COMPUTER AIDED PRONUNCIATION LEARNING FOR AL-JABARI METHOD: A REVIEW

Noor Jamaliah Ibrahim¹, Mohd Yamani Idna Idris²  
M. Y. Zulkifli Mohd Yusoff³

ABSTRACT

Speech processing for Quranic Arabic is an active field of research, since a few years ago. We propose in this paper, a review on the potential of automatic speech recognition (ASR) computer-based technology to support Quranic learning processes. Thus, the aspects of Computer Aided Pronunciation Learning (CAPL) are discussed, focusing towards the implementation on Quranic learning through Al-Jabari method. We believe Al-Jabari method is fast and efficient, as well as a practical way of learning Al-Quran. The analysis of CAPL systems towards the implementation in Quranic learning through Al-Jabari method are discussed in details.

Keywords: Automatic Speech Recognition (ASR), Computer-based Technology, Quranic, Al-Jabari, Computer Aided Pronunciation Learning (CAPL)

(*) This article was submitted on: 23/04/2014 and accepted for publication on: 24/11/2014.
¹ Faculty of Computer Science & Information Technology, Email: n_jamaliah@um.edu.my  
² Academy of Islamic Studies, University of Malaya, K.L., Malaysia, Email: yamani@um.edu.my  
³ Centre of Quranic Research (CQR), University of Malaya, Email: zulkifliy@um.edu.my
1. INTRODUCTION

Language learning is a field which closely related to speech and communication. Thus, the aspect of pronunciation learning is partly considered as an important aspect in computer based language learning known as ‘Computer-Aided Language Learning (CALL)’, which also includes ‘Computer-Aided Pronunciation Learning (CAPL)’. Both terms are referring to the achievements in the fields of computer aided learning system. Some of the related studies are on speech recognition, speech synthesis and dialogue systems, which permits the ability to produce efficient computer aided system. CAPL can present easier, enjoyable, effective learning tools than the traditional non-computerized learning system. Therefore, learning the specific pronunciation rules known as Tajwid, essentially the fundamental knowledge of reading Al-Quran could be eased if supported by CAPL-based systems.

There are many methods of learning Al-Quran such as Al-Jabari, Al-Baghdadiah, Qirati and Iqra’. However, learning Al-Quran through Al-Jabari method is believed to be more effective. Al-Jabari was introduced in Malaysia in early 2012. This method is able to teach reading and writing the Quran after 30 hours of lesson. Al-Jabari method includes certification of teachers and technological approach that present interactive and self-learning functions, should enhance the learning experience of Quranic reading among students (Ibrahim, Idris, Razak, & Rahman, 2013). The existing technology, product and ICT tools available currently, mostly focus on multimedia learning concepts (Drilling, quizzes, drag and drop learning) and only capable to show Al-Quran texts and/or play stored Al-Quran recitation with no CAPL technology. In other word, this paper focuses towards developing an automated and intelligent system, which able to recognize the Quranic recitation through Al-Jabari method.

2. LITERATURE REVIEW

2.1 Computer Aided Learning systems

Computer Aided Language Learning (CALL) system is a computer-based language learning system, which particularly design for helping students in learning process. In its purest form, CAL is carried out by an interaction between an erudite program and the student(s), with no teacher (human) being involved (Nihtilä, Sundqvist, Söderlund, & Östermark, n.d.), such as the LISTEN system. The LISTEN system is a speech-recognition based computer-guided oral reading coach, which had been implemented by Banerjee et al. (2003).

In learning aspects of the Holy Quran recitation, the basic understanding of
correct recitation is a requirement before starting the assessment and correction using speech recognition technology. Three aspects of basic understanding required by CAPL before developing the system are on, (1) the definition of the Holy Quran, and (2) the main aspects of teaching it, and lastly (3) the purpose of learning correct recitation of the Holy Quran based on Tajweed. Beside the main requirements mentioned earlier, the characteristics of the teachers (Mudarris) also need to be considered as a part of the requirements. By identifying the advantages of CALL system and its relations with the requirements needed and methodologies that are essential for Al-Quran teachers (Mudarris), the main aspects of the targeted CAPL systems can be determined. Basically, CAPL system is required to imitate the tasks of teachers (Mudarris) and use the advantages identified from CALL systems, to enhance the performance of learning by adding extra capabilities to the system for analyzing the students’ speech of language and providing detailed feedback.

2.2 Previous Research Effort of CAPL

In the past 20 years, there have been stimulated efforts to use advances in the fields of human language processing, especially speech recognition in the field of CALL. Meanwhile, CAPL speech recognition technologies offered powerful tools for analyzing students’ speech and providing detailed feedback. Since these technologies were built originally with recognition in mind, thus many modifications were needed to be able to deploy them in the field of pronunciation verification.

From the study made by Kawai (1999), CALL system has been introduced mainly to teach the pronunciation of a second language. Three areas of pronunciation skills have been addressed: phonetic quality, duration and pitch. For phonetic quality assessment, a speaker-independent bilingual phonetic recognizer has been used to compare L1 (native language) and L2 (target language) phonetics in order to identify insertions, deletions and substitutions (Kawai, 1998a; Kawai, 1998c; Kawai, 1998d). Here, we found that the degree of the learner’s foreign accent can be measured based on the number of alternate pronunciations the learner uses; the number decreases as learning progresses. Meanwhile, for phonetic duration assessment, speech recognition has been used to measure the durations of each phonemes and compare them with distributions of native speakers while correcting for different speech rates (Kawai, 1996; Kawai, 1998b). The system tells the learner the likelihood of native speakers understanding the learner’s utterance as the learner intended. From their results of evaluation experiments using Japanese and American English, conclude that the system is an effective component technology for computer-aided pronunciation learning.
2.3 CAPL in Al-Quran Recitation Learning

CAPL in Al-Quran recitation learning has been explored by Mourtaga et al. (2007), Tabbal et al. (2006) and Morgan (2000). The implementation of speech recognition technology for recognizing the Quranic Arabic 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 non-native second language teaching (Franco, Neumeyer, & Bratt, 1999; Hiller et al., 1994; Witt, 1999). However, in these recent years, CAPL also includes automatic training for correct recitation of the Holy Quran for native Arabic speakers as well (N. Jamaliah, Zulkifli, & Zaidi, 2011). The basic stages of speech processing involves 5 main stages, which includes; pre-processing, feature extraction, training, identification and verification. In pre-processing stage, the recording speech input is filtered to get rid of the noise, before next process of feature extraction. Based on the research conducted by Ahmad, Ismail, & Samaon (2004) and Noor Jamaliah et al. (2008), Mel Frequency Cepstral Coefficient (MFCC) algorithm has been used for feature extraction process. The survey provides recognition rates and description of test data for the approaches considered between another feature extraction algorithm known as Linear Predictive Cepstral Coefficient (LPCC) and MFCC (Ahmad, Ismail, & Samaon, 2004; N. Jamaliah, I. Zaidi, R., Zulkifli, M.Y., M. Yamani I., Emran, M.T., 2008). From the results obtained from Ahmad et al. (2004), LPCC is the best algorithm for recognizing the Arabic alphabets of Quran, with the percentage of 99.3%, more efficient compared to MFCC. However, MFCC is still the most popular feature set with 98.6% efficient, in which computed on a warped frequency scale based on known human auditory perception.

![Image](image_url)

Figure 2.1: System feedback for emphasizing letter “ب” (adapted from Metwalli, 2005)
Meanwhile for training, identification and verification stages Ibrahim et al. (2013) used the Markov Chain Code algorithm for speech recognition (Ibrahim et al., 2013). A Markov chain is characterization of a system that transits from one state to another, in a chainlike manner. It concerns any random process endowed with the Markov property. It is a useful tool for statistical modelling in almost all fields of modern applied mathematics. Markov chain is the basis for Hidden Markov models, which are an important tool in such diverse fields of speech recognition application. It involves states, transitions and observations map for speech recognition process (Juang & Rabiner, 1991). This Markov Chain algorithm was used in developing the speech recognition software using mathematical modelling in MATLAB program. MATLAB program has become the preferred language of computing for the researchers in speech recognition. Omar (1999) use Hidden Markov Model (HMM) speech verification system, in verifying the acoustic model of Arabic phonemes (Omar, 1999). 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. The same approach was also recommended by N.Jamaliah (2010), but the implementation was directly focus towards Quranic verse recitation (N.Jamaliah, 2010).

In this research, the Tajweed rules of Quranic verse recitation is verified by using HMM and confidence score values. The confidence score values is based on the Log-Likelihood Ratio values, known as LLR. These LLR values are scaled using Viterbi decoder from Viterbi recognizer (referred to figure 3.1) for recognition part. Besides, Hidden Markov Model (HMM) based speech recognizer also has been used by Salah & Mohsen (2006). 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 (Salah & Mohsen, 2006).

Beside the HMM technique, Maximum Likelihood Linear Regression (MLLR) also has been used in Speaker Adaptation block diagram while developing a HAFSS system. It is mainly used for adapting acoustic models to each user acoustic properties, in order to boost the system performance. Originally, Abdou et al. (2006) and Witt (1999) developed the HAFSS system for teaching Arabic pronunciation to non-native speakers. However, this application has been used, to solve the challenging task in teaching the correct recitation of the Holy Quran. The pronunciation error hypothesis in HAFSS® 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 generates user helpful feedback that use lattice unit similar with the one used in traditional methods of the
Holy Quran recitation teaching (Abdou et al., 2006; Witt, 1999). In the table 2.1 below, comparison and approaches used by previous researchers in recognizing the Quranic verse recitation. Research conduct by Abdou et al. (2006) achieve the highest accuracy based on speech recognition performance compared to other 2 research projects, with the percent values within 97.58% - 96.96%.

<table>
<thead>
<tr>
<th>Author</th>
<th>Experiment Data</th>
<th>Experiments</th>
<th>Performance/Ac</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Abdou et al., 2006)</td>
<td>507 utterances</td>
<td>Developed a HAFSS© system, that used HMM acoustic model and MLLR speaker adaptation, due to correct and correct recitation of the Holy Quran</td>
<td>97.58% - 96.96%</td>
</tr>
<tr>
<td>(Tabbal El-Falou, W. &amp; Monla, B., 2006)</td>
<td>13 Professional reciters &amp; 40 normal reciters</td>
<td>Using Open Source Sphinx Framework – tested against tajweed and tarteel</td>
<td>85% - 92%</td>
</tr>
</tbody>
</table>
| (Mourtaga et al., 2007)       | 2000 distinct words             | Developed an automatic speech recognizer for Quranic based speaker independent. This system is based on the triphone Hidden Markov Model and Maximum Likelihood Linear Regression (MLLR). | 68% - 85%

Table 2.1: Comparison of approaches used by previous researchers (Adapted by (N.Jamaliah et al., 2013; N.Jamaliah, Zulkifli, Zaidi, & Rosli, 2011))

3. PROPOSED IMPLEMENTATION & LEARNING APPROACH

Yusuf Sodik (2012), the founder of Al-Jabari method designed the first part of lesson with an induction set containing with 4 main items, which are: Solmisation (Nazham), Badr Nasheed (Selawat Badar), Nasheed of Holy Quran and lastly, Memory mapping (Titian Ingatan) song. Al-Jabari has 4 books which covered the reading and written modules (Irnavati, S.Sarah, & Zulkifli, 2012; Sodik, 2012), shown in table 3.1 below:

<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 11:</td>
</tr>
<tr>
<td>• Lesson 7:</td>
<td>• Lesson 1: Continuous letters (merge)</td>
</tr>
<tr>
<td>• Lesson 1:</td>
<td>• Lesson 2: (Initial, middle and end/final/last letter).</td>
</tr>
<tr>
<td>• Lesson 2:</td>
<td>• Lesson 3: Sound [j]</td>
</tr>
<tr>
<td>• Lesson 3:</td>
<td>• Lesson 4: Sound [u]</td>
</tr>
<tr>
<td>• Lesson 4:</td>
<td></td>
</tr>
<tr>
<td><strong>Lesson 4</strong></td>
<td><strong>Lesson 5</strong></td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>ع ش ر ض</td>
<td>Sound AN</td>
</tr>
<tr>
<td>ن ك م ق ل</td>
<td></td>
</tr>
<tr>
<td>ه ي ن و</td>
<td></td>
</tr>
<tr>
<td>Note: Arab letter</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Lesson 8</strong></th>
<th><strong>Lesson 9</strong></th>
<th><strong>Lesson 10</strong></th>
<th><strong>Lesson 11</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sukoon letters (Special). Sound of letters in sakina/sukoon (ذ ﺟ ﻋ) bounces (vibration of sound at the end of the pronunciation of a letter)</td>
<td>Tasydid letters (Syiddah)</td>
<td>Syiddah letters (Special)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Note: Name of letters (al-Jabari arrangement)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Book 3</strong></th>
<th><strong>Book 4</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Consists of lesson 1 until lesson 14:</td>
<td>Consists of lesson 1 until lesson 14:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lesson 1:</strong> Sound (ال) pronounce clearly (al) /Clear reading</td>
<td><strong>Lesson 1:</strong> Lam Lafzul Jalalah (Allah)</td>
</tr>
<tr>
<td><strong>Lesson 2:</strong> Sound (ال) unread</td>
<td><strong>Lesson 2:</strong> Sound of letters in sakina/sukoon with the normal letters (alive) is equal.</td>
</tr>
<tr>
<td><strong>Lesson 3:</strong> Sound أ elongated, with alif</td>
<td><strong>Lesson 3:</strong> Sound of letters in sakina/sukoon followed by the closest letters &amp; its sounds (same makhraj) and its sifat.</td>
</tr>
<tr>
<td><strong>Lesson 4:</strong> Sound ى elongated, with ya</td>
<td><strong>Lesson 4:</strong> Sound of letters in sakina/sukoon followed by the closest letters &amp; its sounds (same makhraj), but different of its sifat.</td>
</tr>
<tr>
<td><strong>Lesson 5:</strong> Sound Ù elongated, with wau</td>
<td><strong>Lesson 5:</strong> The signs of waqaf.</td>
</tr>
<tr>
<td><strong>Lesson 6:</strong> Sound of Noon saakina (ן) or Tanween should clearly read followed with the letter of (ך)</td>
<td><strong>Lesson 6:</strong> The way of waqaf. The proper way to stop (waqf).</td>
</tr>
<tr>
<td><strong>Lesson 7:</strong> Sound of Noon sakina (ן) or Tanween followed by any of these 4 letters (ן י ב ג) the reader should read with Ghunnah.</td>
<td><strong>Lesson 7:</strong> Madd Wajib Mutasil</td>
</tr>
<tr>
<td><strong>Lesson 8:</strong> Sound of Noon Sakina (ן) or Tanween is followed by any of these 2 letters (ן י), there is no Ghunnah.</td>
<td><strong>Lesson 8:</strong> Madd Jaiz Munfashil</td>
</tr>
<tr>
<td></td>
<td><strong>Lesson 9:</strong> Madd Aridl Lissukun</td>
</tr>
<tr>
<td></td>
<td><strong>Lesson 10:</strong> Madd Iwad</td>
</tr>
<tr>
<td></td>
<td><strong>Lesson 11:</strong> Madd Badal</td>
</tr>
<tr>
<td></td>
<td><strong>Lesson 12:</strong> Letters and Madd Lin. Sound AU, AI with elongates with 2, 4 and 6 harakat.</td>
</tr>
<tr>
<td></td>
<td><strong>Lesson 13:</strong> Madd Shilah.</td>
</tr>
<tr>
<td></td>
<td>1. ֻ and ַ read with elongate.</td>
</tr>
<tr>
<td></td>
<td>2. ֻ and ַ should be read elongate with 5 harakat.</td>
</tr>
</tbody>
</table>
• Lesson 9: Sound of Noon Sakina (س) or Tanween has change into the sound of miim (م) when it is followed by (ب)

• Lesson 10: Sound of Noon sakina (س) or Tanween change to be unclear when it is followed by these letters (ت ث ج ذ ز س ش ض ط ظ ف ق ك)

• Lesson 11: Sound of meem (م) followed by another meem (م) should clearly read with ghunnah and not been off in the middle.

• Lesson 12: Sound of meem in sukoon (س) followed with letter (ب)، should clearly read with ghunnah and not been off.

• Lesson 13: Sound of meem in sukoon (س) followed with all letters, except meem (م) and ba (ب).

• Lesson 14: The rules of Ra (ر)

3. ژ and ـ read in short.

• Lesson 14: Madd Tamkin

• Lesson 15: Madd Farqi. Read with elongate of 6 harakat and give a sign of ـ.

• Lesson 16: Letters at the early surah

• Lesson 17: Madd Lazim Kalimi

Table 3.1: Lesson Contents in Al-Jabari books

Here, the way of pronouncing the particular letters from the certain ayates were briefly explained in details. However, learning Al-Jabari method alone by totally depending on this books without presence of teachers (Mudarris) were not the right and proper way to learn Al-Quran. Teachers play the vital role in assisting students to learn Al-Quran in the right track, to ensure the proper way in pronouncing the Quranic letters (makhraj) based on its sitat. In Al-Jabari method, before the classes start each day, the students must make dua’ and sing the solmization based on Al-Jabari memory mapping. These elements are considered unique compared to other techniques of learning Al-Quran exists in the world. Start from volume 1, the students taught about the single letters or hijaiyah letters, either fatha, kasra, damma and others. After students able to memorize these hijaiyah letters in single form, they continued to learn and identify the connecting letters, sukoon, tasydid and syiddah
marks and their pronunciations. All those lesson were contains in volume 2 (Book 2). Students able to know about the Madd and harakat after they proceed to learn Al-Jabari from book 3 and 4.

3.1 Proposed Implementation of CAPL for Al-Jabari Method

The content approach proposed in this research is different from the previous research work, such been proposed by Samir et al. (2007) (Samir, Abdou, Khalil, & Rashwan, 2007). The approach of the content is based on Al-Baghdadiah technique, which covers the whole chapter of Al-Quran. This technique of learning Al-Quran usually take longer time to complete for learning to read Al-Quran. The system capability to deal with non-native pronunciation was not efficient enough for speakers in the region South East Asia, like Malaysia and Indonesia. There are 2 main components to be included in CAPL for Al-Jabari.

1. Design and implementation based on Al-Jabari modules, embedding speech recognition system.
2. Configure the system capability to deal with non-native Arabic speakers (dealing with non-native pronunciation).

3.2 CAPL System Design for Al-Jabari Learning Method

Figure 3.1 shows the block diagram of the speech verification module in the in Al-Jabari, where the CAPL system is used to teach the correct recitation of the Holy Qur’an.

(1) **Verification HMM models:** The acoustic HMM models for the system. Speech signal modelling using HMM algorithms.
(2) **Speaker Adaptation:** Used to adapt acoustic models to each user acoustic properties in order to boost system performance. It uses speaker classification, Maximum Likelihood Linear Regression (MLLR) speaker adaptation algorithms and Canonical Correlation (CC), as well as supervised incremental technique.
(3) **Pronunciation hypotheses generator:** To analyse the Holy Qur’an current prompt and generates all possible pronunciation variants that are fed to the 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.
(4) **Confidence Score Analysis:** It receives n-best decoded word sequence from the decoder, then analyse their scores to determine whether to report that result or not.
(5) **Phoneme duration analysis:** For phonemes that have duration variables,
this layer determines whether these phonemes have the correct lengths duration or not.

(6) **Feedback Generator**: Analyze results from the speech recognizer and user selectable options to produce useful feedback messages to user.

![Block Diagram for online Automatic Speech Recognition](image)

**Figure 3.1**: Block Diagram for online Automatic Speech Recognition

(Pronunciation error detection)

## 4. ANALYSIS AND DISCUSSION

The existing technology available only focuses on Quranic learning as a whole. Most of the products are only capable showing Al-Quran texts and/or play stored Al-Quran recitation without any embedded intelligent system. The system functionalities are limited, showing Al-Quran text and/or play the audio of the text that are unable to evaluate the user reading and produce no feedback. The implementation through HAFSS system 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 improved based on features as in HAFSS® system, to create the self-learning system in Al-Jabari lesson (Samir et al., 2007).

The development of CAPL system for Al-Jabari method includes automatic evaluation technique to evaluate speech signals from the users. The CAPL system proposed embedded automatic training components for correct recitation of the Holy Quran. This technique evaluates the system by measuring the degree of usefulness of its feedback to learners. It evaluate the system responses for confident decisions and make general feedbacks, or no comments for non-confident decisions to reduce deceiving effect of inherent speech recognition systems. Automation of the evaluation process is vital to reduce complexity of CAPL systems, because of the existence of many tuneable thresholds and parameters. Thus, the aim of this research is to develop a comprehensive Computer Aided Pronunciation Learning (CAPL) system. It can be used to teach recitation of the Holy Qur’an to students by accepting their reading of a given verse and then assessing the quality of their recitation to produce feedback messages to help them identify their mistakes.

According to table 4.1 shown below, the tajweed rules contain in Al-Jabari module were categorized into 5 different groups based on harakat. It involved 22 varieties of tajweed rules, extracted from 4 volumes of Al-Jabari books. Those categories of harakat involves with certain rules of tajweed as listed below:

- **1 harakat category** – Involve 2 types of letters, either single or connecting letter. The marks/signs of single letters in fatha, kasra, damma and others, must be pronounced differently based on those marks. Meanwhile for connecting letters, the single letters learnt previously have to identify, either initial, middle or end of kalimah. Other marks such as sukoon, qalqalah, as well as tasydid and syiddah letters also under this category. For tajweed rules, harf lin, idgham maal ghunnah and idgham bil ghunnah is grouped under this category, which pronounced in 1 harakat only.

- **2 harakat category** – There are 3 madd involved under this category. These tajweed rules includes madd lin, madd arid lissukun, mad asl, mad iwash, mad badal, mad shilah and madd tamkin. Any letters in kalimah identified with those tajweed rules mentioned must be pronounced in 2 harakat.

- **4 and 5 harakat** – There are 3 same madd were categorized under same harakat. Those madd are Madd wajib Muttasil, Madd Jaiz Munfashil, and Madd Shilah.

- **6 harakat** – Two type of madd known as madd farqi and madd lazim kalimi were categorized under this highest harakat. Means, the way the letters and certain ayat been pronounced should obviously differed compared to other
<table>
<thead>
<tr>
<th>No.</th>
<th>Harakat</th>
<th>Tajweed Rules</th>
<th>Descriptions</th>
</tr>
</thead>
</table>
| 1.  | 1 harakat | Single letters (Makhraj of Quranic Arabic letters) | (Book 1) Consists of lesson 1 until lesson 7:  
- Lesson 1: ح ت  
- Lesson 2: د خ  
- Lesson 3: ص ر  
- Lesson 4: ن م  
- Lesson 5: ك ل  
- Lesson 6: ن  
- Lesson 7: ن و  
Note: Arab letter |
| 2.  | Connecting letters | (Book 2) Consist of lesson 1 until lesson 11:  
- Lesson 1: Continuous letters (merge)  
- Lesson 2: (Initial, middle and end/final/last letter).  
- Lesson 3: Sound  
- Lesson 4: Sound  
- Lesson 5: Sound  
- Lesson 6: Sound  
- Lesson 7: Sound  
- Lesson 8: Dead letters (letter with sukoon)  
- Lesson 9: Sukoon letters (Special). Sound of letters in sakina/sukoon (  ) bounces (vibration of sound at the end of the pronunciation of a letter) - qalqalah  
- Lesson 10: Tasydid letters (Syiddah)  
- Lesson 11: Syiddah letters (Special)  
Note: Name of letters (al-Jabari arrangement) |
| 3.  |          | (Book 3) Consists of lesson 1 until lesson 14:  
- Lesson 1: Sound (ال) pronounce clearly (ال) Clear reading  
- Lesson 2: Sound (ال) unread  
- Lesson 3: Sound Δ elongated, with |
• **Lesson 4**: Sound of alif (١) elongated, with ya (ي)
• **Lesson 5**: Sound of wau (У) elongated, with wau (و)
• **Lesson 6**: Sound of Noon saakina (نْ) or Tanween should clearly read followed with the letter of an-naa feh (ء ف ح خ)
• **Lesson 7**: Sound of Noon sakina (ن) or Tanween followed by any of these 4 letters (ي ن م و) the reader should clearly read with Ghunnah.
• **Lesson 8**: Sound of Noon Sakina (ن) or Tanween is followed by any of these 2 letters ( ل ر), there is no Ghunnah.
• **Lesson 9**: Sound of Noon Sakina (ن) or Tanween has change into the sound of miim (م), when it is followed by (ب)
• **Lesson 10**: Sound of Noon sakina (نْ) or Tanween change to be unclear when it is followed by these letters (ت ث ج ذ ح خ)
• **Lesson 11**: Sound of meem (م) followed by another meem (م) should clearly read with ghunnah and not been off in the middle.
• **Lesson 12**: Sound of meem in sukoon (م) followed with letter (ب), should clearly read with ghunnah and not been off.
• **Lesson 13**: Sound of meem in sukoon (م) followed with all letters, except meem (م) and ba (ب).
• **Lesson 14**: The rules of Ra (ر)

4.1 harakat Harf Lin (Book 4) Lesson 12:
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 5. | **Idgham Maal Ghunnah** | *(Book 3) Lesson 7:*  
- Lesson 7: Sound of *Noon sakina* (ن) or Tanween followed by any of these 4 letters (ي ن م و) the reader should read with Ghunnah. |
| 6. | **Idgham Bil Ghunnah** | *(Book 3) Lesson 8:*  
- Lesson 8: Sound of *Noon Sakina* (ن) or Tanween is followed by any of these 2 letters (ن،) there is no Ghunnah. |
| 7. |   | *(Book 3) Lesson 9-14:*  
- Lesson 9: Sound of *Noon Sakina* (ن) or Tanween has change into the sound of *miim* (م)، when it is followed by (ب)  
- Lesson 10: Sound of *Noon sakina* (ن) or Tanween change to be unclear when it is followed by these letters (ت ج د ذ س ص ص ض ط ظ ف).  
- Lesson 11: Sound of *meem* (م) followed by another *meem* (م) should clearly read with ghunnah and not been off in the middle.  
- Lesson 12: Sound of *meem* in *sukoon* (م) followed with letter (ب)، should clearly read with ghunnah and not been off.  
- Lesson 13: Sound of *meem* in *sukoon* (م) followed with all letters, except *meem* (م) and *ba* (ب).  
- Lesson 14: The rules of *Ra* (ر) |
| 8. | **2 harakat** | **Madd Lin** | *(Book 4) Lesson 12:*  
- Lesson 12: *Madd Lin*, where the sound of *AU, AI* with elongates with 2, 4 and 6 harakat. |
| 9. |   | **Madd Arid Lissukun** | *(Book 4) Lesson 9:*  
- Lesson 9: Read with elongate of 2, 4 or 6 harakat. |
| 10. |   | **Mas Asli** | *(Book 3) Lesson 3-5:*  
- Lesson 3: Sound *A* (أ) elongated |
<table>
<thead>
<tr>
<th>Lesson</th>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| 11.    | Mad Iwad | (Book 4) Lesson 10:  
- Lesson 10: Read with elongate of 2 harakat. |
| 12.    | Mad Badal | (Book 4) Lesson 11:  
- Lesson 11: The madd letters, start with hamza with 2 harakat. |
| 13.    | Mad Shilah | (Book 4) Lesson 13:  
- Lesson 13: Read with elongate of 2 harakat. |
| 14.    | Madd Tamkin | (Book 4) Lesson 14:  
- Lesson 14: Ya tasydid, followed with Ya sukuun read with 2 harakat, without washal. |
| 15.    | 4 harakat | Mad wajib Muttasil | (Book 4) Lesson 7:  
- Lesson 7: Read with elongate of 4 harakat. |
| 16.    | 5 harakat | Mad wajib Muttasil | (Book 4) Lesson 8:  
- Lesson 8: Read with elongate of 4 harakat. |
| 17.    | 6 harakat | Mad Shilah | (Book 4) Lesson 13:  
- Lesson 13: Read with elongate of 4 or 5 harakat. |
| 18.    | 7 harakat | Mad wajib Muttasil | (Book 4) Lesson 7:  
- Lesson 7: Read with elongate of 5 harakat and give a sign of ~. |
| 19.    | 8 harakat | Mad wajib Muttasil | (Book 4) Lesson 8:  
- Lesson 8: Read with elongate of 5 harakat. |
| 20.    | 9 harakat | Mad Shilah | (Book 4) Lesson 13:  
- Lesson 13: ٔ and َ should be read elongate with 5 harakat. |
| 21.    | 10 harakat | Madd Farqi | (Book 4) Lesson 15:  
- Lesson 15: Read with elongate of 6 harakat and give a sign of ~. |
| 22.    | 11 harakat | Madd Lazim Kalimi | (Book 4) Lesson 17:  
- Lesson 17: If hamza followed by Alif Lam Qamariah elongate with 6 harakat. |

Table 4.1: Category of tajweed rules in Al-Jabari module
5. CONCLUSION

In this paper, several key approaches of speech recognition and verification (acoustic HMM model), speaker adaptation techniques, phoneme duration classification, as well as the response and feedback of learners based on CAPL systems evaluation, had been presented with some current improvement done by researchers. Here, a few possible methods and approaches have been reviewed to find the most suitable and significant approaches to be used with Al-Jabari method in Quranic learning. The approach used in the teaching and learning of the Qur’an should be innovative to support the fun and efficient Quranic learning. This could be a motivation factor for children and adults to learn Al-Quran.

The different pronunciation of the Quranic recitation from Al-Jabari books (modules), were categorized based on the different harakat (1, 2, 4, 5 and 6 harakat), as shown in table 4.1. Those different harakat serves as a guide for the correct Quranic recitation. In Al-Jabari, lessons and modules were arranged according to different level of difficulties (from easy to difficult). This factor adds special uniqueness to Al-Jabari method and possibly the preferred Quranic learning method for non-native Arabic speaker in Muslim community. Hopefully, this method will give benefits to the Muslim Ummah, to overcome the Quranic problem of illiteracy, to ensure the embodiment of the Holy Quran in everyday lives.

6. ACKNOWLEDGEMENT

Special thanks are posed to University of Malaya for its funding (UMRG grant RG441-13HNE and RP004-13HNE) in carrying out this research project. We gratefully acknowledge their support for this research.
7. REFERENCES


