

ABSTRACT

Al-Qur'an is the guidance for Muslims which is given from Allah SWT and written in Arabic [1]. Islam is the leading religions in Indonesia with the number of followers reaches about 207 million people [2]. Because of the high population of Muslims in Indonesia, Al-Qur'an was easily found in every part of the country. But reciting Al-Qur'an sometimes becomes hard to do for Indonesian because Al-Qur'an was written in Arabic which is not the original language of Indonesia. The society needs to learn how to pronounce the letters first before they can recite Al-Qur'an in the right way.

The common mistake for Indonesian is pronouncing the Hijaiyah letters. For some Indonesians, either the expert one or the beginner one, often do this kind of mistake. This mistake can be prevented by learning the right way to recite Al-Qur'an with a teacher or instructor.

In the other hand, the development of technology grew significantly year by year. *Speech Recognition* becomes one of the technology trend nowadays. Using this technology, a machine can recognize a person's voice and understand regarding to what the person said [3].

In this paper, we propose to utilize the ability of *Speech Recognition* to help people learn reciting Al-Qur'an in the right way. The machine is trained using some dataset to gain information about Hijaiyah letters and in the test time, the machine will recognize what Hijaiyah letter the person said. This system is built using K-Nearest Neighbor Algorithm as the classifier. For the extraction feature, the system used Mel-Frequency Cepstrum Coefficients (MFCC). Then the system also compared the result for system with Principal Component Analysis (PCA) and without PCA. For *testing* schemes, the system is tested using 2 schemes: *Speaker-Dependent* and *Speaker-Independent*.

The *testing* result showed that MFCC, PCA and KNN was successfully implemented by yielding 78,32% of *Micro Average F1-Score* for *Speaker-Dependent* with *testing* parameters: *sample rate* is 16000 Hz, the number of *filterbanks* is 26, the number of *principal components* is 64 and the *k-value* is 1. For *Speaker-Independent*, the best *Micro Average F1-Score* is 18,97% with *testing* parameters: *sample rate* is 16000 Hz, the number of *filterbanks* is 26, the number of *principal components* is 104 and the *k-value* is 1.

Keywords: Hijaiyyah Letter Spoken, Punctuation, *Speech Recognition*, MFCC, KNN, PCA