

# CLASSIFICATION OF ZAKAT FITRAH RECIPIENTS USING NAÏVE BAYES METHOD

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## ABSTRACT

*Indonesia is a country with a majority Muslim population. In the daily life of the Indonesian population, it is inseparable from the influences of Islamic teachings. In life in this world there are many commands of Allah that must be carried out, including the order to pay zakat. One of them is when Eid al-Fitr is required to pay zakat fitrah for each of its citizens. In grouping the distribution of zakat fitrah using the Naïve Bayes classification method. Naïve Bayes classification itself is a classification method that can be applied in classification. The classification system used to classify categories of zakat fitrah recipients. From each test results using test data and training data randomly, and each test using training data which increased 37 pieces of data in each test. It can be concluded that the more training data the level of accuracy decreases. The determination of the amount of training data and test data is very influential on the final results of calculations using the Naïve Bayes method. Class determination also affects the final results of calculations using this Naïve Bayes method.*

**Keywords:** Classification, Zakat, Naïve Bayes.

## 1. INTRODUCTION

For now, Nurul Huda Mosque has not implemented a system that can help grouping zakat fitrah recipients and is still using old data, if they are entitled to receive zakat fitrah. Therefore, to make it easier for the committee to group zakat fitrah recipients in Janti Village, Waru Sidoarjo District, a system will be created that can help the committee determine which groups can receive zakat fitrah. To determine the grouping of zakat fitrah distribution itself using the Naïve Bayes Classification method.

In grouping the distribution of zakat fitrah using the Naïve Bayes classification method. Naïve Bayes classification itself is a classification method that can be applied in decision support systems. The purpose of the Naïve Bayes method is to classify data on certain classes (labels), then this pattern can be used to estimate the nutritional status of children under five. In this method, each variable will contribute, with the weight of the variables that are equally important and each of these variables is mutually independent

one another. By using the Naïve Bayes method, it is hoped that it can be used in determining zakat fitrah recipient groups, by predicting zakat recipient groups by utilizing existing inputs based on training data obtained from previous experience, so that they will get the right results and the reasoning process is done relatively fast.

Based on the explanation above, it aims to create a system for determining the group of Zakat Fitrah recipients at the Nurul Huda Mosque using the Naïve Bayes classification method (Case Study: Waru Sidoarjo). With this information system, it will really help the zakat fitrah committee to distribute zakat to residents who are entitled to receive zakat fitrah.

## **2. LITERATURE**

### **2.1 Classification**

Classification is the job of assessing data objects to include them in a particular class with a number of available classes. In classification, there are two main jobs carried out, namely the construction of a model as a prototype to be stored as memory and the use of the model to carry out recognition / classification / prediction on another data object so that it is known which class the data object is in the model it has stored (Prasetyo, 2012).

Classification is a data mining method that can be used for the search process for a set of models (functions) that can explain and differentiate data classes or concepts, the aim of which is that the model can be used to predict class objects whose labels are unknown or can predict trends in data appear in the future. The classification method also aims to map data into predefined classes based on the data attribute value (Han and Kamber, 2006).

### **2.2 Naïve Bayes**

Naive Bayes is one of the algorithms contained in the classification technique. Naive Bayes is a classification using probability and statistical methods proposed by the British scientist Thomas Bayes, which predicts future opportunities based on previous experience, so it is known as Bayes' Theorem. The theorem is combined with Naive where it is assumed that the conditions between attributes are mutually independent. The Naive Bayes classification assumes that the presence or absence of certain characteristics of a class has nothing to do with the characteristics of other classes..

## **3. RESEARCH METHODOLOGY**

### **3.1 Problem Analysis**

The first step in classification is to identify the problems to be studied, while the problems taken in making a system for classifying zakat recipient data are the name of age, income, expenditure, debt, religion, and address (Rt). And if it is feasible, it will fall into the category of sabililah, light and heavy.

### **3.2 Data Analysis**

In this study, data on zakat recipients were obtained from the Administration of Zakat Distributors (Masjid Nurul Huda Waru), the data was converted into a table to speed up the results of finding solutions. In Table 4.1, there are five features that will be classified to find out data on zakat recipients, namely age, income, expenditure, debt, religion, and address. And there are three output classes whose results will be known, namely Sabililah, Light and Heavy. The following is a table of zakat recipients who will be classified.

### **3.4 Flowchart**

Flowchart is a graphic depiction of the steps and sequence of procedures of a program. Flowcharts help analysts and programmers solve problems into smaller segments and help analyze other alternatives in operation. Flowcharts usually make it easier to solve a problem, especially problems that need to be studied and evaluated further.



Figure 1. Flowchart system

The following is an overview of the system flow:

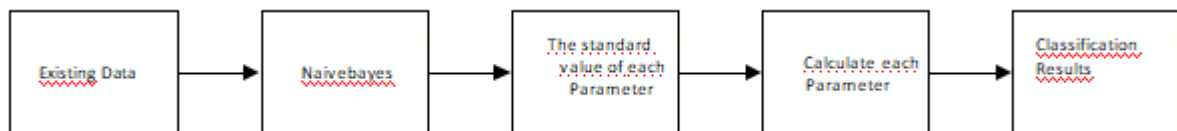


Figure 2. Flow System

### 3.5 Data Flow Diagram (DFD)

DFD (Data Flow Diagram) is a system design tool used for describing analysis and system design oriented to data flow, which is a process created to describe where the data comes from and where the data comes out of the system, where the data is stored, what process that produces that data. The context diagram is a general description of the application system, the context diagram in this research application system can be seen in the image below:

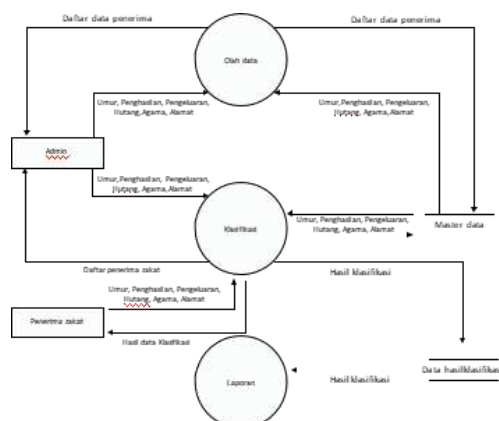


Figure 3. Data Flow Diagram Level 0

### 3.6 Entity Relationship Diagram (ERD)

ERD (Entity Relationship Diagram) is a graphical representation of an information system that shows the relationships between tables in a system. ERD explains the relationship between attributes where the attribute has a function to describe the characteristics of the entity, the content of the attribute has something that can identify the contents of one element with another.

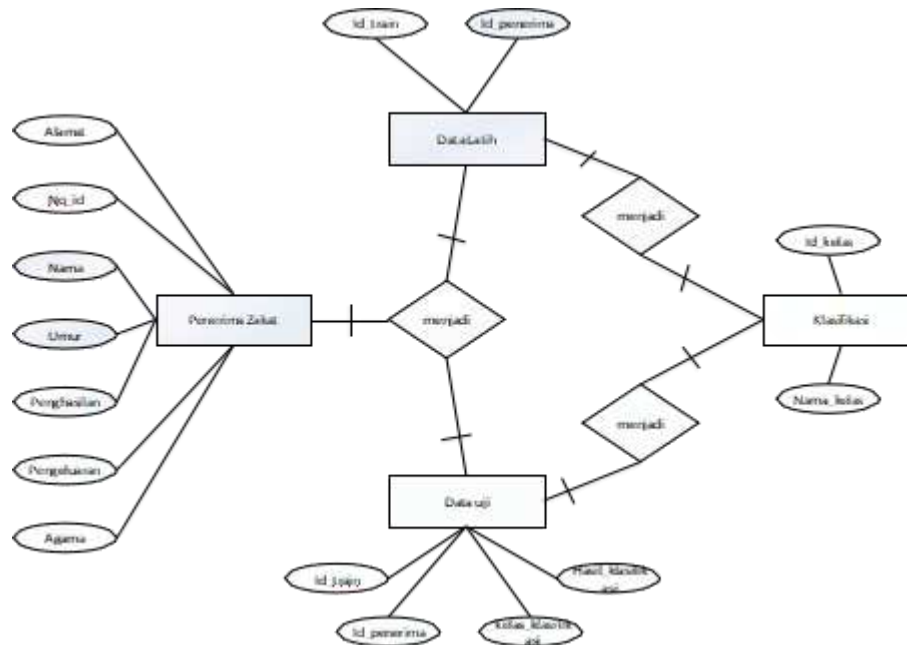


Figure 8. ERD

### 3.7 Interface Implementation

The interface implementation is a display of the overall system which will be explained as below this:

#### 3.7.1 Zakat Fitrah Application

Here are some views of the Zakat Fitrah application, which include: the application login display, the user and password form. As in the image below:

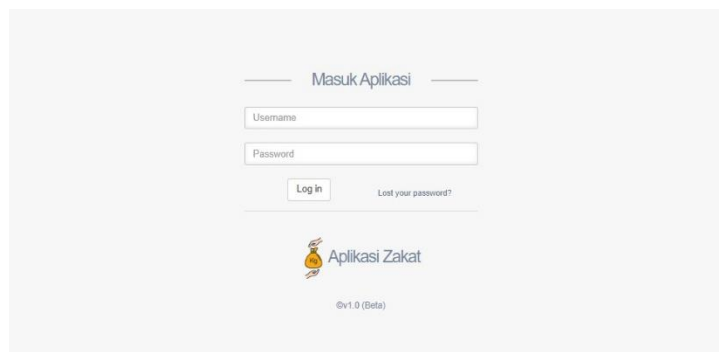


Figure 9. Display of Zakat Application

### 3.7.2 Web Administrator View

The dashboard page functions to display data on zakat fitrah recipients.

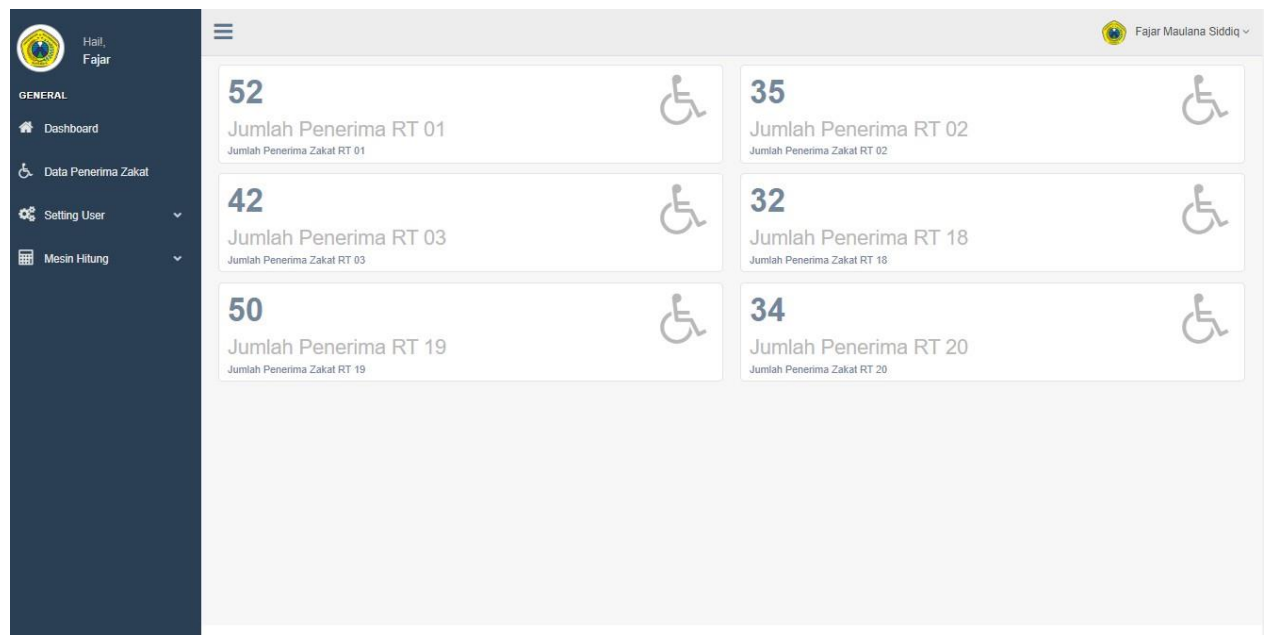


Figure 10. Web Administrator Dashboard

## 4. RESULTS AND DISCUSSION

Experiments or experiments conducted on the zakat recipient data classification system at Nurul Huda Waru Mosque are to prove whether the results of the program are the same as the original results of the Zakat Recipient Data classification or even far different from the original results, therefore it is necessary to try and compare the program results with real data. Of course the testing will be carried out with training data and test data.

Testing is done by comparing training data and test data as follows:

Table 1. Testing Table.

No.	Name	Age	Income	Spending	Debt	Religion	Address	Result	Value
1.	P. Timin	Middle-aged	Less	Moderate	Height	Islam	Rt01	Light	0.00947
2.	B. Minah	Middle-aged	Less	Moderate	Height	Islam	Rt01	Light	0.10277
3.	B. Yani	Young	Moderate	Less	Less	Islam	Rt01	Light	0.10277
4.	Ana	Young	Moderate	Less	Moderate	Islam	Rt01	Hard	0.10277
5.	Ponidi	Old	Height	Moderate	Moderate	Islam	Rt01	Hard	0.0497
6.	B. Zulaikah	Old	Height	Height	Moderate	Islam	Rt01	Sabililah	0.12123

7.	B. Zubaidah	Young	Moderate	Height	Moderate	Islam	Rt01	Sabililah	0.09172
8.	Windy	Middle-aged	Moderate	Less	Moderate	Islam	Rt01	Light	0.04302
9.	B. Kasiyah	Old	Less	Moderate	Less	Islam	Rt01	Light	0.12123
10.	Siti (Janda)	Young	Less	Moderate	Less	Islam	Rt01	Light	0.06751
11.	P. Siddiq	Middle-aged	Moderate	Moderate	Less	Islam	Rt01	Weight	0.04302
12.	P. Samsul	Middle-aged	High	Moderate	Moderate	Islam	Rt02	Sabililah	0.1267
13.	P. Khoirul Anam	Young	High	Moderate	Moderate	Islam	Rt02	Sabililah	0.09172
14.	Paeran	Middle-aged	High	Less	Height	Islam	Rt02	Sabililah	0.00947
15.	Jasimo	Old	High	Less	Height	Islam	Rt02	Light	0.00947
16.	B. Sati/Giman	Old	Moderate	Less	Moderate	Islam	Rt02	Light	0.06751
17.	Jayadi Sanimas	Old	Moderate	Moderate	Moderate	Islam	Rt02	Light	0.10798
18.	P. Suli	Old	Less	Moderate	Moderate	Islam	Rt02	Sabililah	0.06751
19.	P. Salam	Middle-aged	High	High	Less	Islam	Rt03	Sabililah	0.03211
20.	B. Sinab	Young	High	High	Less	Islam	Rt03	Light	0.06751
21.	Hadak	Young	Moderate	Moderate	Moderate	Islam	Rt03	Light	0.04302
22.	Mak Atim	Middle-aged	Moderate	Moderate	High	Islam	Rt03	Weight	0.1267
23.	Rita	Young	Less	Less	High	Islam	Rt03	Light	0.04807
24.	Anik Indahsani	Middle-aged	High	Less	Less	Islam	Rt03	Sabililah	0.09172
25.	B. Tris	Old	High	Moderate	Moderate	Islam	Rt03	Sabililah	0.08873
26.	Jenjem	Old	Less	High	Moderate	Islam	Rt18	Light	0.06751
27.	Soemarno	Middle-aged	Moderate	Less	Moderate	Islam	Rt18	Light	0.04302
28.	Yono	Young	Less	Less	High	Islam	Rt18	Light	0.1267
29.	B. Saropah	Middle-aged	High	Moderate	High	Islam	Rt19	Weight	0.09172
30.	Buri	Old	Moderate	Less	Less	Islam	Rt19	Weight	0.06751

31.	Maryanto	Old	Less	High	Moderate	Islam	Rt19	Sabililah	0.04302
32.	Pak Pri	Middle-aged	High	High	Moderate	Islam	Rt19	Sabililah	0.1267
33.	Wartaji	Middle-aged	High	Less	Moderate	Islam	Rt20	Light	0.09172
34.	P. Sari	Young	Less	Moderate	Moderate	Islam	Rt20	Light	0.06751
35.	P. Sholeh	Young	Moderate	Moderate	Moderate	Islam	Rt20	Light	0.04302
36.	P. Navasen	Middle-aged	Less	Less	Less	Islam	Rt19	Weight	0.1267
37.	P. Gun	Old	Less	High	Less	Islam	Rt19	Sabililah	0.06751
38.	Niswati	Old	Moderate	Moderate	Less	Islam	Rt20	Sabililah	0.06751
39.	M. Bukhori	Young	Less	Moderate	Moderate	Islam	Rt18	Sabililah	0.04302
40.	Sukimun	Middle-aged	Moderate	Less	Moderate	Islam	Rt02	Light	0.1267
41.	Nurul	Middle-aged	Moderate	Less	High	Islam	Rt02	Light	0.09172
42.	Jaiman	Old	High	Moderate	High	Islam	Rt03	Light	0.00947
43.	Suroso	Young	High	High	Less	Islam	Rt03	Weight	0.00947
44.	Matrio	Middle-aged	Less	High	Moderate	Islam	Rt02	Weight	0.04302
45.	Sumarto	Middle-aged	Less	Less	Moderate	Islam	Rt01	Light	0.00947
46.	Mulyono	Middle-aged	High	Less	Moderate	Islam	Rt01	Light	0.10277
47.	Mbak Ni	Young	Moderate	Less	Less	Islam	Rt01	Light	0.10277
48.	Mbak Sina(Pijet)	Young	Moderate	Moderate	Less	Islam	Rt01	Weight	0.10277
49.	Hariono	Old	Less	Moderate	Moderate	Islam	Rt02	Weight	0.0497
50.	Suyadi	Old	Less	High	High	Islam	Rt02	Sabililah	0.12123
51.	Mbah Mut	Young	Moderate	High	High	Islam	Rt02	Sabililah	0.09172
52.	Choirul Anam	Middle-aged	High	Less	Less	Islam	Rt02	Light	0.04302
53.	Mbah Kamiso	Old	High	Moderate	Moderate	Islam	Rt02	Light	0.12123
54.	Mina	Young	Less	Less	Moderate	Islam	Rt02	Light	0.06751
55.	Mbah Gima	Middle-aged	High	Less	Moderate	Islam	Rt02	Weight	0.04302
56.	Ratni	Middle-aged	Less	Moderate	Moderate	Islam	Rt03	Sabililah	0.1267
57.	Jamila	Middle-aged	Less	Moderate	Moderate	Islam	Rt03	Sabililah	0.09172
58.	Sugeng R.	Young	Moderate	Less	Less	Islam	Rt03	Sabililah	0.00947
59.	Tupatni	Young	Moderate	Less	Less	Islam	Rt03	Light	0.00947
60.	Khazin	Old	High	Moderate	Less	Islam	Rt03	Light	0.06751

61.	Tantok	Old	High	High	Moderate	Islam	Rt03	Light	0.10798
62.	Paijo	Young	Moderate	High	Moderate	Islam	Rt03	Sabililah	0.06751
63.	Pak To(Becak)	Middle-aged	Moderate	Less	High	Islam	Rt18	Sabililah	0.03211
64.	Sukardi	Old	Less	Moderate	High	Islam	Rt18	Light	0.06751
65.	Pornomo	Young	Less	Moderate	Moderate	Islam	Rt18	Light	0.04302
66.	Amin	Middle-aged	Moderate	Moderate	Moderate	Islam	Rt19	Weight	0.1267
67.	Mujiati	Middle-aged	High	Moderate	Less	Islam	Rt19	Light	0.04807
68.	Anis	Young	High	Moderate	Less	Islam	Rt19	Sabililah	0.09172
69.	Dewi Aswiya	Middle-aged	Less	Less	Moderate	Islam	Rt19	Sabililah	0.08873
70.	Achmad Baihaqi	Old	Moderate	Less	High	Islam	Rt20	Light	0.06751
71.	Sri Wahyuni / Sum	Old	Moderate	Less	Less	Islam	Rt20	Light	0.04302
72.	Pak Selamat	Old	Moderate	Moderate	Less	Islam	Rt20	Light	0.1267
73.	Puji / Udin	Old	Less	Moderate	Moderate	Islam	Rt19	Weight	0.09172
74.	Bu Napsiyah	Middle-aged	High	High	Less	Islam	Rt19	Weight	0.06751
75.	Bu Hendun	Young	High	High	High	Islam	Rt20	Sabililah	0.04302
76.	Bu Nunuk	Young	Moderate	Moderate	High	Islam	Rt18	Sabililah	0.1267
77.	Susiat / Pendik	Middle-aged	Moderate	Moderate	Less	Islam	Rt02	Light	0.09172
78.	Susilowati	Young	Less	Less	Moderate	Islam	Rt02	Light	0.06751
79.	Bu Umi	Middle-aged	High	Less	Moderate	Islam	Rt03	Light	0.04302
80.	Pak Amir	Old	High	Moderate	Less	Islam	Rt03	Weight	0.1267
81.	Endang	Old	Less	High	High	Islam	Rt01	Sabililah	0.06751
82.	Asmalikah	Middle-aged	Moderate	Less	Moderate	Islam	Rt01	Sabililah	0.06751
83.	Pak Fadil	Young	Less	Less	Moderate	Islam	Rt01	Sabililah	0.04302
84.	Temurah	Middle-aged	High	Moderate	Less	Islam	Rt01	Light	0.1267
85.	Asema	Old	Moderate	Less	Less	Islam	Rt02	Light	0.09172
86.	Ali Mudlofir	Old	Less	High	Moderate	Islam	Rt02	Light	0.00947
87.	Pak Narto	Middle-aged	High	High	High	Islam	Rt02	Light	0.00947
88.	Joko / Hari	Middle-aged	High	Less	High	Islam	Rt02	Light	0.04302



89.	Ninik	Young	Less	Moderate	Less	Islam	Rt02	Weight	0.00947
90.	Sate	Young	Moderate	Moderate	Less	Islam	Rt02	Weight	0.10277
91.	Agus	Middle-aged	Less	Less	Less	Islam	Rt02	Sabililah	0.10277
92.	Nanang Ambon	Old	Less	High	Moderate	Islam	Rt03	Sabililah	0.10277
93.	Sukarmi/Sumi	Old	Moderate	Moderate	Moderate	Islam	Rt03	Light	0.0497
94.	Ulva	Young	Less	Moderate	High	Islam	Rt03	Light	0.12123
95.	Fitri	Middle-aged	Moderate	Less	High	Islam	Rt03	Light	0.09172
96.	Indah	Middle-aged	Moderate	Less	Less	Islam	Rt03	Weight	0.04302
97.	Suripmo	Old	High	Moderate	Moderate	Islam	Rt03	Sabililah	0.12123
Result Sabililah : 35  Light Results : 45  Weight Results : 18									

From the data, the test results in table 6.1 have 98 data on Zakat recipients with 30 pieces of Shabililah category and 45 pieces for Light category and 18 pieces for Heavy category. The resulting value of each data is taken from the test table data using the following calculations:

$$P(\text{Classification Results}|\text{Sabililah}) = \frac{30}{98} = 0.306122449$$

$$P(\text{Classification Results}|\text{Light}) = \frac{45}{98} = 0.459183673$$

$$P(\text{Classification Results}|\text{Weight}) = \frac{18}{98} = 0.183673469$$

So the Light value is more than the Shabililah, and Heavy category. The probability in each class, for categorical data, is only calculated based on how much the same amount of data is on the features in one class then divided by the number of classes then the resulting value is formed in each data.

Table 1. Test Table.

Sabililah	Light	Weight
0.306122449	0.459183673	0.183673469

### 3.2 Functional Testing

The following is a test of the application for the classification of zakat fitrah recipients using Niave Bayes. Based on Figure 1 and Figure 2, the flow of this application is as follows:

Beginning with logging in first.

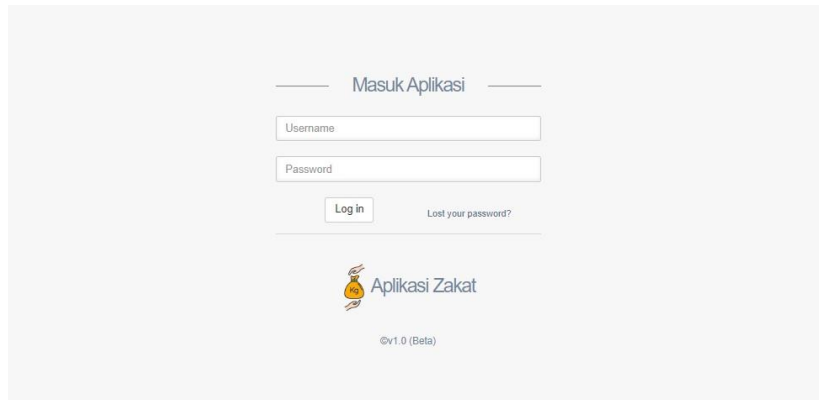


Figure 10. Login

On the naïve Bayes menu page, the admin user enters the recipient data of zakat fitrah. The example is as follows:



Figure 11. User Public Melapor, a. Admin Page, b. fill in the recipient's data zakat fitrah

After the admin user enters the data of the recipient of zakat fitrah, the value will automatically come out and enter the category of sabililah, light, heavy. After the results come out, the admin is tasked with re-entering the data into the data of zakat fitrah recipients with the result categories of this application.



Figure 12. add recipient data, d. add the recipient's name, e. data notification has been added, f. recipient data is displayed.

In functional testing, the zakat fitrah application can work very well. And the conclusion from the functional testing above is that the application can run properly and produce results from the category of zakat fitrah recipients.

## **4. CONCLUSIONS AND SUGGESTIONS**

### **4.1 CONCLUSION**

Based on the results of the design and testing of the system that has been carried out, it can be concluded that:

- [1]. The classification system used to classify categories of zakat recipients is 98 data and Light data is larger.
- [2]. The determination of the amount of training data and test data is very influential on the final results of calculations using the Naïve Bayes method.
- [3]. Class determination also affects the final results of calculations using this Naïve Bayes method.

### **4.2 SUGGESTION**

Based on the results of the design and testing that has been carried out, there are several suggestions for further development, namely:

- [1]. The system is only able to assess or classify the criteria that have been determined now, the authors hope that further research the criteria can be dynamic, or in other words, there are criteria management in the system.
- [2]. It is expected that in further research the method used is the hybrid method.

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