Quranic verse Recitation Recognition Engine for Self Learning of Al-Jabari Method: A Review

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ABSTRACT

In our reality of life, there are still a lot of Muslims can’t read Al-Quran properly with a better understanding of Tajweed rules. Moreover, the correct recitation of Quran is required and important for prayer and worship in Islam. Reality of hours provided, particularly for Quranic learningsyllabus (Pendidikan Islam) during schools hours, were particularly less and limited. Due to this matter, Al-Jabari method of learning Al-Quran has been introduced through effective and faster way, just only in 30 hours. This method is a new approach in learning Al-Quran, which formerly founded in Bandung, Indonesia. This technique and skill is believed able to compete the currently techniques implemented in Malaysia, such as Qiraati and Iqra’. Currently, Al-Jabari method has been taught by experienced teachers (Mudarris), but the numbers of Mudarris is still limited. Moreover, today’s busy lifestyle needs a modern and technological approach that able to optimize the study time and improve the learning process. With the huge demanding of this learning approach in Malaysia, interactive and self-learning tools for Al-Jabari method could be the right choice to be implemented nowadays, due to support the Mudarris as well as students, particularly focuses on aspect of “know how to read” Al-Quran in proper and right way. This paper seeks to provide a comprehensive review of any recent research related to Al-Quran learning and the potential technology that really suit to be implemented with Al-Jabari method. Here, the recognition of the Quranic recitation checking techniques, algorithms, advantages, as well as the drawbacks of the system that might be occurred, will be discussed in details.

Keywords: Al-Jabari, Qiraati and Iqra, Mudarris, recitation, recognition

INTRODUCTION

Al-Quran is the holy book revealed by Allah SWT to Prophet Muhammad PBUH gradually over 23 years, through the medium of the angel Jibreel AS. The Qur’an was revealed with Tajweed rules applied to it. Means that, when the angel Jibreel (AS) recites the words of Allah SWT to the Prophet Muhammad PBUH, he has showed the Prophet (SAW) the certain ways, in which permissible in reciting the Qur’an. Read each letter in
Al-Quran is considered as worship in Islam. Moreover, reciting Al-Quran in appropriate way is compulsory for all Muslims and indispensable in Islamic worship, such as prayers. In learning Al-Quran as been shown by our Prophet, different systems and methodologies are essential in putting the word of Allah SWT into the rightful place. Since the revelation of al-Quran, the Quranic learning process through talaqqi&musyafahah method is the only way to learn how to recite Al-Quran correctly with a proper way of reading and understanding of Tajweed rules.

Currently, there are a few techniques and methods of Quranic learning have been implemented in Malaysia, such as Qiraati and Iqra’. However, both techniques are believed unable to compete with Al-Jabari method that newly introduced in Malaysia, in earlier year of 2012. This method of learning Al-Quran has been performed through effective and faster way, just only in 30 hours of learning. Practically, after 30 hours of learning Al-Quran through Al-Jabari method, the students might be able to read and write al-Quran appropriately, with a better understanding of Tajweed rules. This method is a new approach in learning Al-Quran, which formerly founded in Bandung, Indonesia by Drs. H. Yusuf Sodik, the founder of this method. The goal and objective outlined by him is to overcome the problems of learning Al-Quran; (unable to identify the Quranic letters and hijaiyah letters), through the easiest and practical method of Al-Jabari. This method is a practical guidance of reading and writing Al-Quran.

Presently, Al-Jabari method has been taught by the experienced and well trained teachers (Mudarris), but the numbers of them is still limited. Furthermore, today’s busy lifestyle needs a modern and technological approach that able to optimize the study time, as well as improve the learning process. With the huge demanding of this learning approach in Malaysia, interactive and self-learning tools using ICT, particularly for Al-Jabari method could be the right choice to be implemented nowadays. It is also mainly needed, due to support the Mudarris as well as students, particularly focuses on aspect of “know how to read” Al-Quran in a proper and a right manner.

As been mentioned earlier, Al-Jabarimethod consists of 2 types of learning, which are recitation and writing. Here, technological approach that suitable to be applied will be focused on reading skills (recitation) of Al-Quran through Al-Jabari method of learning.
Thus, speech recognition technique is the right option and perfect delivery vehicle for learning in near future. Hence, for further development of recognition process, signal processing technology is more preferable to implemented for this kind of application. This research stimulates speech recognition technology, which incorporates with the various components in artificial intelligent, natural sciences, speech processing technology and computer human interaction [1].

In this paper, we will review the potential application; focus on algorithms that might be able to be implemented with Al-Jabari method of Quranic learning approach. In current days, there is certain software that can be considered as ICT learning and teaching tools that invented and already been used as a teaching aid of Quranic learning. However, Al-Jabari method of learning though ICT is still do not been implemented yet neither in Malaysia nor in Indonesia. Thus, the implementation for Al-Jabari method is really most beneficial indeed for Muslim.

2. Background

The Holy Quran is the literal words of Allah SWT that revealed by Him as an infallible source of legislation for mankind. It contains regulations and guidance about all aspects of life and references of life in hereafter. It is extremely important, that the Quran must be read, written and recited correctly and clearly, due to avoid creating any sort of ambiguity or misunderstanding whatsoever. Since the generation of Prophet Muhammad PBUH, no one has ever denied the fact that Tajweed is definitely important. Currently, in our generation the people has lost respect and forgotten the status of Tajweed. The role of Quranic learning in today’s society is worrying, considering there are a lot of Muslim people still can’t read Al-Quran properly with a better understanding of Tajweed rules [2]. Current scenario especially in Malaysia, there are still a lot of Muslim people have been categorized as Quranic illiterate with approximation of 100% at every level of age. Most of them were unable to read or write Al-Quran properly with a better understanding of Tajweed rules. This phenomenon has been proved and support from the survey and research conducted by scholars, through their statistical data of research findings, with approximation population with more than 200 000 Muslim people in Malaysia within the range of age 35 years old and above, who were unable to read Al-Quran properly [3].
Because of this situation, there is a huge demand for fast learning method in Quranic learning, as well as growing market for self-learning method to learn Al-Quran, that also compatible to be used in current busy lifestyle. Therefore, we presented Al-Jabari method and ICT learning tools in this paper, because we believed both of them met the described criteria mentioned earlier, which are fast, efficient method of learning, as well as practical way of learning using ICT tools.

2.1 Acoustic Model of Holy Quran

Linguistically, the word ‘Quran’ means ‘reading’ or ‘the recitation’ and it is usually referred as ‘the text which is read’. The Quran itself refer as ‘kitab’, which lexically advert to a written book. Focus on recitation aspect, the basic recognition technology will be the main focus of research area and criteria to be evaluated. Although, various range of input speech already implemented in previous research, but the input speech applied and experimented in this research is totally different, which is Al-Quran.

It is known as fact that, the voice for each different person’s is totally different. Hence, the recitations of the Holy Quran tend to differ a lot from one person to another. The way of the same sentence in Al-Quran been recited or delivered by the different people may be dissimilar and unlike. It is because of the flexibility of the laws of the tajweed[4, 5]. Based on previous research conducted by researchers, a lot of challenging and difficulties have arisen when dealing with Arabic language, especially in Al-Quran. These difficulties are concerning to the differences between written and recite the Holy Quran [4, 6, 7]. Those same combinations of letters may be pronounced differently, due to the use of harakattes[4, 8]. Furthermore, the pronunciations of the Quranic phonemes are marked with diacritics. It is indicated by “shadda” sign and “tanween” sign of word adverbial markers.

2.2 Al-Jabari Learning Approach

Al-Jabari method is officially implemented in Indonesia on January 1991. The Al-Jabari books and modules already through YayasanPendidikan Al-Jabari[9] (Kementerian Agama Republik Indonesia, 2010). In early year of 2012, Al-Jabari method has successfully reaches and spread in Malaysia. Through the efforts and collaboration
made between them and Tun Abdul Aziz mosque, Petaling Jaya, Selangor, a few teachers (Mudarris) has been well trained by them. YayasanSemestaBerdaftar, which is a registered foundationunder Tun Abdul Aziz mosque, has been given a full authority to manage and handled any kind of classes, trainings and programs related with Al-Jabari. The main philosophy introduced by its founder is to introduce the fathah letters as the basic principle in learning, start with the easier module, moderate until the high and difficult module. The arrangement of these modules are based on the memory mind mapping (titian ingatan) that has been composed from the Arabic word with a certain meaning, due to introduce the students with Arabic language [10, 11]

2.2.1 Learning Module

According to Yusuf Sodik[12], the founder of Al-Jabari method, this learning must be started and initiated with a induction set containing with 4 main items, which are:

1. Solmisation(Nazham)
2. BadrNasheed (SelawatBadar)
3. Nasheed of Holy Quran
4. Memory mind mapping (Titian Ingatan)

For learning modules, Al-Jabari has 4 books which covered the reading and written modules [10, 11]

<table>
<thead>
<tr>
<th>Book 1</th>
<th>Book 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consists of lesson 1 until lesson 7:</td>
<td>Consist of lesson 1 until lesson 8</td>
</tr>
<tr>
<td>1. Lesson 1: اب ح ت</td>
<td>1. Lesson 1: Continuous letters (merge)</td>
</tr>
<tr>
<td>2. Lesson 2: ج د س خ</td>
<td>2. Lesson 2: (Initial, middle and end/final/last letter).</td>
</tr>
<tr>
<td>3. Lesson 3: ت ذ ص ز</td>
<td>3. Lesson 3: Sound</td>
</tr>
<tr>
<td>4. Lesson 4: ع ش ر ض</td>
<td>4. Lesson 4: Sound</td>
</tr>
<tr>
<td>5. Lesson 5: ط ف غ ظ</td>
<td>5. Lesson 5: Dead letter (letter with sukoon)</td>
</tr>
<tr>
<td>7. Lesson 7: ه ي ن و</td>
<td></td>
</tr>
</tbody>
</table>
| Note : Arab letter | Lesson 7 : Sound In  
| Lesson 8 : Sound Un  
Note : Name of letters (al-Jabari arrangement)  
|  
| **Book 3** | **Book 4**  
| Consists of lesson 1 until lesson 13: | Consists of lesson 1 until lesson 14:  
| • Lesson 1: Sound A elongated  
• Lesson 2: Sound I elongated  
• Lesson 3 : Sound U elongated  
• Lesson 4 : Sound AU, AI  
• Lesson 5 : Heavy sound (Heavy)  
• Lesson 6 : Sound (ال) pronounce clearly (al) /Clear reading  
• Lesson 7 :Sound (AL) followed by Sabdu/tasydid  
• Lesson 8 : Pronounce with Ghunnah  
• Lesson 9 : Sound of Noon saakina (ن) or Tanween should clearly read followed with the letter of (ء خ ح غ خ)  
• Lesson 10 : Sound of Noon sakina (ن) or Tanween followed by any of these 4 letters (ي ن م و) the reader should read with Ghunnah.  
• Lesson 11 : Sound of Noon Sakina (ن) or Tanween is followed by any of these 2 letters (ر ل)، there is no Ghunnah.  
• Lesson 12 : Sound of Noon Sakina(ن)or Tanween has change into the sound of miim(م), when it is followed by (ب)  
| • Lesson 1: Sound of letters in sakina/sukoon (ق ط ب ج) bounces (vibration of sound at the end of the pronunciation of a letter)  
• Lesson 2 : Sound of meem (م) should clearly read.  
• Lesson 3 : Sound of meem(م) followed by another meem (م) should clearly read with ghunnah and not been off in the middle.  
• Lesson 4 : Sound of meem in sukoon (مْ) followed with letter(ب)، should clearly read with ghunnah and not been off.  
• Lesson 5 : Sound of letters in sakina/sukoon with the normal letters (alive) is equal.  
• Lesson 6: Sound of letters in sakina/sukoon followed by the closest letters and its sounds.  
• Lesson 7 : Sound of letters in sakina/sukoon followed by the any letters with the similar sound.  
• Lesson 8 : Read with elongate of 5 counts and give a sign of ـ.  
• Lesson 9 : Read with elongate of 2, 4, and 5 counts.  
• Lesson 10 : 1. ﻩ and read with elongate. |
- Lesson 13: Sound of Noon sakina (ن) or Tanween change to be unclear when it is followed by these letters (ت ج د ذ ز س ش ص ض ط ظ ف ق ك)

2. ه and ه should be read elongate with 5 counts.

3. أ and ؋ read in short.

- Lesson 11: The proper way to stop (waqf).
- Lesson 12: Read with elongate of 6 counts. The end of the letter should be clearly pronounced (heavy).
- Lesson 13: The signs of waqf
- Lesson 14: Letters at the early surah.

### 2.2.2 Learning and teaching Method

Al-Jabari approach is totally different from other method in teaching and learning Al-Quran. The main criteria while developing this technique is to attract the students interest and increase their motivation to learn Al-Quran through interactive way, thus, make them easier to understand about the modules teaching intended. Before the learning process begin, the teacher (Mudarris) will assist the students on how to pray through du’a. This activity is usual routine that need to be done before the classes started, due to seek permission from Allah SWT for getting a better understanding about Quranic learning. Then, the learning process will be continued through ‘singing’. The method of learning through ‘singing’ is recommended in teaching pedagogy, because it is considered as attractive approach, in which influenced the psychological and mood of the students. In Al-Jabari method, the main core of learning is focused on memory mind mapping. The hija’iyyah letters need to be remembered by each of student through singing, which has a same rythm with BadrNasheed (Selawat Badar) and Nasyeed, with a title “Kitab Al-Quran” (Irnavati et al., 2012). Beside that, the writing technique also been teach in Al-Jabari. The teacher (Mudarris) will teach how to write the Quranic letters in a right way, in front of the students. Then, the students will follow the order and imitate the way of the teacher write those hija’iyyah letters repeatedly till they are expert. Practical assessment approach will definitely help the students master the reading and writing techniques, at the same time increase their skills.
According to Irna et al. (2012)[13], Al-Jabari method has its own uniqueness. The special and unique about this method can be seen through the skills and method applied in this method. Based on the previous research, thesis or dissertation made so far, found out that there is no such method of Quranic learning that combine both technique of writing and reading skills altogether into 1 complete module. However, Al-Jabari have both techniques in their learning modules.

3. Existing Approach

According to this research, the basic of speech recognition technology was mainly concentrate here. However, the implementation is totally different, which applied to the different type of Quranic learning approach, such as Al-Jabari. Previously, the existing technology performed only focus toward the learning of Quran, through Al-Bahgdadi method, and currently in Malaysia, most of primary school used Iqra’ method as their main syllabus in teaching and learning Al-Quran. The learning method of Quranic learning through Al-Jabari method is believed more effective and efficient compare to Al-Bahdadi, Qiraati and Iqra’ method. The different contents of input, would probably affect the percentage of accuracy during the recognition process. Hence, the reliability and effectiveness of the system was depending on the language and system created. The algorithms used for the certain application that really close related with Quranic learning will be reviewed. Besides, the basic principle of speech recognition techniques has been explored in [4, 14] and [15].

Under the aspect of technology, the implementation of speech recognition for recognizing the Quranic Arabic has been started since early year of twentieth century. Computer Aided Pronunciation Learning (CAPL) has been introduced, where it received a considerable attention in recent years. Many research efforts have been done for improvement of such systems, especially in the field of second language teaching [16, 17]. However, in these recent years, researchers took serious actions after experiencing some challenging problems and difficulties in recognizing Quranic letters, especially in checking the Tajweed rules. At the same time, CAPL also facing a same problem, in order to be automatic training for correct recitation of the Holy Quran for Arabic
speakers[18]. Different strategies and approaches have been carried out by them, where the details are discussed after this.

3.1 Hidden Markov Model (HMM)

Omar, M.K. [19] take a step forward to use Hidden Markov Model (HMM) based speech verification system, in verifying the acoustic model of Arabic phonemes. Here, the Arabic phoneme set was clustered to a group of clusters and the pronunciation assessment was accomplished in 2 steps, which are detection step of substitution, insertion and deletion errors, as well as, tested by discriminatively trained HMM models against the units. Same approach also recommended by N. Jamaliah, I. [20], but the implementation was directly focus towards Quranic verse recitation. In this research, the Tajweed rules of Quranic verse recitation is verified by using HMM and confidence score values. The implementation of confidence score values is based on the Log-Likelihood Ratio Values, known as LLR. The acoustic model likelihoods are scaled by the likelihood of the first alternative path model of decode model, using Viterbi decoder for recognition part. Meanwhile, Baum-Welch algorithm is based on combination of forward and backward algorithm, mainly for HMM training model. Besides, Hidden Markov Model (HMM) based speech recognizer also has been used by Salah, E. H. and Mohsen, R. [21]. Here, the most probable pronunciation error hypotheses is generated from CAPL system, that are fed to this HMM speech recognizer, in order to test them against the spoken utterance. It also generates mapping information to determine the appropriate location for the feedback of each candidate hypothesis.

3.2 Open Source Sphinx Framework

Automatic Speech Recognizer (ASR) has been developed using the open source of Sphinx Framework as the basis of research. SpinxTrain is a tool based on HMM (Hidden Markov Model), for the development of Acoustic Model. Group of research lead by H.Tabbal, et al. (2006) [4] have go through the Quranic verse recitation recognition, which covered the Quranic verse delimitation system in audio files using this speech recognition techniques. The scope of this project more focus into the automated delimiter, which can extract the verse from the audio files. Research techniques for each phase were discussed and evaluated using implementation of various techniques for different recitors,
which recite sourat “Al-Ikhlas”. The most important tajweed rules and tarteel were also discussed, which can influence the recognition of a specific recitation in surah Al-Ikhlas.

3.3 **Maximum Likelihood Linear Regression (MLLR)**

In developing a HAFSS system, MLLR has been used in Speaker Adaptation block diagram, which mainly for adapting acoustic models to each user acoustic properties, in order to boost system performance. Originally, Sherif M. A. et al. (2006) [17][22] developed the HAFSS system for teaching Arabic pronunciation to non-native speakers. However, this application has been applied into challenging task in teaching the correct recitation of the Holy Quran. Here, the pronunciation error hypothesis in HAFSS® represented in the form of a linear lattice that is flexible enough to support error hypothesis addition, deletion and overlapping of probable mispronunciation. Most Quranic learners are not familiar with the phonemes, and thus in HAFSS system, it will generate user helpful feedback that use lattice unit similar with the one used in traditional methods of the Holy Quran recitation teaching.

4. **Analysis and Discussion**

The existing technology available right now only focuses on Quranic learning as a whole. Most of the products were only capable to show Al-Quran texts and/or play stored Al-Quran recitation. In the table 1 below, show the comparison and approaches used by previous researchers in recognizing the Quranic verse recitation.

<table>
<thead>
<tr>
<th>Author</th>
<th>Experiment Data</th>
<th>Experiments</th>
<th>Performance/Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Ehab, M. et al.’07][14]</td>
<td>2000 distinct words</td>
<td>Developed an automatic speech recognizer for Quranic based speaker independent. This system is based on the triphone Hidden Markov Model and Maximum Likelihood</td>
<td>The level of accuracy from the tested range 68% - 85%</td>
</tr>
</tbody>
</table>
Linear Regression (MLLR). The advantages of using the Quranic verse as the database – uniqueness of the words and high level of orderliness between verses

| [Sherif M. A. et al. ‘06][22] | 507 utterances | Developed a HAFSS© system, that used HMM acoustic model and MLLR speaker adaptation, due to correct and correct recitation of the Holy Quran |
| Model Tuning result= 97.58% - 96.96%
| Sys. Performance with confidence=96.87%
| Message based sys. Performance with confidence = 80.13%

| 85% - 92%

The implementation through HAFSS© system [22] is believed able to improve the user performance based on Hidden Markov Model (HMM) acoustic model and Maximum Likelihood Linear Regression (MLLR) speaker adaptation, specifically for correction of Quranic recitation. The previous research project will be modified and added with additional features as in HAFSS© system, due to create the self-learning system in Quranic lesson. This self-learning system, able to be improved and fully implemented for Al-Jabari method, as it is designated to this purposes.
5. Conclusion

In this paper, all different methods or approaches have been discussed and reviewed, due to find the most suitable and significant method used for learning Al-Quran for support in Al-Jabari method. The approach used in the teaching and learning of the Qur'an must be aligned with the new innovation and technology, due to ensure Al-Jabari method is easy to understand, fun and really efficient to be implemented in current time, till the children are keen to learn the Quran.

Al-Jabari method of learning Al-Quran is remarkably proven, able to help students “know how to read and write al-Quran”, through a faster way and effectively just only 30 hours. This technique and skill is believed able to compete the currently techniques implemented in Malaysia, such as Qiraati and Iqra’. Although this method is still not fully been spread and implemented to all Malaysia regions, there is a huge demand from the individual person and the Muslim people locally. Moreover, their feedback about this technique is really encouraging and positively. Thus, the interactive and self-learning tools for Al-Jabari method are really necessary and could be the right choice, due to support the limited numbers of Mudarris to teaching this kind of method. Hopefully, this method will give benefits to Ummah, by solving and overcome the Quranic illiterate, due to ensure Al-Quran may be internalized and implemented to all aspects in human life.
6. References


