



# CLASSIFICATION OF FEASIBILITY OF BASIC FOOD RECIPIENTS IN KELURAHAN TANJUNG MORAWA A, TANJUNG MORAWA SUB-DISTRICT USING NAÏVE BAYES CLASSIFIER ALGORITHM

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## ABSTRACT

*In the era of globalization, information technology is developing so rapidly. Computers are tools made to facilitate human work. Village officials need a system that can support performance and provide better services to residents. The COVID-19 pandemic affects various aspects of life, including economic aspects, at the global level. The performance of most industrial sectors has decreased. In 2005, the Direct Cash Assistance (BLT) program was introduced as a substitute for fuel subsidies. To reduce the negative impact of the COVID-19 pandemic on the economy, the government through the Ministry of Social Affairs has implemented various social assistance programs such as an increase in the number of aid recipients in the Family Hope Program, non-cash assistance programs or the Basic Food Program with an expansion of the number of recipients from 500 thousand to 900 thousand families. Poverty is one of the critical issues in every world that has been the subject of political concern. Poverty is one of the issues that many developed countries, including Indonesia, have faced. Naïve Bayes is a basic classification of probabilities that calculates a series of probabilities by adding the frequencies and value combinations from the given dataset, so the solution developed to overcome the problems.*

**KEYWORDS:** Covid-19, poverty, Algoritma Naïve Bayes Classifier

## A. INTRODUCTION

The COVID-19 pandemic is affecting various aspects of life, including economic aspects, at the global level. The performance of most industrial sectors has decreased. MSMEs, especially in the tourism and retail sectors have experienced a significant negative impact. People's purchasing power has also decreased, along with the sluggish economy. To reduce the negative impact of the COVID-19 pandemic on the national economy, the Indonesian government has implemented several programs to strengthen social protection and economic stimulus, including: Family Hope Program (PKH), Pre-Work Cards, Social Assistance, Micro and Ultra Micro MSME Stimulus, and reduced electricity rates. Most of these programs are programs that have been routinely carried out by the government. In connection with COVID-19, the

government has since increased the number of beneficiaries of the programs previously mentioned. Since being implemented for the first time in the 1990s, the government's social assistance programs for communities have undergone various forms of change and reached more beneficiaries. In 2005, the Direct Cash Assistance (BLT) program was introduced as a substitute for fuel subsidies. To reduce the negative impact of the COVID-19 pandemic on the economy, the government through the Ministry of Social Affairs has implemented various social assistance programs such as an increase in the number of aid recipients in the Family Hope Program, non-cash assistance programs or the Basic Food Program with an expansion of the number of recipients from 500 thousand to 900 thousand families (source: *PowerPoint Presentation (sumutprov.go.id)*).



The results of studies conducted so far show that the implementation of the government social assistance program, especially in the aspect of its distribution, faces several challenges, such as (a) disbursing funds to the right beneficiaries; (b) the distribution of the appropriate amount and amount of aid; and (c) program duration. To support the effectiveness of the distribution of government social assistance programs, the Directorate General of Population and Civil Registration (Dirjen Dukcapil) of the Ministry of Home Affairs in collaboration with local governments (PEMDA) continues to improve the accuracy of aid recipient status. Through the Integrated Social Welfare Data (DTKS), which is the database used for the distribution of social assistance nationally, the Director-General of Population and Civil Registration matches his population data based on the Identification Number (NIK), with recipients of assistance at DTKS based on NIK, so that distribution is believed right on target.

Previous study was carried out using one of the Fuzzy MADM methods, namely Simple Additive Weighting, to identify recipients of non-cash food assistance (SAW). This method was selected because, from many possible alternatives, it was able to choose the best alternative. The findings obtained for this approach from the experimental simulation are sufficiently optimal to justify the decision-making that person B is poorer than person A and C, and the outcome is that priority is given to person B to get assistance.

This study aims to compare and evaluate the classification algorithm that generates the most accurate precision that will later be used to create a system that will help predict and determine the Naive Bayes method's feasibility. Compared to other classification methods in terms of accuracy and computational efficiency, it is also considered to be theoretically effective at classifying data. The system application that will be designed will use the Visual Basic programming language, where this application can make it easier to determine/classify the eligibility of foodstuff recipients so that they can produce better results by utilizing computerized technology.

## **B. RESEARCH METHOD**

Data collection is done by collecting books, articles, journals, papers, or internet sites related to Naive Bayes and Staple Food, especially those related to methods on computer vision. Writing this journal is a form of writing about the implementation of environmental and social care program activities with mechanical engineering student associations and

involving several lecturers and the community in their participation in social service activities as a manifestation of this form of community service. Through studying and analyzing how data mining methods work, research and design was carried out. An application design with the method chosen is generated from the results of the analysis. Programming (coding) is performed by programming based on a design made using the programming language of Visual Basic. Discussion of outcomes by performing n tests on the application and generating a summary table of results tests.

## **C. LITERATURE REVIEW**

Poverty is one of the fundamental problems that have become the center of attention of governments in any country. Poverty is one of the problems experienced by several developing countries, including Indonesia. There are many ways to reduce poverty, including social assistance programs for the poor. Based on this explanation, it can be concluded that poverty is a problem faced by many developing countries and has become the center of attention in any country.

Everyone's concern is because they are afraid of contracting because the coronavirus can have an impact on causing death for people with it. Therefore the government provides assistance in the form of basic food packages, to prevent the spread. (Shofiana, 2020). The government is increasingly alert to help ease the burden on the community, especially for those affected by the coronavirus (covid-19). The plan is for the government to provide several types of social assistance in the form of direct cash assistance (BLT) (BLT). The aim of the initiative to include this assistance program is to preserve the community's purchasing power throughout the Corona time. Later, all the assistance will be distributed throughout Indonesia and aimed directly or indirectly at the affected citizens. Interestingly, President Joko Widodo said the government will provide cash assistance of IDR 600,000 a month concerning BST and BLT cash assistance.

Basic food or often abbreviated as SEMBAKO are nine types of basic foods according to the Decree of the Minister of Industry and Trade No. 115 / MPP / Kep / 2/1998 dated 27 February 1998 (abbreviated: "Kepmenperindag 115/1998"). [1] The Ministry of Trade issued Regulation of the Minister of Trade Number 27 / M-DAG / PER / 5/2017 concerning Determination of Reference Prices for Purchases at Farmers and Reference Prices for Sales at Consumers



("Permendag 27/2017") which took effect on May 16, 2017.<sup>[2]</sup>

The nine basic foods that are determined by the reference price for purchase and sale according to "MOT 27/2017" are:<sup>[2]</sup>

1. Rice: The reference price for purchases from farmers, the price of IDRSS 7,300 per kilogram (kg), the reference price for sales at consumers is IDR 9,300 per kg.
2. Corn: The reference price for purchases from farmers is sold at a price range of IDR 2,500-IDR 3,150 per kg, (the lower the moisture content, the higher the price), while the reference price for sales to consumers is IDR 4,000 per kg.
3. Soybeans: Local soybeans for the purchase reference price at farmers are sold for IDR 8,500 per kg, for users / craftsmen for IDR 9,200 per kg. Then for imported soybeans, the reference price for purchases at farmers is IDR 6,550 per kg, and for IDR 6,880 at users per kg.
4. Sugar: The reference price for purchases from farmers is IDR 9,100 per kg, IDR 12,500 per kg for consumers.
5. Cooking Oil: A reference price for bulk oil is set at IDR 10,500 per liter for bulk oil and IDR 11,000 per liter for simple packaging.
6. Onion: The reference price for purchases from farmers is IDR 15,000 per kg for wet konde, IDR 18,300 per kg for onions with leaves (konde Askip), and IDR 22,500 per kg for onions without leaves (Rogol Askip). As for the reference price at the buyer, the Askip Rogol is IDR 32,000 per kg.
7. Frozen Meat and Fresh Meat (Beef): The reference price is only set for consumer purchases, which is IDR 80,000 per kg for frozen meat. As for fresh meat, the quadriceps are IDR 98,000 per kg, hamstrings IDR 105,000 per kg, brisket IDR 80,000 per kg, and bones with a bit of adhering meat IDR 50,000 per kg.
8. Broiler Chicken Meat: The reference price for the purchase at the farmer is set at IDR 18,000 per kg, and IDR 32,000 at the consumer per kg.
9. Broiler chicken Eggs: The reference price for the purchase at the farmer is IDR 18,000 per kg and IDR 22,000 per kg at the consumer.

Visual Basic is a well-known high-level programming language that originated on an "older" machine like the AT286 with BASIC. The BASIC language was a language at the time that could be relied on in an important application. Microsoft Access is an application that can support the creation of database applications that can design, create, and manage databases simply in a relatively short time. Microsoft

Access is also a program application that is very simple to use, flexible in making and designing information systems. The Naïve Bayes classifier is a simple probability classification that calculates a set of probabilities by adding up the frequencies and value combinations from a given dataset. The algorithm uses the Bayes theorem and assumes that all attributes are independent or not interdependent given by the value of the class variable [9]. Another definition states that Naive Bayes is a classification proposed by the British scientist Thomas Bayes using probability and statistical methods, which estimates future possibilities based on previous experience. Naive Bayes is based on the simplifying assumption that attribute values are conditionally independent of each other when given an output value. In other words, the probability of observing together is the product of individual probabilities, given the output value [8]. The advantage of using Naive Bayes is that this method only requires a small amount of training data to determine the parameter estimates needed in the classification process. Naive Bayes often performs much better in most complex real-world situations than might be expected.

The equation of the Bayes theorem is

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

Where:

X : Data with an unknown class

H : The data hypothesis is a specific class

P(H|X) : The probability of hypothesis H based on condition X (posteriori probability)

P(H) : The probability of hypothesis H based on condition X (posteriori probability)

P(X|H) : Probability X based on the conditions in the hypothesis H

P(X) : Probability X

## D.SYSTEM PLANNING

### 1. System Analysis

The method of data analysis utilizes quantitative data in the form of numerical and nominal mathematics. Naive Bayes is based on the simplified assumption that when an output value is given, attribute values are conditionally independent of each other. In other words, the probability of observing together is the product of individual probabilities, given the output value. The advantage of using Naive Bayes is that this method only requires a small amount of training data to determine the parameter estimates needed in the classification process. In the Naive Bayes method, constant string data is distinguished from continuous



numeric data, this difference will be seen when determining the probability value of each criterion, be it criteria with string data values or criteria with numeric data values. Considering the difficult situation and conditions caused by the impact of the COVID-19 virus nationally have caused the public to feel the

large-scale social restrictions (PSBB) that the Indonesian government implemented to cope with the corona virus outbreak, not a few of them have had difficulty finding fortune and/or loss of a job. So that concern for what they need to meet their basic daily needs.

**Table 1**  
**The need for basic food packages**

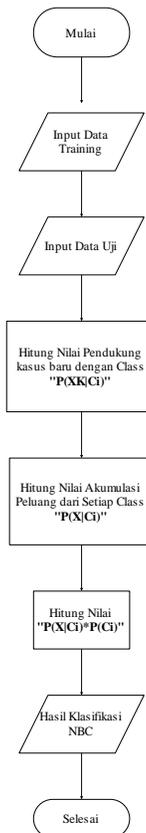
Type	Total	Unit
Rice	5	kg
Canned fish	2	Canned
Cooking oil	1	Liter
Sugar	1	Kg
Instant noodles	5	Package

Source: Head Office of Tanjung Morawa A

## 2. System Design

The next step that is carried out after the research material is obtained is the system design using the Edraw Max software. The design of the system for

determining the level of ripeness of the coffee fruit can be seen in the design of the flowchart and the design of the following system forms:



**Figure 1 Flowchart of Naïve Bayes Classifier**



### 3. Data processing

Data analysis is a step that must be performed after successfully collecting the data. Data Cleaning is being performed at this stage. Data Cleaning is a procedure that must be taken to eliminate noise from previously generated data. Data Cleansing is used to unify data in

the same format so that accurate results from mining can be obtained. The author estimates the data collected after completing the Data Cleaning. Table 3 is the randomly taken training data and Table 4 is the sample test data.

**Table 2**  
**Variabel**

Attribute	Numerization	Description
Gender	0	Female
	1	Male
Age	0	20 - 29 y/o
	1	30 - 40 y/o
	2	> 40 y/o
Position	0	Civil Servants/Police/Indonesian National Army
	1	Private employees
	2	Laid off employees

**Table 3**  
**Case Data**

No	Name	Gender	Age	Position	Basic food recipient
1	Rahmad	1	0	2	No
2	Irwansyah	1	1	2	No
3	Hj. Saniah	0	1	2	No
4	Jumaiyah	1	0	2	No
5	Muhammad Tamrin	1	1	2	Yes
6	Budi Andoko	1	1	1	No
7	Purwanto	1	1	1	Yes
8	Hasbi Hidayatina	1	1	0	No
9	Riya Dewi	0	1	0	No
10	Fitriani	0	1	0	Yes
11	Arman Syahputra	1	1	2	Yes
12	Sri Rizkiyah	1	0	2	Yes
13	Rudi Iskandar Nasution	1	1	2	Yes
14	Rini Susanti	0	1	2	Yes
15	Mhd Maulana Ra	1	2	2	Yes
16	Harry Agus	1	2	1	Yes
17	Razie Alif Ananta	1	2	2	No
18	Samsuddin K	1	1	2	Yes
19	Darlina	1	1	2	Yes
20	Zainab	1	1	1	????

Based on table 3, it can be calculated that the data classification of foodstuff recipients is given if input is Gender, Age, and Occupation using the Naive Bayes

algorithm. If new data input is given, the data classification of foodstuff recipients can be determined through the following steps:

- a. Calculating value of  $P(XK|Ci)$   
 $P(\text{Criteria 1} = \text{"male"}|\text{classification} = \text{"Yes"})$   
 $P(\text{Criteria 1} = 9/15 = 0,6)$



$P(\text{Criteria 1} = \text{"male"} | \text{classification} = \text{"No"})$

$P(\text{Criteria 1} = 6/15 = 0,4$

$P(\text{Criteria 2} = \text{"30-40 y/o"} | \text{classification} = \text{"Yes"})$

$P(\text{Criteria 2} = 8/13 = 0,62$

$P(\text{Criteria 2} = \text{"30-40 Tahun"} | \text{classification} = \text{"Tidak"})$

$P(\text{Criteria 2} = 5/13 = 0,38$

$P(\text{Criteria 3} = \text{"Private employees"} | \text{classification} = \text{"Yes"})$

$P(\text{Criteria 3} = 2/3 = 0,66$

$P(\text{Criteria 3} = \text{"Private employees"} | \text{classification} = \text{"No"})$

$P(\text{Criteria 3} = 1/3 = 0,33$

- b. Calculating value of  $P(X|C_i)$  for every class (label)

$P(X | \text{Classification} = \text{"Yes"})$

$= 0,6 \times 0,62 \times 0,66 = 0,245$

$P(X | \text{Classification} = \text{"No"})$

$= 0,4 \times 0,38 \times 0,33 = 0,050$

- c. Calculating value of  $P(X|C_i) * P(C_i)$

$(P(X | \text{Classification} = \text{"Yes"}) \times P(\text{Classification} = \text{"Yes"})) = 0,245 \times \frac{11}{19} = 0.141842$

$(P(X | \text{Classification} = \text{"No"}) \times P(\text{Classification} = \text{"No"})) = 0,050 \times \frac{8}{19} = 0.021053$

### Specifies the Class of the new case

Based on the final calculation by multiplying the probability value of the cases raised, we see that the P-value ( $X | \text{Information} = \text{"Yes"}$ ) is higher than  $P(X | \text{Information} = \text{"No"}) = 0.141842$  versus  $0.021053$ . So it can be concluded that the food recipients are classified as "Yes"

### E. CONCLUSION

From the study findings, below are a few conclusions:

1. This Classification application can help an officer or village office employee to classify the recipient community or non-recipient of the basic needs.
2. The results of the classification of basic food recipients are based on the highest level of confidence in each label variable for each independent variable.
3. By knowing whether or not the new basic food recipients are yes or no, this will minimize errors in targeting the basic food recipients.

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