

Zakah Management System using Approach Classification

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Abstract

The often problematic faced by Muslims are lack of understanding in calculating Zakah and determining the feasibility of compliant recipients based on Islamic Shari'a. This study aimed to establish Zakah management system to support calculation process based on Al Qaradhawi method, helping Board of Zakah in distributing Zakah funds to mustahik. The algorithm used for the classification of Zakah recipients is Naive Bayes. The classification was combination of discrete and continuous data which is conducted by experiments using feasible and unfeasible data as a novelty approach. The results have shown that the Naive Bayes method could solve the problem with 85% of average.

Keywords: mustahik, Al Qaradawi, Naive Bayes

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1. Introduction

Zakah is one of the pillars of Islam that must be implemented by Muslims, the collected Zakah funds will be distributed to the beneficiary (mustahik). The dense activity and lack of understanding in calculating the amount of Zakah that must be spent mainly maal Zakah (wealth) is often be an obstacle for musakki to pay maal Zakah, moreover, the main problematic faced by Board of Zakah is the problem of the distribution of non-targeted Zakah funds in accordance with Islamic law because of the difficulty of measuring the economic level of the Zakah recipients. Zakah funds is one of the financial assistance that is instrumental in changing economic circumstances mustahik be musakki, one of them with their small capital support provided by the Board of Zakah [1, 2], [5-7]. This makes the author to provide a solution to the problem encountered during this time, which makes a mobile web application that can be accessed anytime and anywhere with the internet network and can facilitate musakki to calculate tithe and maal Zakah, as well as facilitate Board of Zakah in determining the eligibility of recipients [2, 3].

Several studies on the management of Zakah funds that have been done by previous researchers, Assessing the Satisfaction Level of Zakah Recipients Towards Zakah Management, the research on the identification of the media information that is used by the receiver to obtain information about the distribution of Zakah and to assess the level of satisfaction of recipients of the management of Zakah [1]. Other studies Fault Diagnosis for Fuel Cell based on Naive Bayesian Classification, classification fault diagnosis system proton exchange fuel cell with Naive Bayes classification method [4].

2. Methods

2.1. The concept of Zakah

Zakah is one of the pillars of Islam, including the part of the building (Islam), as described in the Qur'an and Sunnah, even Allah mentioned in the Qur'an in parallel with prayers at eighty-two places, it showed high notch Zakah. Allah Subhaanahu WaTa'aala said In Qur'an as follows, "And steadfast in prayer, pay the poor due, and bow with those who bow" (QS. Al-Baqarah: 43).

Zakah consists of two types: Maal Zakah is obligatory Zakah issued by Muslims who have reached enough nishab and haul. Tithe is the obligatory soul Zakah for all Muslims ranging from birth and during the life of the world, which is paid each month of Ramadan.

2.2. Al Qaradhawi Method

The Al Qaradhawi calculating method is a method of calculating Zakah based on Yusuf al Qaradawi's premise perspective where it used the istinbat method. Etymologically, istinbat means the discovery, excavation, expenditure (of origin), meaningful laws, regulations and powers.

2.3. Naive Bayes Classifier

Naive Bayes is a machine learning method that uses probability calculations. This algorithm utilizes the methods of probability and statistic which are stated by the British scientist Thomas Bayes, that predict the probability in the future based on past experience. Naive Bayes method is shown to have an accuracy and a very high speed when it is applied to a database with a large data. The basis of the Naive Bayes theorem that is used in the programming is the Bayes formula:

$$P(H|X) = \frac{P(X|H) \cdot P(H)}{P(X)}$$

The flow of Naive Bayes method can be seen in Figure 1,

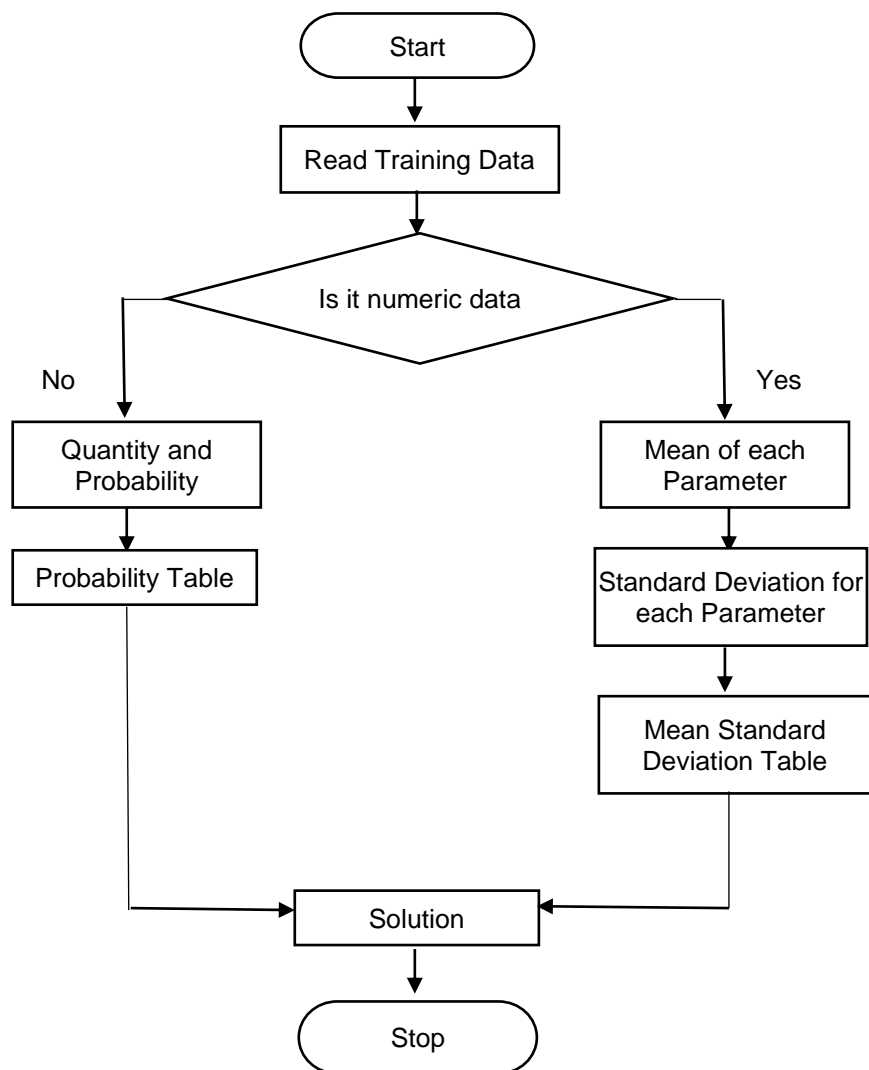


Figure 1. The Naive Bayes Method Flow

Description:

a. Read the training data.

b. Calculate the amount and probability, but if the numerical data:

Find the mean and standard deviation of each parameter which is numeric data.

The equation used to calculate the average arithmetic value (*mean*) can be seen as follows:

$$\mu = \frac{\sum_{i=1}^n x_i}{n}$$

or

$$\mu = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

Where:

μ : arithmetic average (mean)

x_i : samples value to -i

n : number of samples

And equations to calculate the standard deviation can be seen as follows:

$$\sigma = \sqrt{\frac{\sum_{i=1}^n (x_i - \mu)^2}{n - 1}}$$

Where:

σ : standard deviation

x_i : value of x to -i

μ : average count

n : number of samples

Find probabilistic value by counting the number of the corresponding data from the same category divided by the amount of data in the category. Getting the values in the mean table, standard deviation and probability. The solution is then generated.

3. Results and Analysis

3.1. Program Testing

This test was conducted to determine how to use the program, the speed of the program and the ability of the program to perform the classification. The program test was conducted using the confusion matrix method in which the author attempted four times and then calculate the accuracy and error.

3.2. Program Usage

On the use of the program will be shown how to run Zakah Application. Musakki party can open the website link of Zakah applications then perform the calculation process, as for the types of Zakah contained in the system, namely Gold and silver Zakah, money Zakah and securities, commercial Zakah (enterprise), agriculture Zakah, charity farm, income Zakah, and rikaz Zakah (artifacts). User calculate the Zakah on owned property by input the amount of assets being owned by type and then the system will calculate, if the nishab referring to the gold price, the system will automatically calculate based on the prevailing price of Antam's gold in Indonesia, moreover, the system displays the calculation results of each types of Zakah and sum the total shown in the results that can be seen in the following figure:

Step Hasil

Hasil Perhitungan

Hasil perhitungan diambil dari seluruh inputan dari step 1 sampai step 7

Zakat Emas dan Perak (jika dibayar dengan uang)

Rp. 1.607.255,00

Zakat Uang dan Surat berharga lainnya

Rp. 0,00

Zakat Perniagaan

Rp. 0,00

Zakat Pertanian, Perkebunan dan Kehutanan

35,00 Kg

Zakat Kambing yang dikeluarkan

3 Ekor

Figure 2. The calculation of maal Zakah

3.3 Classification Prospective Zakah Recipients

Distribution of Zakah funds by Board of Zakah Al Markaz, Makassar, South Sulawesi is done after determining mustahik using the classification process. Classification is made using discrete and continuous data which is conducted by experiments using feasible and unfeasible data. Examples of data that we use in the experiment are described in the Table 1:

Table 1. Total Practice and Test Data

Practice Data		Test Data	
Feasible	Unfeasible	Feasible	Unfeasible
200	150	25	25

In the fourth experiment, the authors tested the 350 practice data consisting of 200 feasible data and 150 unfeasible data. Tested with 50 pieces of test data. With details of 25 feasible and 25 unfeasible data. To determine a mustahik candidate is classified in the feasible or unfeasible class. Then the 7 features that will be used are as follows:

- a. Income
- b. Amenability
- c. Ownership of Assets.
- d. Surface area.
- e. Wall Types.
- f. Floor Types.
- g. Last Education.

Board of Zakah admin performs the data entry of mustahik candidate on the form of test data that is displayed as shown in Figure 3.

Tambah Data Uji

NAMA LENGKAP: SANUSI COANG,MZQGR6C

PENDAPATAN: 475000
pendapatan penerima zakat (per) Bulan

TANGGUNGAN: 3
Jumlah Orang yang ditanggung penerima zakat.

LUAS LAHAN: Luas tanah < 8 m²
luas lahan tempat tinggal penerima zakat.

JENIS LANTAI: Lantai Tanah
jenis lantai tempat tinggal penerima zakat

JENIS DINDING: Dinding Kayu
Jenis dinding tempat tinggal penerima zakat.

KEPEMILIKAN ASET: X <= 10000000
Kepemilikan aset (Harta) penerima zakat.

PENDIDIKAN TERAKHIR: SLTP
Pendidikan terakhir penerima zakat.

KATEGORI MUSTAHIK: Miskin
Kategori Mustahik.

Proses Batal

Figure 3. Mustahik Candidate Data Input Form

After the data of candidate mustahiq was input as in Figure 3, the program will make the process of classification using Naive Bayes method, then the system will show the calculation results of classification which resulted in a decision support system that states a candidate mustahik eligible to receive Zakah and entered in the mustahik category as shown in the Figure 4.

Perhitungan Naive Bayesn

Hasil Perhitungan

L	0.002419
T	0.000237

Karena Hasil (Kriteria | L) Lebih Besar Dari (Kriteria | T) Maka Keputusannya Adalah **Layak**

Kembali Ke Data Uji

Figure 4. The results of the mustahik prospective classification

The use of the Naïve Bayes classifier method to classified the feasible and unfeasible of the Zakah receiver is an effective and productive way. Due to the ease in determining of mustahik candidates as is done by computerization with the terms and conditions in making decisions. The author has conducted four experiments as shown in Table 2:

Table 2. Number of Practice and Test Data 4 Times Trial

Trial	Practice Data		Test Data		Percentage
	Feasible	Unfeasible	Feasible	Unfeasible	
1	45	70	25	25	84%
2	85	70	25	25	84.5%
3	100	100	25	25	86%
4	150	110	25	25	88%

Where the results of the final percentage of the accuracy of the program's success is the result of percentage of accuracy:

$$\begin{aligned}
 Accuracy &= \frac{84 + 84 + 86 + 88}{4} * 100 \\
 &= \frac{342}{4} * 100 \\
 &= 85\%
 \end{aligned}$$

Accuracy or precision of the program that we have created with the use of Naive Bayes methods experience the difference at every change of practice data that author used. Thus, it is known that mustahik classification program that we made is very dependent and influenced by the used data set.

4. Conclusion

Based on the results of the study as described above, it can be concluded that this application can help musakki for calculating maal Zakah and tithes, using Naive Bayes as a method of classification and can facilitate the Board of Zakah in determining whether a resident is feasible or not to receive Zakah based on Islam Shari'a. The built program has shown the final percentage of the accuracy is at average 85%. It is hoped that the development of program can be combine with GIS in order to easily identify the mustahik address and region.

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