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Development of Speech Recognition Application for the Holy Quran

A Thesis Submitted in Partial Fulfillment of the Requirements
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ABSTRACT

One of the educational methods is the education using the concept of speech recognition. This method is used to develop application that can listen to the words pronounced by the user, then the application recognize the talk and gives the results by shown the words that have been recognized or using these words to do another process, and this is what is called feedback.

In this thesis we developed an application to recognize Holy Quran ayahs, this application prints the ayah that have been pronounced by the learner and its words confidence degree if the ayah recited correctly.

We used Java language in the development of this application, also we used sphinx which is open source library for speech recognition, and the application trained by eleven Holy Quran recites from different countries.

The experimental results show that the accuracy percentage in recognizing the correct recitation increased when the size of trained data increased.



المستخلص

واحدة من منهجيات التعليم هي التعليم باستخدام مفهوم التعرف على الكلام، استخدمت هذه المنهجية لتطوير برنامج يستطيع الاستماع للكلمات المنطوقة من الإنسان، وبعد ذلك يقوم التطبيق بالتعرف على الكلام وإعطاء نتائج عن طريق طباعة الكلمات التي تم التعرف عليها أو باستخدام هذه الكلمات في معالجات أخرى وهذا ما يسمى بالتغذية العكسية.

في هذه الأطروحة تم تطوير تطبيق للتعرف على آيات القرآن الكريم، ويقوم هذا التطبيق بطباعة الآية التي تم نطقها بواسطة المستخدم ودرجة الثقة في كلماتها إذا قرأت الآية بصورة صحيحة.

تم استخدام لغة الجافا لتطوير هذا التطبيق وذلك باستخدام مكتبة sphinx وهي مكتبة مفتوحة المصدر للتعرف على الكلام، ثم تم تدريب التطبيق بواسطة أحد عشر قارئ للقرآن من بلدان مختلفة.

نتائج الاختبار أظهرت أن نسبة الدقة في التعرف على التلاوة الصحيحة تزيد كلما زاد حجم البيانات التي تتم بها عملية التدريب.



1.1 Introduction

What is speech recognition? Speech recognition is the process of converting a speech signal to a sequence of words, by means of an algorithm implemented as a computer program. Speech recognition applications that have emerged over the last few years include voice dialing, call routing, and simple data entry, preparation of structured documents and content-based spoken audio search [1].

The performance of a speech recognition system is usually specified in terms of accuracy and speed. Accuracy is measured with the word error rate, whereas speed is measured with the real time factor [1].

The Sphinx is a speech recognition engine system developed at CMU .It can be used to build small, medium and large vocabulary applications .Sphinx has been submitted to SourceForge as an open source project, its source code is available for download form the internet [2].

1.2 Research Problem

There is a need for a Holy Quran learning software which is fully interactive with the users, that can gives examples of the correct pronunciation of the Holy Quran and can detect whether the pronunciation of the user is correct or incorrect. There is a huge numbers of interested Holy Quran learners needed who help them in correct Holy Quran recitation.

1.3 Research Objectives

The objectives of this research include the following:

To investigate the speech recognition techniques.

To develop a Holy Quran speech recognition application that can recognize Holy Quran ayahs and learn the correct ayah recitation.

1.4 Research Methodology

We used java language and open source speech recognition library called Sphinx to develop the speech recognition application for Holy Quran, The developed application has been trained for recognizing three Holy Quran Sowers alfateha, alfalag and alnnas, the developed application has the ability to recognize every these three sowers correct ayahs Tilawa and to learn correct recitation for these ayahs with the discovery of the right and wrong ayah words and their Holy Quran recites pronunciation.

1.5 Research Organization

This research organized as following:

Chapter one is an introduction to the research, Chapter two presents the background and the related work, Chapter three shows the tools used to develop the Holy Quran application, Chapter four presents the implementation of the speech recognition application for Holy Quran, Conclusion and future work presented in chapter five.

