SPEECH RECOGNITION OVER

ELECTRICAL/ELECTRONIC APPLIANCES

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UNIVERSTI TEKNIKAL MALAYSIA MELAKA
FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II

Tajuk Projek : Speech Recognition Over Electrical/Electronic Appliances

Sesi Pengajian : 2009/2010

Saya .... LEE KAM WAH ....

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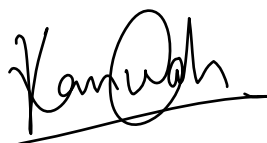Disahkan oleh:

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           : MUZALIFAH BINTI MOHD SAID

Date   : ……………………………………

Dedication for my family, especially to my beloved father and mother,

my lecturers and my friends…

ACKNOWLEGEMENT

Firstly, I would like to dedicate my highest gratitude to God for giving me the strength to complete this final project.

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God blesses all of you.

ABSTRACT

Overall, the purpose of this project is to build a system that can control electronic appliances by using speech recognition technology. Speech recognition technology is applied in computer systems that convert speech directly into electronic text. This technology allows computer users to bypass their keyboards and use their voices to enter text. It also a fairly natural and intuitive way of controlling the simulation while allowing the user's hands to remain free. Basically, this project development consists of three parts. The first part is software development. GUI is used as interface from user to the system. Program code and GUI is designed using Visual Basic 2008 Express while Speech API is used to apply speech recognition in this system. This software provides function to hear voice and access the function of microphone. The second part is using simple circuit as prototype to trigger the output. Simple components are used such as bulb represents a lamp; motor represents a fan and relay represents a door lock. The third part is applying parallel port as a connection between the circuits with the system (personal computer). This speech recognition technology system is operating by input voice from the user and then the system will accept the input. The signal is passing through the parallel port and triggers the output shows at circuit. Otherwise, the output will not trigger and need to give another input.

ABSTRAK

Tujuan projek ini adalah untuk membina satu system yang boleh mengawal alat-alat elektronik dengan menggunakan teknologi pengakuan pidato. Teknologi pengakuan pidato diterapkan dalam system computer dan menukarkan pidato kepada teks elektronik secara langsung. Teknologi ini membenarkan pengguna computer menggunakan suara untuk memasukkan teks tanpa menggunakan *keyboard*. Ini juga satu cara yang intuitif dan semulajadi bagi pengguna tanpa menggunakan tangan mereka. Dasarnya, projek ini ada tiga bahagian. Bahagian pertama ialah pembangunan perisian. *GUI* digunakan sebagai perantaraan antara pengguna dan system. Kod program dan *GUI* direka dengan *Visual Basic 2008 Express* manakala Speech API digunakan untuk pengakuan pidato dalam system ini. Perisian ini member fungsi untuk mendengar suara. Bahagian kedua adalah menggunakan litar ringkas sebagai prototaip untuk mencetuskan hasil. Komponen biasa telah digunakan seperti mentol lampu mewakili lampu di rumah, motor mewakili kipas dan *relay* mewakili pintu. Bahagian ketiga adalah menggunakan port selari sebagai sambungan antara litar dan system (komputer persendirian). Sistem teknologi pengakuan pidato ini dioperasikan dengan masukan suara dikeluarkan oleh pengguna dan system akan menerimanya. Isyarat akan diarahkan melalui port selari dan mencetuskan hasil yang ditunjukkan dalam litar. Jika tidak, hasil tidak akan dicetuskan dan perlu memberikan masukan yang lain.

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LIST OF ABBREVIATIONS

ECP   -   Extended Capabilities Mode

EPP   -   Extended Parallel Port

GUI   -   Graphical User Interface

IEEE   -   Institute of Electrical and Electronics Engineers

LPT   -   Line Print Terminal

PC   -   Personal Computer

RSI   -   Repetitive Strain Injury

SAPI   -   Speech Application Programming Interface

SR   -   Speech Recognition

TTS   -   Text-to-Speech

VB   -   Visual Basic

LIST OF APPENDIXES

CHAPTER I

INTRODUCTION

This chapter explains the background of the project and gives the introduction about the project. This chapter also states the project objectives, problem statements and scope of work.

1.1 Introduction

This project is about developing a Windows application with speech recognition technology to control the electronic and electrical appliances such as fan, lamp, door lock, and the others. This application enables users to control any home appliances by inserting voice commands without the use of hands. This is useful for both able and disabled users. In addition, it is essential for people with limited physical ability.

A computer based system is created to use as an interface to the speech recognition engine which integrated in Microsoft Windows. A software application is developed with graphical user interface (GUI) which designed using Microsoft Visual Basic. Thus, it is easy to be used by everyone. From the software application, it sends an output signal to the hardware circuit through the parallel port. The output signal control the electronic appliances on or off.

Speech recognition is the technology that converts sounds, words or phrases spoken by human to machine-readable input. Speech recognition systems can be trained to recognize specific commands and upon confirmation of correctness instructions can be given to systems. The term "voice recognition" is sometimes used to refer to speech recognition where the recognition system is trained to a particular speaker. Hence there is an aspect of speaker recognition which attempts to identify the person speaking, to better recognize what is being said.

Speech recognition is different from voice recognition, through many people use the terms interchangeably. In the technical sense, voice recognition is strictly about trying to recognize individual voices, not what the speaker said. It is a form of biometrics, the process of identifying a specific individual, often used for security applications. When we type a word or phrase, the computer doesn't actually understand English, but it recognizes the command and software tells the computer what to do when that command is recognized.

1.2   Project Objective

The main objective of this project is to design and implement the speech recognition technique to control the electronic and electrical appliances which can ease a person's daily activity. This makes the life easier and convenient. Nowadays, many applications can be reached without use of hands such as Bluetooth interact with mobile phone. In addition, it helps to reduce the utility expenses. Other objectives are:

  i.   To familiar with programming coding using Visual Basic environments.
  ii.   To construct and analyze the suitable circuit for external hardware.
  iii. To learn and study the specification of parallel port.
  iv.   To apply the function of parallel port.
  v.   To apply speech recognition technique to control the appliances.

1.3   Problem Statement

This project is proposed to solve the problems that occur mostly towards to people with disabilities. The target users are:

  i.   Handicapped people
 ii.   Paralytic people
iii.   Elder person
 iv.   Person who recovered from surgery
  v.   Overweight person

People with disabilities can benefit from speech recognition programs. Speech recognition is especially useful for people who have difficulty using their hands, ranging from mild repetitive stress injuries to involved disabilities that preclude using conventional computer input devices. In fact, people who used the keyboard a lot and developed repetitive strain injury (RSI) became an urgent early market for speech recognition.

By developing this project, it will give them benefit and convenience by lighten their burden. This makes their life easier so that they will not fully depend on other people.

1.4   Scope of Work

This project is started by collecting information about all the requirements which are needed to accomplish these matters. Basically, the searching process begins by exploring information via internet, related books, journals and thesis. Resource from the library and supervisor's guidance is used and some essential information is used in this project. After information gathering, the project's methodology is being planned. The project development is preceded based on the methodology. Overall, this project is divided into three parts which is consists of:

i.   Software writing using Microsoft Visual Basic

Create a windows application which can interface between the speech recognition engine in computer operating system and the hardware circuit such as motor, lamp bulb. The windows application can determine which appliances can switch on or off. There are two main functions, choose the electronic appliances and choose to switch on or off.
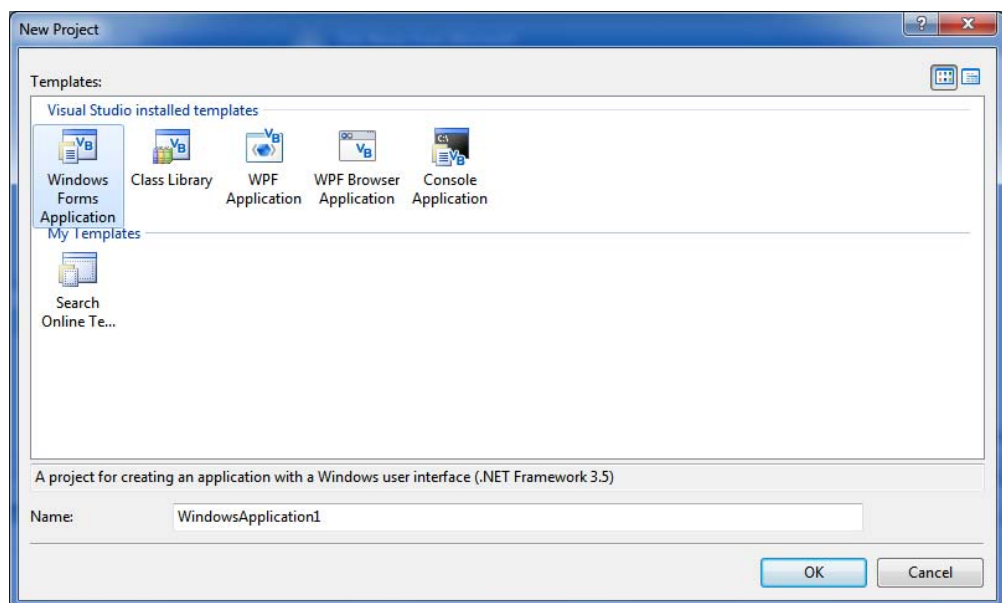

Figure 1.1: New Windows Application.

ii.   Speech recognition engine from Windows

Users speak commands that are recognized by a piece of software called the speech engine. The speech engine then tells the speech application what the user said, and the application determines what to do next. The speech recognition engine is integrated in Microsoft Windows. We have to be trained by reading text to computer to improve the computer's ability to understand our voice. This can help improve dictation accuracy.
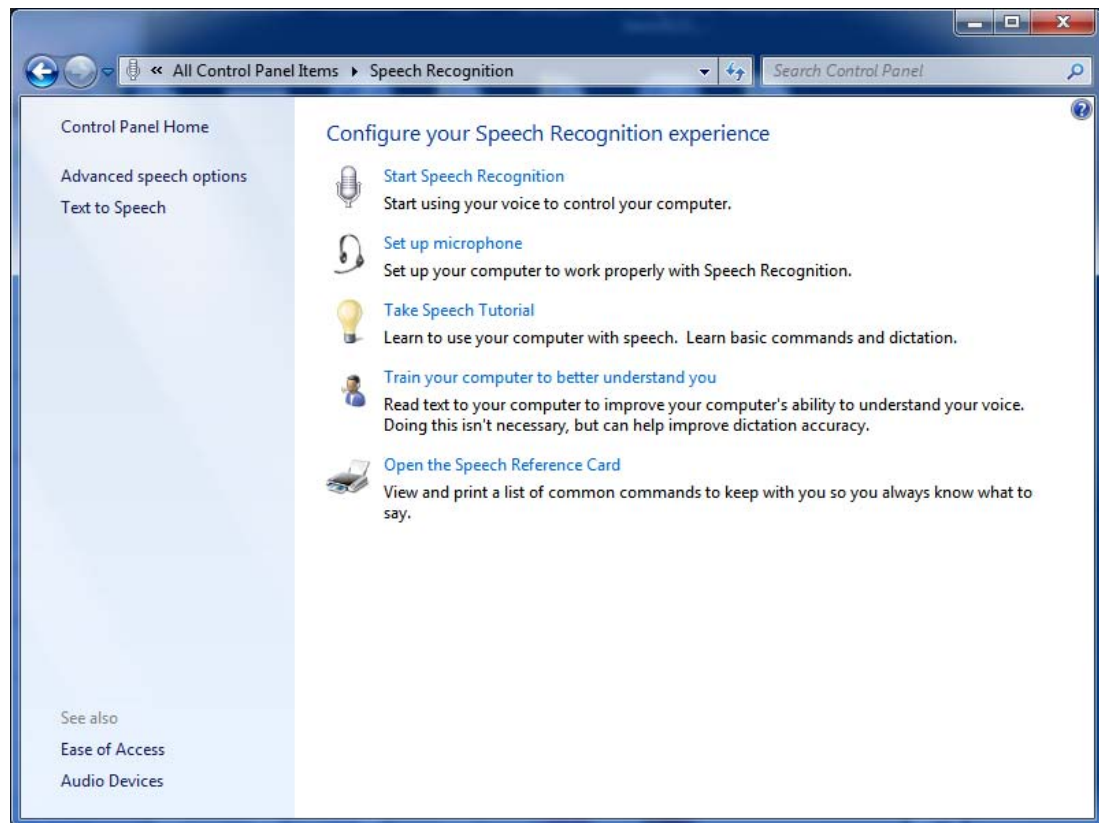
Figure 1.2: Speech Recognition in Microsoft Windows.

iii.   Hardware

Parallel port is applied to this project. The components used are bulb, motor, relay, resistors, diodes, transistor and the others. The circuit will connect to the parallel port. Computer will send output signals to the circuit through parallel port and control the electronic appliances.

Figure 1.3: Parallel Port and Connector.

1.5   Thesis Outline

This thesis is documentary delivering the ideas generated, concepts applied, activity done, and finally the product itself. It consists of five chapters. The following is the outline for this project in order to understand the whole project.

Chapter I explains briefly about the project background, objective of the project which needs to be achieved, problem statement of the project, scope of works regarding the project and methodology of the project.

Chapter II is a literature review on theoretical concepts applied in this project. It contains the information gathering of the project in order to complete the whole project.

Chapter III introduces the methodology of the project. This chapter introduces the construction of the project, which involves hardware development and software development. The approach for meeting the goals and objectives and project life cycle phase is described in this chapter, along with the tasks needed to complete it.

Chapter IV has covered the entire project finding which includes the simulation design and GUI. This chapter also discusses and analyze about the project and operation of the software such as the programming code. The output from combination of software and hardware is also included.

Chapter V is the conclusion and suggestion to the project for the future recommendation that can be implemented.

CHAPTER II

LITERATURE REVIEW

This chapter contains the literature review on theoretical concepts applied in this project. It contains the information gathering of the project in order to complete the whole project.

2.1   Microsoft Visual Basic 2008 Express

Visual Basic 2008 is an evolution of the Visual Basic language that is engineered for productively building type-safe and object-oriented applications. Visual Basic enables developers to target Windows, Web, and mobile devices.

Visual Basic Express provides a fully functional development environment for first-time programmers and hobbyists who are interested in building Windows Forms applications, Windows Presentation Foundation client applications, and class libraries. Visual Basic Express is the ideal choice for first-time developers who are interested in learning how to program in the Visual Basic language. If we can imagine a computer program, we can probably create it with Visual Basic Express. From a simple program that displays a message, to a full-fledged application that accesses a database or a Web service, Visual Basic Express gives us the tools we need.