

CLASSIFICATION OF ZAKAT FITRAH RECIPIENTS USING NAÏVE BAYES METHOD

¹R DIMAS ADITYO

¹Informatics Engineering Study Program, Faculty of Engineering

Universitas Bhayangkara – Surabaya

e-mail: ¹dimas@ubhara.ac.id

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.

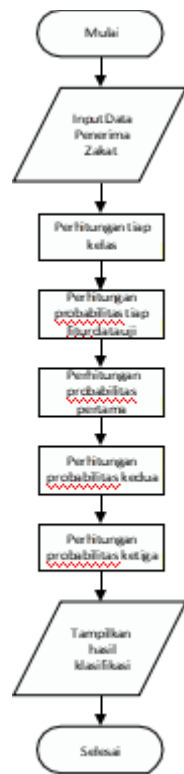


Figure 1. Flowchart system

The following is an overview of the system flow:

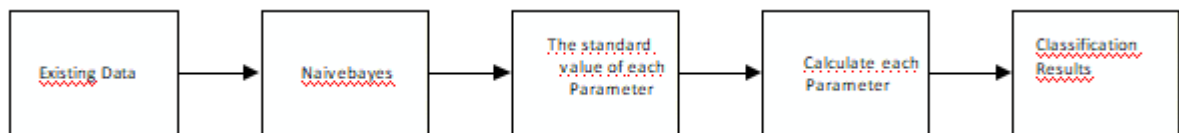


Figure 2. Flow System

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:

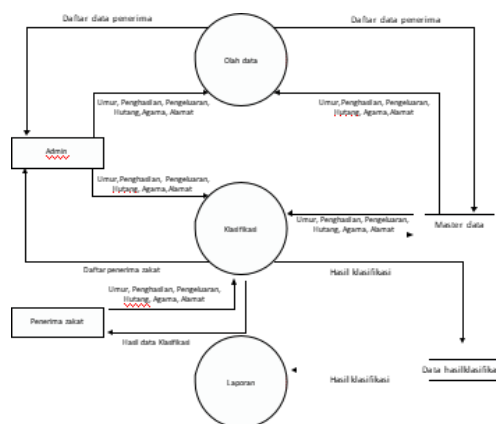


Figure 3. Data Flow Diagram Level 0

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.

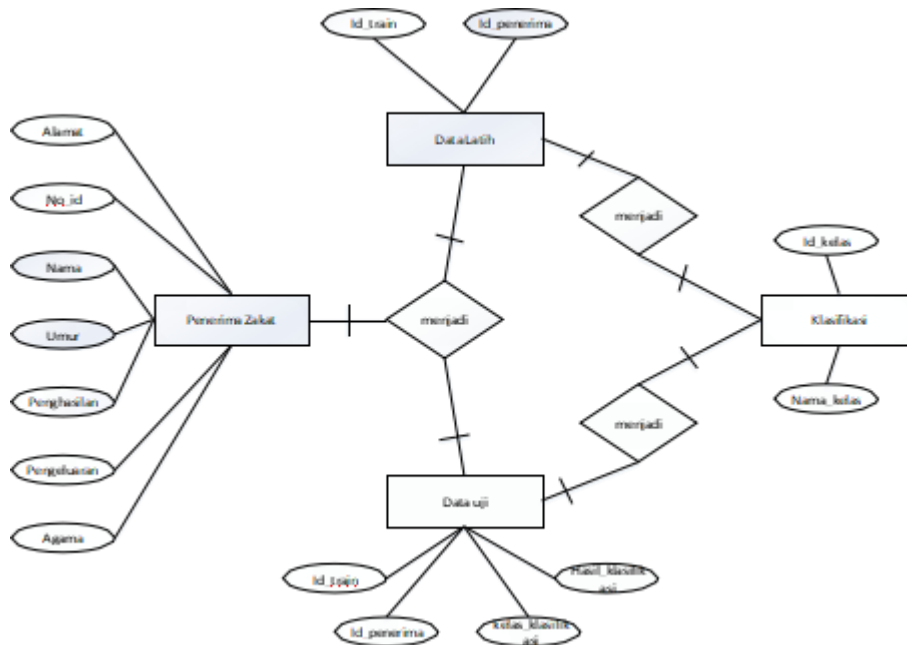


Figure 8. ERD

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:

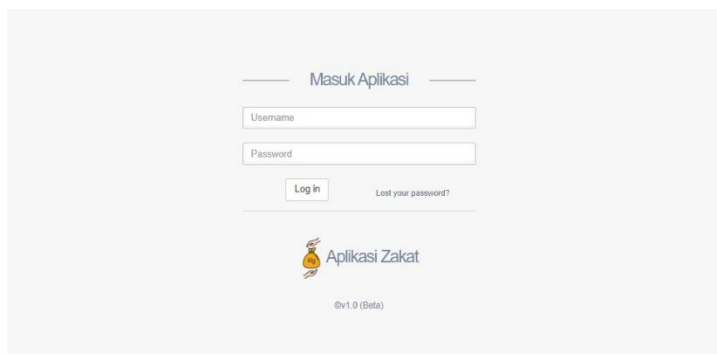


Figure 9. Display of Zakat Application

3.7.2 Web Administrator View

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

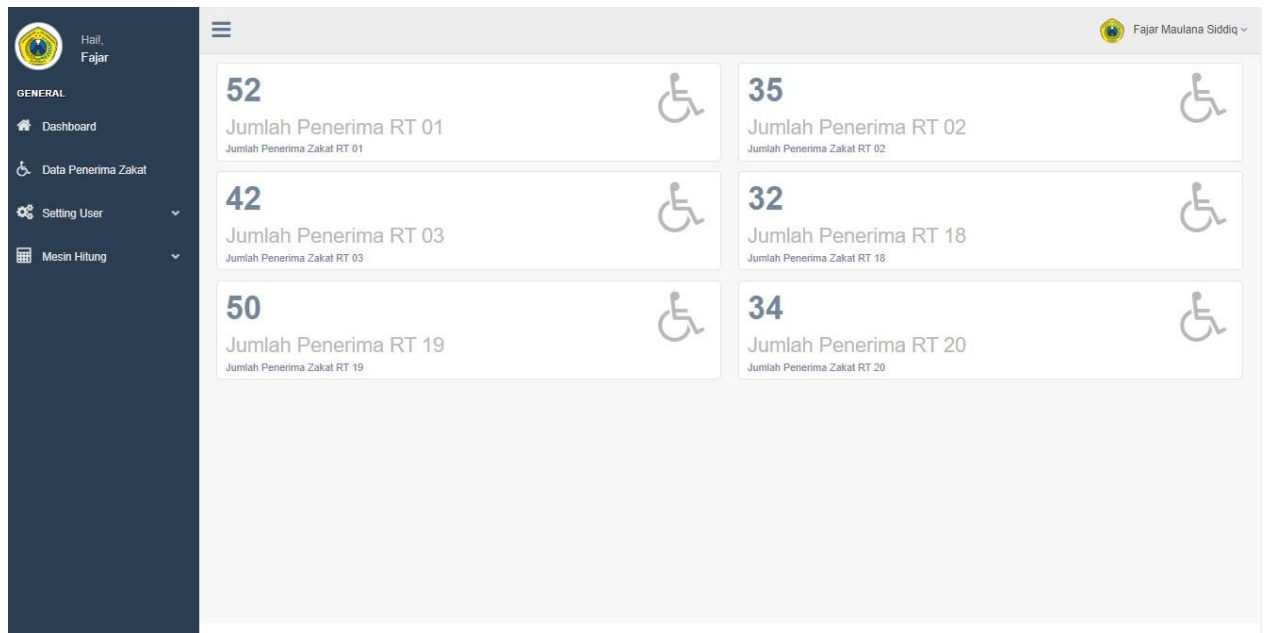


Figure 10. Web Administrator Dashboard

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 Samimas | 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. Nawasen | 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. | Tupaini | Young | Moderate | Less | Less | Islam | Rt03 | Light | 0.00947 |
| 60. | Khozin | 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. | Susiati / 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. | Sukarni/ 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 Naive Bayes. Based on Figure 1 and Figure 2, the flow of this application is as follows:

Beginning with logging in first.

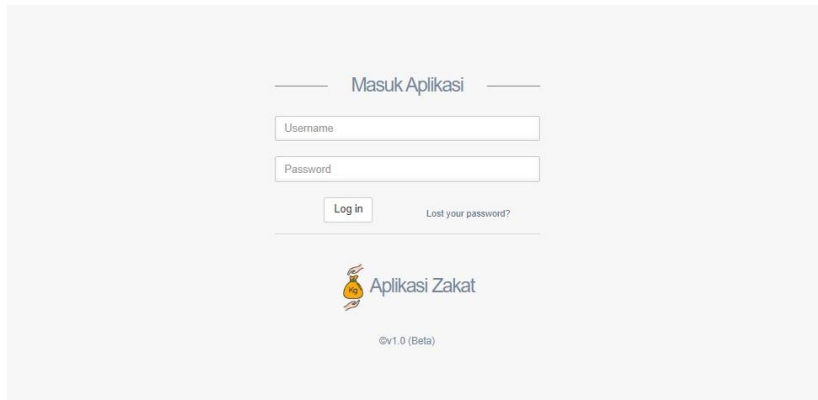


Figure 10. Login

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

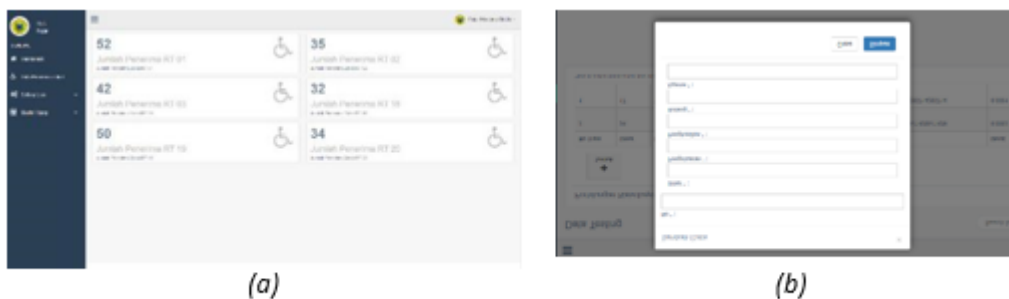


Figure 11. User Public Melapor, a. Admin Page, b. fill in the recipient's data zakat fitrah

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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