various clients).

1.5 Methodology

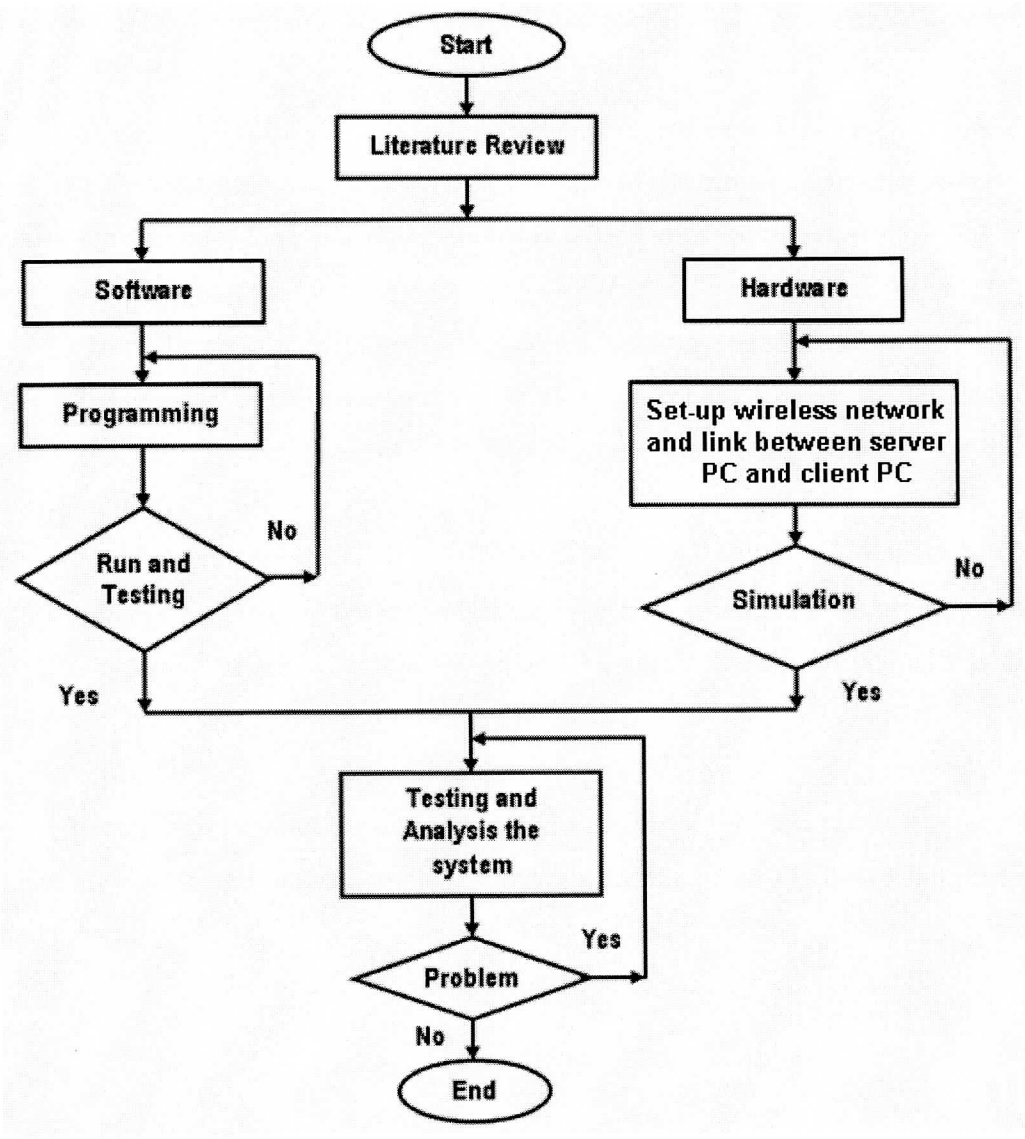

Figure 1.5: Flow Chart of Project

1.6 Report Structure

The first chapter of this report is about the introduction of the report. It includes explanation about objectives, problem statement, scope, and the methodology of the project.

The second chapter is about literature review of the project. This chapter discusses the concept of the research and how it related with the theory.

Chapter Three is explanation about the methodology and process that taken to complete the project. It consist the detail development of GUI using Visual Basic.Net software and the process to set-up wireless network interfacing between server and clients computer.

Chapter Four is about the result that we obtain based on the methodology that we used. The obtained result will be analyze and based on the objectives and problem statement.

Chapter Five is about the discussion and summary of project achievement. It also includes the conclusion and recommendation that can be taken for future improvement of the project.

CHAPTER II

LITERATURE REVIEW

This chapter is discussing about theory and components use on the project. There are seven main theories included Basic Communication, Speech Recognition System, Microsoft Visual Basic software, Graphical User Interface (GUI), Wireless Networking Interfaces and Windows Messenger and Window Firewall.

2.1 Basic Communication

Communication is the process of generation, transmission, or reception of messages to oneself or another entity, usually via a mutually understood set of signs.

2.1.1 Transmission Mode

Simplex - The communication is one way only, from transmitter to receiver. It is permanent unidirectional communication. No traffic is possible in the other direction across the same connection.

Half-duplex - A half duplex link can communicate in only one direction, at a time. Two way communications is possible, but not simultaneously.

Full-duplex - Full duplex communication is two-way communication achieved over a physical link that has the ability to communicate in both directions simultaneously.

2.2 Speech Recognition

Speech Recognition is a technology allows the computer to identify and understand words spoken by a person using a microphone or telephone. The speech that user and computer exchange is scripted. In other words, user can talk with computer using a set of pre-programmed commands and instructions. The computer will respond in the same way (also using a scripted language). Computer software that understands input speech enables user to have conversations with the computer. These conversations would include user and the computer speaking as commands or in response to events, input, or other feedback. Speaking is easier and more intuitive than selecting buttons and menu items. Human speech has evolved over many thousands of years to become an efficient method of sharing information and giving instructions.