Recognition System Of The Al Qur'an Surah Al-Falaq Verse 1-5 Through Voice Using Ada-Boost

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Abstract

In everyday life, it is not uncommon when we hear the sound of chanting the holy verses of the Al Al Qur'an which are read in mosques before prayer time or in other conditions we seem interested in knowing what Surah and which verse is being recited. This is due to the love of Muslims themselves for the Al Qur'an but not all Muslims memorize the entire contents of the Al Qur'an . Based on the limitations and the magnitude of curiosity about Surah and Verse information, the writer is interested in developing a computer system that can recognize and provide information on the recited Surah and Verse. Advances in computer technology not only make it easier for humans to carry out activities. One of the human intelligences that are planted into computer technology is to recognize the verses of the Al Al Qur'an Surah Al-Falaq through voice. Ada-Boost method is one method to identify or recognize voice classification, and by using this method the success rate in recognizing verse numbers reaches 72%. This system can only recognize the number of verses of the Al Al Qur'an Surah Al-Falaq, recorded sound files with the .wav file extension and built using the Delphi programming language.

Keywords: *Technology, Al Qur'an, Ada-Boost, Recognation System.*

1. Introduction

Reading the Al Qur'an is obligatory for Muslims. Why not, the Al Qur'an was revealed as a way of life for humans in general and Muslims in particular. For Muslims, apart from being a way of life, the Al Qur'an is the highest source of law so that the implementation of the Shari'a must comply with the rules stated therein. Not only Muslims, those who are religious other than Islam also get a lot of instructions about science that comes from the Al Qur'an . Even many of the researchers who eventually embraced Islam because the results of their research were already described in the contents of the verses of the Al Qur'an . The Al Qur'an whose authenticity has been guaranteed by Allah until the Day of Judgment is the word of Allah revealed to the Prophet Muhammad to be conveyed to mankind through the intermediary of the angel Gabriel and revealed mutawatir (gradually).

In its development, especially in Indonesia, reading the Al Qur'an or what is more commonly called the Al Qur'an is often done in mosques, especially before prayer time. this is done to fill spare time with useful things and this tradition has been attached to our culture so that it becomes a custom.

In everyday life, it is not uncommon when we hear the sound of chanting the holy verses of the Al Qur'an which are read in mosques before prayer time or in other conditions we seem interested in knowing what Surah and which verse is being recited. This is due to the love of Muslims themselves for the Al Qur'an but not all Muslims memorize the entire contents of the Al Qur'an . Based on the limitations and the magnitude of curiosity about Surah and Verse information, the writer is interested in developing a computer system that can recognize and provide information on the recited Surah and Verse. Previously, an application called Track Id made by a Japanese cellular phone manufacturer, Sony, was already circulating by installing it on every cellular phone produced. However, its use is to detect the singer and the title of the song being sung.

Based on the description of the problem above, therefore the author is interested in taking the title "System of Recognition of Al Qur'an Verses in Surah Al-Falaq Verses 1-5 Through Voice Using the Ada-Boost Method".

2. Literature Review

In language, the Al Qur'an comes from Arabic, namely qaraa-yaqrau-quraanan which means reading. This is explained by the Al Qur'an itself in Surah Al-Qiyamah verses 17-18. Meaning: Indeed, it is at our expense to collect it (in your chest) and (make you clever) to read it. When We have finished reading it, then follow the reading. (Surat al-Qiyamaah 17-18).

In terminology, according to Manna 'Al-Qattan.

كَلَامُ اللهِ الْمُنَزَّلُ عَلَي مُحَمَّدٍ صَلَّي اللهُ عَلَيْهِ وَسَلَّمَ الْمُتَعَبَدُ بِتِلَاوَتِهِ

Meaning: "The Book of Allah which was revealed to the Prophet Muhammad, and those who read it get a reward".

Surah Al-Falaq is the 113th surah based on the order of the Al Qur'an ic manuscripts. Consists of 5 verses, and this surah includes the Makkiyah surah. This surah was revealed after surah Al-Fill and is named al-Falaq (at dawn) which is taken from the word al-Falaq contained in the first verse of this surah.

Al – Falaq verses 1 – 5:

قُلْ أَعُوذُ بِرَبِّ الْفَلَقِ ۝ مِن شَرِّ مَا خَلَقَ ۝ وَمِن شَرِّ غَاسِقٍ إِذَا وَقَبَ ۝ وَمِن شَرِّ النَّفَّاثَتِ فِ الْعُقَدِ ۝ وَمِن شَرِّ حَاسِدٍ إِذَا حَسَدَ ۝

1. Say: "I seek refuge in the Lord of the dawn,
2. From the evil of His creatures,
3. And from the evil of the night when it is dark,
4. And from the evil of the sorcerers who blow on the knots,
5. And from the evil of the envious when he is envious."

Ada-Boost is one of several variants of the boosting idea. The idea of boosting comes from a branch of machine learning research known as computational learning theory.

The concept of Ada-Boost emerged from a question by Kearns and Valiant in 1988. Can a weak learning be upgraded to a strong learning? The answer to the above question was answered by Schapire by building a boosting algorithm for the first time.(domain) because of its strong theoretical basis, accurate prediction and great simplicity. The steps of the Ada-Boost algorithm are:

a. *Sample* $x_1 \ldots x_n$
b. *Desired output* $y_1 \ldots y_n, \; y \in \{-1, 1\}$
c. *Initialize*: Weight of a training sample: $w_i^1 = 1/N$ for all i=1,…,N
d. *Do for t* = 1,…,T

    1. Choose $h_t(x)$ on the training weight sample.

    2. Calculate the training error on $h_t : \varepsilon_t = \sum_{i=1}^N W_i^t , \neq h_t(xi)$.

    3. Set the weight for *component classifier* $h_t = \alpha_t = \frac{1}{2} \ln\left(\frac{1-\varepsilon_t}{\varepsilon_t}\right)$.

    4. *Update training sample weight bobot* $W_i^{t+1} = w_i^t \frac{\exp\{-\alpha_t y_i h_t(x_i)\}}{\varepsilon_t}$

    5. *Renormalize* W_i^{t+1}, $\sum_{i=1}^N W_i^t +1=1$, uji total weight = 1, otherwise it will be repeated until the total weight = 1.

3. Methods

The scheme for the recognition system for reading Al Qur'an Surah Al-Falaq verses 1-5 through voice is presented in Figure 1.
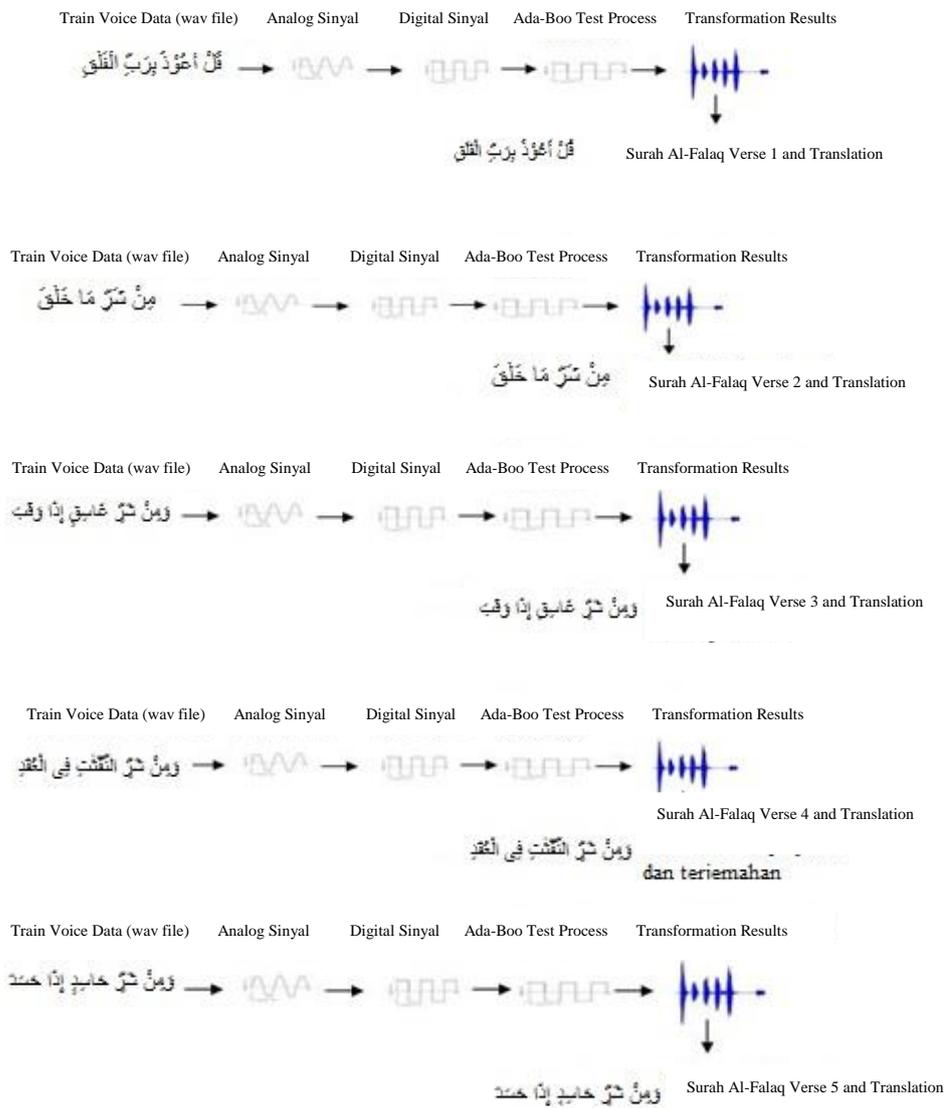

Fig 1. Overall System Schematic

The stages of the system built are inputting a sample of the sound of reading the Al Qur'an Surah Al-Falaq with different types of verses, this input is as a sound source. After voice input, the system performs the signal wave translation process stage, and proceeds to the training process on the system to recognize the characteristics of each reading pattern, then the Ada-Boost test is carried out. Then re-input the sound source, then the system performs the stages of the signal wave translation process, the last stage is testing the sound. The algorithm or approach method used for detection plays a role in recognizing the sound pattern of the level of reading the Al Qur'an that is being trained. So that the last output that will come out is the name of the sura and the verse number and the translation of the reading of the Al Qur'an .

The computational calculations performed depend on the role of Ada-Boost's translation into the correct code or listing. If it is wrong then the program does not run as expected. Ada-Boost is used to calculate the signal value of the sound of Surah Al-Falaq which is inputted into the system.
Here is an example of the translation of the formula from Ada-Boost for manual introduction that is applied in this application:

Is known
Signal -1 0 1 2
Number of Signals n = 4
y = -1 0 1 1

Weight = ¼ ¼ ¼
Then :

$$\epsilon = \sum_{1}^{4} \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$$

$$\alpha_{t} = \frac{1}{2} \ln\left(\frac{1-\frac{3}{4}}{\frac{3}{4}}\right)$$

Weight Update:

New Wright 1 $= \frac{1}{4} e^{-(-1)\alpha t}$

New Wright 1 $= \frac{1}{4} e^{-0}$

New Wright 1 $= \frac{1}{4} e^{-1(1)\alpha t}$

New Wright 1 $= \frac{1}{4} e^{-1(-2)\alpha t}$

Test whether the total weight = 1, if not repeat back to:

$$\alpha_{t} = \frac{1}{2} \ln\left(\frac{1-\frac{3}{4}}{\frac{3}{4}}\right) = 0,5 * \ln (1-0,75/0,75) = 0,5*\ln(0,33)$$

$$= 0,5*(-0,481486)$$

$$= -0,240743$$

Until the total weight = 1 or a certain iteration.

The explanation of the formula above is the process of recognizing the voice of Surah Al-Falaq through voice with the Ada-Boost method which aims to analyze the method that detects the most truth in the process of recognizing the verses of the Al Qur'an Surah Al-Falaq.

4. Results and Discussion

Testing is carried out after the sample training process. The training was carried out to determine the value of the proximity of the characteristics as a reference in order to identify a sound characteristic of Surah Al-Falaq.
While the test is carried out to compare the weight of the sound feature that is used as a reference with the proximity of the previously inputted sound feature, whether the proximity can be recognized as a feature or not.

Measurement of the performance of this system has a total of 5 sound characteristics in the training process and 25 sound samples in the testing process.

Table 1. The Performance Results of the Ada-Boost Metode Method

No	Verse name	Number of Test Votes	*False Identification*	*True Identification*	*Persentase*
1	verse 1	5	3	2	40%
2	verse 2	5	2	3	60%
3	verse 3	5	2	3	60%
4	verse 4	5	0	5	100%
5	verse 5	5	0	5	100%

Table 4.1 test results. shows that true identification in each reading of Surah Al-Falaq verses 1-5 is strongly influenced by the number of training voice samples. This happens because the reading sound sample is recognized if the voice sample being tested has a sound pattern sampling similar to the training sound pattern sampling. For the results of testing the reading of Surah Al-Falaq. To find the truth presentation value, the identification rate is divided by the number of test votes multiplied by 100.

4. Conclusion

The results showed that the system of recognizing verses of the Al Qur'an in Surah Al-Falaq verses 1-5 by voice using the Ada-Boost method had an average detection rate range of 72%. There is also a verse voice recognition error with a false positive rate of 28%. The percentage of detection rate shows that the Ada-Boost method can be used as an approach for voice recognition for reading verses of the Al Qur'an .

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