APPLLYING VOICE RECOGNITION TECHNOLOGY IN LEARNING BASIC ARABIC LANGUAGE

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Dedicated to my family, specially to my beloved mother and father

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ABSTRACT

Applying Voice Recognition System in Learning Basic Arabic language is a project to develop a windows application with recognition technology to learn basic Arabic. A Graphical User Interface (GUI) will be developed as a user interface to show the Arabic calligraphy. Voice recognition Application Programming Interface (API) will be used to enable the speech processing to compare between the user's voice and pre-recorded voice. Results obtained will enable user to revise their Arabic pronunciations. If the accuracy is equal or greater than 80%, the system will assume that the pronunciation is correct. The main objective of this project is to build a learning system of Arabic Educational in an easier and effective way. This system is developed to attract users especially children to learn Arabic language. This application is targeted to children in age between 6 to 10 years old. The voice recognition application is developed using Visual Basic.Net software and Microsoft Speech API software. The Visual Basic.Net software used to write the program coding and Microsoft Speech API software is used for voice recognition system. This is a user-friendly system in which it will give feedback to user when user's pronunciation is incorrect. This project is actually to apply voice recognition technique in the software and to apply a new technology in learning basic Arabic language.

ABSTRAK

Applying Voice Recognition System in Learning Basic Arabic Language adalah sebuah projek untuk membangunkan aplikasi Windows yang menggunakan teknologi pengesanan sebutan bagi mempelajari bahasa Arab asas. Sebuah antaramuka pengguna (Graphical User Interface - GUI) akan dibangunkan sebagai antaramuka bagi membolehkan pengguna dan sistem berkomunikasi. Antaramuka aplikasi program (Application Programming Interface - API) pula digunakan bagi membolehkan sistem mengesan dan membuat perbandingan antara sebutan pengguna dengan suara 'cikgu - teacher' yang telah direkodkan di dalam sistem. Hasil daripada projek ini akan membolehkan pengguna untuk mengulangi sebutan di dalam bahasa Arab sehingga pengguna dapat menyebut sebutan tersebut dengan sebutan yang tepat. Di dalam sistem ini, sebutan pengguna akan dikira betul jika ianya melebihi ketepatan 80%. Tujuan utama projek ini adalah untuk membangunkan sebuah system pembelajaran khusus di dalam Bahasa Arab dengan cara yang mudah dan berkesan. Ianya dibangunkan bagi menarik minat di kalangan kanak-kanak untuk belajar Bahasa Arab asas. Sasaran utama system ini adalah di kalangan kanak-kanak yang berumur di antara 6 hingga 10 tahun. Aplikasi pengesanan sebutan ini dibangunkan dengan menggunakan perisian Visual Basic.Net dan Microsoft Speech API. Perisian Visual Basic.Net digunakan untuk menulis program manakala perisian Microsoft Speech API digunakan untuk system pengesanan suara. Sistem ini adalah mesra pengguna kerana ianya memberi maklum balas kepada pengguna apabila pengguna menyebut sebutan yang salah dengan membetulkan semula bacaan pengguna tersebut.Projek ini sebenarnya adalah untuk mengaplikasikan teknik pengesanan suara di dalam perisian dan juga untuk mengaplikasikan teknologi terbaru di dalam mempelajari bahasa Arab asas.

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LIST OF ABREVIATIONS

API	Application Programming Interface
ARPA	Advanced Research Projects Agency
DLL	Dynamic Link Library
GB	GigaByte
GUI	Graphical User Interface
IBM	International Business Machine
IDE	Integrated Development Environment
MCI	Media Control Interface
MIDI	Musical Instrument Digital Interface
PC	Personal Computer
PCM	Pulse Code Modulation
PSM	Projek Sarjana Muda
RIFF	Resource Interchange File Format
SAPI	Speeach Application Programming Interface
VB	Visual Basic

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CHAPTER I

PROJECT OVERVIEW

This chapter will explain briefly about the project background, objectives to be achieved, problem statement and scope of work.

1.1 Introduction

This project is intended to develop a windows application with recognition technology to learn basic Arabic. A Graphical User Interface (GUI) will be developed as a user interface to show the Arabic word. Voice recognition Application Programming Interface (API) will be used to enable the speech processing to compare between the user's voice and pre-recorded voice. Results obtained will enable user to revise their Arabic pronunciations.

Voice recognition is the process of taking the spoken word as an input to a computer program. This process is important to virtual reality because it provides a fairly natural and intuitive way of controlling the simulation. Voice recognition is "the technology by which sounds, words or phrases spoken by humans are converted into electrical signals, and these signals are transformed into coding patterns to which

pronunciation has been assigned". While the concept could more generally be called "sound recognition", focus on the human voice because we most often and most naturally use our voices to communicate our ideas to others in our immediate surroundings. In the context of a virtual environment, the user would presumably gain the greatest feeling of immersion, or being part of the simulation, if they could use their most common form of communication, the voice.

This system is developed as an introduction to the Arabic language. It is developed for anyone who is intended to learn Arabic language, but with little or no Arabic knowledge background. The philosophy of this system is to present Arabic language learning at a level that new user can understand. The targeted of this system is for the children below than 10 years old.

To make the learning process become more interesting and ease, the system will be developed by using an interesting graphical user interface (GUI) that is suitable with children's need. Here, the system will provide user with the illustration and graphic for each of the word or pronunciation in the Arabic language. From here, the user will get to understand easily and have an idea of what the system is teaching about. Besides that, the system will also provide the user with bilingual notes. This means that the system will use two languages, which are Malay (National language) and Arabic.

1.2 Project Objectives

In order for the project to success and to be implemented, the following objectives have to be achieved:-

- To improve the communication skills in Arabic language among the children.
- To provide an easy way for children in learning Arabic language without attending any classes. By this system, children can learn Arabic language at home.

- To attract the children so that they have the interest in learning the Arabic language.
- To allow users in different age to keen studying the Arabic language because the system will provide user with very basic Arabic language learning.
- To apply voice recognition technique in the software and to apply a new technology in learning Arabic language.
- To reduce the cost as a person does not require extra expenditure for paying Arabic class fees.

1.3 Problem Statement

There are some problems facing by the children in learning Arabic language. The main problem is that most software at market nowadays only provides one-way communication. System that is tried to develop is more efficient because it provides two-way communications, which enable them to learn basic Arabic language easily. Besides that, there is some difficulties in founding an Arabic language class and facing some problem to attend that class. Moreover, the children also must attend the class according to the time that has been scheduled by that class. Ultimately, parent need to spend a lot of money and time in order to make sure their children is expert in Arabic Language.

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1.4 Scope of Work

The scope of this project is to develop a system by using software. The software that will be used in this project is Visual Basic.NET and Microsoft Windows API software. The program code will be written in VB.NET programming language. Microsoft Windows API is software that builds specially for the voice recognition application. These two (2) software will be linked together to obtain a complete system. Here, Microsoft Windows API is a complementary software for VB.NET to apply voice

recognition. This system is specially developed for the children below than 10 years old. This system provide user with the basic Arabic language with 3 steps of learning:

i. The system will play the original sound (pre-recorded voice), and hear the teacher for pronunciation verification.
ii. Then, the user will repeat according to the original sound (user input their voice according to the words that appear on the screen). At this time, the system will inspect the pronunciation of that user.
iii. The system will detect and make comparison between the user's pronunciation and pre-recorded voice. If the accuracy is equal or more than 80%, the system will assume that the pronunciation is correct. If it is below than 80%, the system will enable the user to revise the Arabic pronunciation.

To use this system, users only need to prepare a microphone and a speaker. This software is quite different from the other software in terms of their application. This software provides the user with two way communication. This means that the system will give feedback to user when user's pronunciation is incorrect. Comparing to other software, users only speak or repeat again the words but there are no feedbacks from the system to make a correction to the user. So, the users could not detect either they speak in correct pronunciation or not.

Voice recognition differs from speech recognition. Speech recognition is the process of converting an acoustic signal, captured by a microphone or a telephone, to a set of words. The recognized words can be the final results, as for applications such as commands & control, data entry, and document preparation. They can also serve as the input to further linguistic processing in order to achieve speech understanding.

1.5 Thesis Outline

This thesis is divided into 5 chapters to provide the understanding of the whole project.

The first chapter of this thesis will explain briefly about the project background, objectives to be achieved, problem statement and scope of work.

Chapter 2 describes about the literature review involved to gather information of the project in order to complete the whole project. This study is focused especially on software in applying voice recognition technique and Visual Basic.NET as the main software to write the program.

Chapter 3 will explain about the project methodology approach taken and how the project is implemented. Each achievement, problems arose and selection taken during the project implementation is explained in detail for each stage until the finishing line.

Chapter 4 will display the output from the project which includes the simulation design and the graphical user interface. This chapter will also discuss and analyze about the project and operation of the software such as their programming code.

Chapter 5 will be the conclusion and suggestion to the project. The recommendation for the future project is explained in this chapter.

CHAPTER II

LITERATURE REVIEW

This chapter describes about the literature review involved to gather information about the project. This study is focused especially on the software and application related to the project.

2.1 History of Voice Recognition Technology

Although the largest strides in the development of voice recognition technology have occurred in the past two decades, this technology really began with Alexander Graham Bell's inventions in the 1870s. By discovering how to convert air pressure waves (sound) into electrical impulses, he began the process of uncovering the scientific and mathematical basis of understanding speech.

In the 1950s, Bell Laboratories developed the first effective speech recognizer for numbers. In the 1970s, the ARPA Speech Understanding Research project developed the technology further, in particular by recognizing that the objective of automatic speech recognition is the understanding of speech not merely the recognition of words.