CoreID JOURNAL

Vol. 1 No. 2, July 2023 (49-57)
ISSN: 2987-6990
DOI: https://doi.org/10.60005/coreid.v1i1.8

Classification of Health and Nutritional Status of Toddlers Using the Naïve Bayes Classification

Yogi Saputra[1], Nurfitria Khoirunnisa[2], Syauqi Arinal Haqq[3]
[1]Department of Information Systems, Univ. Nationality of the Republic of Indonesia
[2]Information System Department, Subang State Polytechnic, Indonesia
[3]International Relations Department, Saint Petersburg State University, Rusia

Article Info

Article history:

Received April 04, 2023
Revised April 30, 2023
Accepted July 25, 2023

Keywords:

Data Mining
Naives Bayes Classification
Stunting
Health and Nutrition

ABSTRACT

Life is characterized by the presence of symptoms of growth and development. The growth and development of the degree of health of each individual are different. In this case, one of the efforts to improve health status is to improve nutritional status. Nutritional status is the state of the body related to food consumption patterns and the use of nutrients that are tailored to the body's needs. Improving nutritional status is useful for increasing body resistance and promoting normal growth. In the daily actualization of the nutritional status of toddlers at the posyandu, it is usually obtained through anthropometric measurements, namely by using the weight/age index or weight-for-age to determine nutritional status. However, in measuring with anthropometry, there was confusion in determining nutritional quality, so to get accurate results, a data mining method is needed, namely the Naive Bayes Classification (NBC) Algorithm, which will be implemented in research. With this research, it is hoped that it can help posyandu cadres in the Baros sub-district, Cimahi sub-district, and Cimahi city determine the level of health and nutritional status of toddlers better and more accurately.

Corresponding Author:
Yogi Saputra
Department of Information Systems, National University of the Republic of Indonesia,
Jl. Halimun No. 37, Lkr. Sel., Kec. Lengkong, Bandung City
Email: yogi.saputra@ukri.ac.id

1. INTRODUCTION

The development of health at this time in the new normal era is experiencing a transitional period after the COVID-19 pandemic, where everyone has anti-body health resistance that adapts to this time. Since early May 2020, Indonesia has recorded confirmed cases of COVID-19, and not only adults but also infants and children have been affected. In the midst of this new normal era, the importance of nutrition is a key factor in maintaining and increasing endurance, especially for children, especially those who are toddlers. So life is characterized by the presence of symptoms of growth and development. The growth and development of the degree of health of each individual are different. In this case, one of the efforts to improve health status is to improve nutritional status.[1][2] Nutritional status is the state of the body related to food consumption patterns and the use of nutrients that are tailored to the body's needs.[3] Improving nutritional status is useful for increasing body resistance and for normal growth because if the nutritional status is not good, then it is likely that the body will be disturbed, and as a result, there will be a decrease in body immunity.[4] Circumstances like this cause children under five to quickly become infested with various diseases. Health development in Indonesia from 2015 to 2020 focuses on three main components: emphasizing maternal and infant mortality rates, reducing stunting, and preventing communicable and non-communicable diseases. Improving nutritional status is useful for increasing body resistance and for normal growth because if the nutritional status is not good, then it is likely that the body will be disturbed, and as a result, there will be a decrease in body immunity. Circumstances like this cause children under five to quickly become infested with various diseases. Health

development in Indonesia from 2015 to 2020 focuses on three main components: emphasizing maternal and infant mortality rates, reducing stunting, and preventing communicable and non-communicable diseases. Improving nutritional status is important for stunting, increasing body resistance, and normal growth because if the nutritional status is not good, then it is likely that the body will be disturbed, and as a result, there will be a decrease in body immunity. Circumstances like this cause children under five to quickly become infested with various diseases. Health development in Indonesia from 2015 to 2020 focuses on three main components: emphasizing maternal and infant mortality rates, reducing disturbed conditions, and preventing communicable and non-communicable diseases.[5] The priority health development program for the 2015–2019 period is implemented through the Healthy Indonesia Program with the aim of realizing the health paradigm, strengthening health services, and providing national health insurance. To achieve this health paradigm, this program adopts a family approach and encourages a healthy living community movement.[6] Efforts to improve the nutritional status of the community, including reducing the incidence of stunting in children under five, are recorded as one of the national development priorities listed in the main objectives of the medium-term development plan. One of the nutritional problems that will be discussed in this study is stunting. Parameters commonly used in assessing the nutritional status of a toddler only based on Weight for Age (WFA), which informed on the Card to Health or Kartu Menuju Sehat (KMS) it can be said to be less specific because, in KMS, it only describes toddlers who are said to be healthy based on graphics alone with weight for age (WFA).[7] While a healthy toddler always gains weight and height appropriate to his age.[8] Based on the conditions of the problem, advances in technology can be used in the classification process to assess the nutritional status of children under Anthropometric standards.[9]

Optimizing children's food intake with the appropriate nutritional composition, both in quantity, type, and frequency, will improve nutritional status and strengthen the immune system so that children can fight infections better. If a child is already infected, healing will be more difficult. During a pandemic, nutritional provision must pay attention to sufficient and balanced intake of macronutrients such as carbohydrates, protein, and fat, and micronutrients such as zinc, iron, calcium, folic acid, and vitamins A, C, D, E, B6, and B12, so that the needs of children's nutrition are met. Children who experience nutritional problems—both undernourished and obese—are at risk of experiencing micronutrient deficiencies. Most of these micronutrients can be found in animal protein sources such as chicken, chicken liver, beef, and fish.[5] In the daily actualization of the nutritional status of toddlers at the posyandu, it is usually obtained through anthropometric measurements, namely by using the weight/age index or weight-for-age to determine nutritional status. To determine the current nutritional status, Posyandu officers calculate the anthropometric index of the card to health (KMS).[10][11] Nutrition status data available in KMS uses age and weight parameters. Nutritional status is only based on the colors in the KMS without any calculation or looking at the index in the anthropometry table because the accuracy of the data is very low.[12] However, in measurements with anthropometry there is often confusion in measurement, so this is to get accurate results, therefore a data mining method is needed, namely the Naive Bayes Classification (NBC) Algorithm which will be implemented in research. Based on existing data at the posyandu in the Baros sub-district, Kota Cimahi, children aged under five have a lower risk of being infected with COVID-19 when compared to adults or the elderly. However, the importance of fulfilling nutrition in children remains a top priority in efforts to prevent this virus. Poor nutritional status in children is a risk factor that increases susceptibility to infection. Children's body immunity is closely related to adequate nutritional intake, which directly affects their nutritional status and immune system. Nutritional problems in children today are not only limited to malnutrition but also obesity which is increasingly common. This is an additional risk factor that exacerbates conditions when exposed to the COVID-19 virus. Therefore, what is important is ensuring appropriate complementary feeding for children in the first 1000 days of life, as well as ensuring a nutritionally balanced food composition for toddlers to maintain their immunity to avoid various infectious diseases. Children's body immunity is closely related to adequate nutritional intake, which directly affects their nutritional status and immune system. Nutritional problems in children today are not only limited to malnutrition, but also obesity which is increasingly common. This is an additional risk factor that exacerbates conditions when exposed to the COVID-19 virus. Therefore, what is important is ensuring appropriate complementary feeding for children in the first 1000 days of life, as well as ensuring a nutritionally balanced food composition for toddlers to maintain their immunity to avoid various infectious diseases. . Children's body immunity is closely related to adequate nutritional intake, which directly affects their nutritional status and immune system. Nutritional problems in children today are not only limited to malnutrition, but also obesity which is increasingly common. This is an additional risk factor that exacerbates conditions when exposed to the COVID-19 virus.[13] Therefore, what is important is ensuring appropriate complementary feeding for children in the first 1000 days of life, as well as ensuring a nutritionally balanced food composition for toddlers to maintain their immunity to avoid various infectious diseases. . but also the increasingly common obesity.[14] This is an additional risk factor that exacerbates conditions when exposed to the COVID-19 virus. Therefore, what is important is ensuring appropriate complementary feeding for children in the first 1000 days of life, as well as ensuring a nutritionally balanced food composition for

toddlers to maintain their immunity to avoid various infectious diseases. . but also the increasingly common obesity. This is an additional risk factor that exacerbates conditions when exposed to the COVID-19 virus. Therefore, what is important is ensuring appropriate complementary feeding for children in the first 1000 days of life, as well as ensuring a nutritionally balanced food composition for toddlers to maintain their immunity to avoid various infectious diseases.[6][15]

With this research, it is hoped that it can add more knowledge and become material for evaluating posyandu cadres in all Padasuka and Ciomas Bogor sub-districts in determining the nutritional status of toddlers. Because knowledge of nutrition and health for toddlers is the basis that must be possessed by a posyandu cadre and mother, knowledge of nutrition and health will affect the parenting pattern that will be applied by posyandu cadres and mothers. The nutritional status of children under five is strongly influenced by food consumption. Children's food consumption can be influenced by the parenting style applied in the family and the environment; in this case, it is usually the mother who plays an important role in children's food consumption.

2. METHOD

In this study, data analysis was performed using the CRISP-DM (Cross Industry Standard Process for Data Mining) method, which is a data mining process model consisting of six phases of the life cycle. These phases include business understanding, data understanding, data processing, modeling, and evaluation, as shown in the following figure:

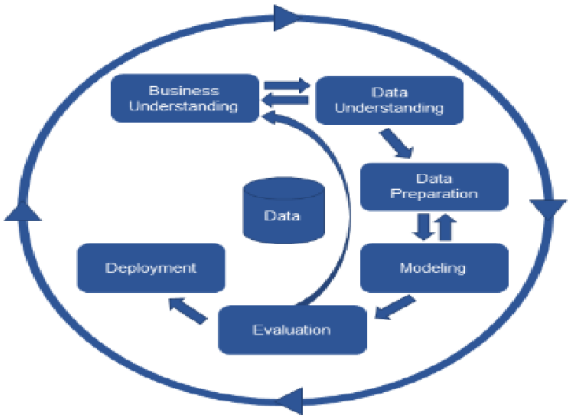

Figure 1. CRISP-DM

In this study also used rapidminer which is open source software. Rapidminer is a solution for analyzing data mining, text mining and predictive analysis. Rapidminer uses various descriptive and predictive techniques to provide insights to users so they can make the best decisions. Rapidminer has approximately 500 data mining operators, including operators for input, output, data preprocessing and visualization.[16]

2.1 Data Mining

Data mining is a process that combines methods such as statistics, mathematics, artificial intelligence, and machine learning to extract and identify useful information from large databases. The essence of data mining as a scientific discipline is to find, explore, or mine knowledge from existing data or information. Data mining is also known as knowledge discovery process in database (KDD).[17]Various data mining classification methods are examined in this study for new database applications. To find a model, the classification divides the data into groups based on predetermined boundaries. Other important classification methods are C4.5 Genetic algorithm, Naive Bayes, and SVM. Finally, we cover the explanation of the algorithm.[18]

2.2 Naïve Bayes Classification

Naïve Bayes is a classification method based on Bayes' theorem, and is used to estimate the probability of each class with the assumption that these classes are independent of one another. In this method, all attributes contribute to decision making with the same weight, and each attribute is considered independent.[17]

As a decision-making tool, Naive Bayes is also used to update the level of confidence in information. Naive Bayes theory is a branch of mathematical statistics that allows the creation of uncertainty models to predict future events.[19]This theory combines general knowledge with facts obtained from observations. Statement in Naive Bayes theory:

$$P(H|X) = P(X|H)P(H)/P(X)$$

Where :
X = Unknown data class
H = Data hypothesis
P(H|X) = Probability of hypothesis H based on condition X
P(H) = Probability of hypothesis H
P(X|H) = Probability of X based on conditions in hypothesis H
P(X) = Probability X 2.

The following is a table in the process of the Naïve Bayes method or algorithm, which can be seen in the following figure:

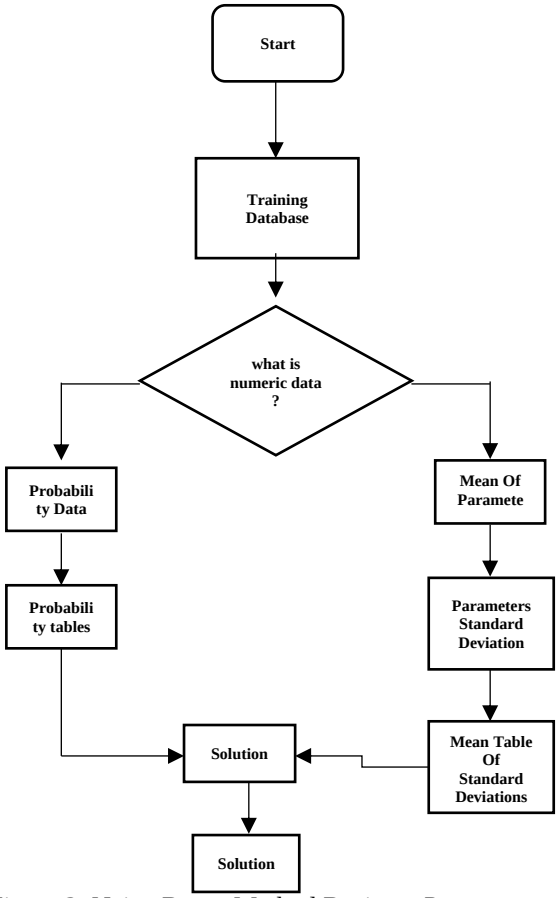

Figure 2. Naive Bayes Method Business Process

2.3 Calculation Analysis of the Naive Bayes

Based on the characteristics of the respondents, the study was grouped based on gender, age, weight, height which is explained as follows:

Table 1. Characteristics of Respondents

Characteristics	Frequency	Percentage(%)
Gender		
Man	12	57,142
Woman	9	42,857
Age		
Age < 16	3	14,285
Age 16-30	7	33,333
Age >30	11	52,380
Weight		
BB < 10	4	19,047

Characteristics	Frequency	Percentage(%)
BB 11-20	16	76,190
BB>20	1	4,761
Height		
TB 50-100	18	85,714
TB>100	3	14,285
Total	**84**	**99.99**

2.4 X variable

Based on the interviews obtained, the padasuka sub-district posyandu was a posyandu that was not integrated with the sub-district until now it has become a posyandu that is integrated with the sub-district and sub-district, while posyandu posko are built in every rw, and there are 12 posyandu in total. As for activities, posyandu counseling is divided into 2 activities, there are toddlers and also the elderly which are carried out on the same day in every RW, the toddler Posyandu is carried out once a month and the elderly every Saturday fortnightly.

In daily practice the cadres when determining the nutritional status of toddlers are accustomed to using anthropometry, based on BMI, namely weight and age data or BB/U as a reference, regarding the nutritional health of toddlers, manual data collection is carried out in the form of sheets filling out forms by cadres and for children who have indicated/known to have nutritional problems is to report to the nearest health center and then action will be taken by the health center staff.

2.5 Y variable

To determine the nutritional status of toddlers there are 4 calculation parameters that are used as input to the Naïve Bayes Classifier method including; weight, height, sex and age. The description is as follows:

A Data beginning

The initial data is raw data that has not been processed for cleaning.

Table2. Preliminary Data of Respondents

No	JK	Age	weight(kg)	TB(cm)	Nutritional status
1	L	26	14.8	90.1	More
2	L	35	12.8	86.6	Normal
3	L	5	7	63	Normal
4	P	52	14.5	100.9	Normal
5	P	30	10.3	86.2	Normal
6	P	32	12.5	95	Normal
7	L	38	12.3	91.2	Normal
8	P	45	12.2	95.5	Normal
9	L	31	12.9	87.5	Normal
10	L	31	11.2	85.5	Normal
11	P	15	9	77	Normal
12	L	5	5.5	59	Not enough
13	P	33	11	88.2	Normal
14	L	50	13.2	92	Normal
15	L	26	12.4	84.4	Normal
16	P	54	22.4	106	More
17	L	18	10.4	80	Normal
18	L	17	8.9	74	Normal
19	L	26	10.5	84	Normal
20	P	16	11.4	85.5	Normal
21	P	50	15	101.6	?

B. Data Cleanup

The process of cleaning data/cleaning is cleaning data whose variables do not fulfill the calculation.

Table 3. Data After Cleanning

No	JK	Age	weight(kg)	TB(cm)	Nutritional status
1	L	26	14.8	90.1	More
2	L	35	12.8	86.6	Normal
3	L	5	7	63	Normal
4	P	52	14.5	100.9	Normal
5	P	30	10.3	86.2	Normal
6	P	32	12.5	95	Normal
7	L	38	12.3	91.2	Normal

No	JK	Age	weight(kg)	TB(cm)	Nutritional status
8	P	45	12.2	95.5	Normal
9	L	31	12.9	87.5	Normal
10	L	31	11.2	85.5	Normal
11	P	15	9	77	Normal
12	L	5	5.5	59	Not enough
13	P	33	11	88.2	Normal
14	L	50	13.2	92	Normal
15	L	26	12.4	84.4	Normal
16	P	54	22.4	106	More
17	L	18	10.4	80	Normal
18	L	17	8.9	74	Normal
19	L	26	10.5	84	Normal
20	P	16	11.4	85.5	Normal
21	P	50	15	101.6	?

C. Data Transformation

The process of transforming data or the process of changing data into certain categories that are suitable for the data mining process.

Table 4. Transformation Category Data

Category	Information
Age < 16	Age under 16 months
Age 16-30	Age between 16 to 30 months
Age > 30	Age over 30 months
BB < 10	Weight under 10kg
BB 10 – 20	Weight between 10kg to 20kg
BB > 20	Weight over 20kg
TBs 50 – 100	Height between 50cm to 100cm
TB > 100	Height above 100cm

Table 5. After Transformation

No	JK	Age	weight(kg)	TB(cm)	Nutritional status
1	L	16-30	10-20	50-100	More
2	L	>30	10-20	50-100	Normal
3	L	<16	<10	50-100	Normal
4	P	>30	10-20	>100	Normal
5	P	16-30	10-20	50-100	Normal
6	P	>30	10-20	50-100	Normal
7	L	>30	10-20	50-100	Normal
8	P	>30	10-20	50-100	Normal
9	L	>30	10-20	50-100	Normal
10	L	>30	10-20	50-100	Normal
11	P	<16	<10	50-100	Normal
12	L	<16	<10	50-100	Not enough
13	P	>30	10-20	50-100	Normal
14	L	>30	10-20	50-100	Normal
15	L	16-30	10-20	50-100	Normal
16	P	>30	>20	>100	More
17	L	16-30	10-20	50-100	Normal
18	L	16-30	<10	50-100	Normal
19	L	16-30	10-20	50-100	Normal
20	P	16-30	10-20	50-100	Normal
21	P	>30	10-20	>100	?

Based on tables 2, 3 to 4 there are 21 data results where 20 of these data will be used for training and determining the classification of the 21st data with detailed data in the form of:

Female gender
Age : 50 (>30)
Weight :15 (10-20)
Height : 101.6 (>100)

3. RESULTS AND DISCUSSION

The research methodology used is a descriptive analysis method with a qualitative approach which aims to get a clear picture of a situation based on the data obtained by presenting, collecting, determining and analyzing the data so that it can become new information that is determined and can be used to analyze the problem. being researched.

3.1. Discussion result

Stages of actualizing the calculation of the nutritional quality of toddlers with Naïve Bayes:

Table 6. Actual Data

Pseudocode NAÏVE BAYES
Begin-pseudo code Bayes
%INPUT%
X → Unknown data class
H → Hypothesis data is a specific class
%Calculate PROBABILITY DATA CLASS%
P(X) → number of classes/labels
%INDEPENDENT CASE DATA PROBABILITY%
P(X|H)→ attribute/number of classes
%COUNT BAYES%
P(H|X)→ (P(X|H).P(H))/P(X)
Bayesian end-pseudo code

Female gender
Age : 50 (>30)
Weight :15 (10-20)
Height : 101.6 (>100)

1. Counting the Number of Classes
   P(Y=Normal) = 17/20
   P(Y=Less) = 1/20
   P(Y=More) = 2/20
2. Counts the number of cases that are the same with the same class.
   P(Gender = Female | Y = Normal) = 7/17
   P(Gender = Female | Y = Less) = 0/1
   P(Gender = Female | Y= More) = 1/2

   P(Age = >30 | Y = Normal) = 9/17
   P(Age = >30 | Y = Less) = 0/0
   P(Age = >30| Y = Over) = 1/2

   P(Weight = 10-20 | Y = Normal) = 14/17
   P(Weight = 10-20 | Y = Underweight) = 0/0
   P(Weight = 10-20 | Y=Over) = 1/2

   P(Height = >100 | Y = Normal) = 1/17
   P(Height = >100 | Y = Less) = 0/0
   P(Height = >100 | Y = Over) = 1/2
3. Multiplying all the variable results for each classification.
   P(Gender = Female | Y=Normal)*P(Age= >30 | Y=Normal)*P(Weight = 10-20 | Y=Normal)*P(Height = >100 | Y=Normal)
   = 7/17*3/17*6/17*2/17
   = 0.411*0.529*0.823*0.058
   = 0.010

   P(Gender = Female | Y=Less)*F(Age = >30 | Y=Less)* P(Weight = 10-20 | Y=Less)*P(Height = >100 | Y=Less)
   = 0/1*0/0*0/0*0/0
   =0*0*0*0 = 0

   P(Gender = Female | Y=Over)*F(Age = >30 | Y=Over)*F(Weight = 10-20 | Y=Over)*S(Height = >100 | Y=Over)
   = 1/2*1/2*1/2*1/2
   = 0.5*0.5*0.5*0.5
   = 2
4. Compare each class in the classification.

   From the results above, it can be seen that the highest probability value is in the (P|More) class with a value of 2 so it can be concluded that the existing criteria are categorized as overweight.

Validity test

Measurement of data validity by comparing the correlation r count with r table. If the correlation r count> r table then the data is valid.

Table 7. Validity test

No. Items	r count	r table	Decision
1	1	0.514	Valid
2	0.689	0.514	Valid
3	0.926	0.514	Valid
4	0.927	0.514	Valid
5	1	0.514	Valid

3. CONCLUSION

After conducting research on the Health and Nutritional Status Analysis of Toddlers using algorithms, in this study it can be concluded that the Naïve Bayes Classification, using naïve bayes can provide a high degree of accuracy, easy to understand and good performance although the test results show accurateness of 0.9577 or 95.77%.

ACKNOWLEDGEMENTS

I am very grateful to all parties who played a role in the success of this paper. We would like to thank everyone involved for their invaluable input and support throughout the research process. Their insights and expertise played an important role in shaping the direction of this research.

REFERENCES

[1] N. Aeni, "Pandemi COVID-19: Dampak Kesehatan, Ekonomi, & Sosial," *J. Litbang Media Inf. Penelitian, Pengemb. dan IPTEK*, vol. 17, no. 1, pp. 17–34, 2021, doi: 10.33658/jl.v17i1.249.

[2] P. Soewondo, G. M. K. Sakti, D. O. Irawati, and ..., "Potret Adaptasi Dan Inovasi Layanan Gizi Di Masa Pandemi Covid-19: Studi Kasus Di 8 Kabupaten/Kota Di Indonesia," *... Forum Ilm. Tah. ...*, pp. 25–26, 2020, [Online]. Available: http://jurnal.iakmi.id/index.php/FITIAKMI/article/view/64

[3] G. G. Sari and W. Wirman, "Telemedicine sebagai Media Konsultasi Kesehatan di Masa Pandemic COVID 19 di Indonesia," *J. Komun.*, vol. 15, no. 1, pp. 43–54, 2021, doi: 10.21107/ilkom.v15i1.10181.

[4] R. Widaryanti, "Cegah Stunting Pada Masa Pandemi Covid-19 Dengan Pembentukan Srikandi Pmba," *Din. J. Pengabdi. Kpd. Masy.*, vol. 5, no. 4, pp. 979–985, 2021, doi: 10.31849/dinamisia.v5i4.5699.

[5] A. P. Isnarti, A. Nurhayati, and R. Patriasih, "Pengetahuan Gizi Ibu Yang Memiliki Anak Usia Bawah Dua Tahun Stunting Di Kelurahan Cimahi," *Media Pendidikan, Gizi dan Kuliner*, vol. 8, no. 2, pp. 1–6, 2019.

[6] Dinkes Cimahi, "Dinkes Kota Cimahi, 2019," *J. Phys. A Math. Theor.*, vol. 44, no. 8, pp. 1689–1699, 2019, [Online]. Available: www.dinkes.kotacimah.go.id

[7] F. Sidik, I. Suhada, A. H. Anwar, and F. N. Hasan, "Analisis Sentimen Terhadap Pembelajaran Daring Dengan Algoritma Naive Bayes Classifier," *J. Linguist. Komputasional*, vol. 5, no. 1, p. 34, 2022, doi: 10.26418/jlk.v5i1.79.

[8] M. Irfan, P. S. Dewi, W. B. Zulfikar, C. Slamet, and I. Taufik, "Sentiment Analysis as Assessment of the COVID-19 Social Assistance Pollemic using Random Forest Algorithm," *Proceeding 2022 8th Int. Conf. Wirel. Telemat. ICWT 2022*, no. December 2020, 2022, doi: 10.1109/ICWT55831.2022.9935483.

[9] S. Sendari, T. Widyaningtyas, and N. A. Maulidia, "Classification of Toddler Nutrition Status with Anthropometry using the K-Nearest Neighbor Method," *ICEEIE 2019 - Int. Conf. Electr. Electron. Inf. Eng. Emerg. Innov. Technol. Sustain. Futur.*, pp. 154–158, 2019, doi: 10.1109/ICEEIE47180.2019.8981408.

[10] D. Gustian, B. Lestari, N. S. Rejeki, and N. M. Zasmine, "Fuzzy Inference System in Determining Nutritional Status of Toddlers," *6th Int. Conf. Comput. Eng. Des. ICCED 2020*, pp. 1–6, 2020, doi: 10.1109/ICCED51276.2020.9415781.

[11] M. Irfan, P. Alkautsar, A. R. Atmadja, and Wildan Budiawan Zulfikar, "Diagnosis of Asthma Disease and The Levels using Forward Chaining and Certainty Factor," *J. RESTI (Rekayasa Sist. dan Teknol. Informasi)*, vol. 6, no. 5, pp. 761–767, 2022, doi: 10.29207/resti.v6i5.4123.

[12] E. Oktavianti, A. R. Yuly, and F. Nugrahani, "Implementation of Naïve Bayes Classification Algorithm on Infant and Toddler Nutritional Status," *Proc. - 2019 2nd Int. Conf. Comput. Informatics Eng. Artif. Intell. Roles Ind. Revolut. 4.0, IC2IE 2019*, pp. 170–174, 2019, doi:

10.1109/IC2IE47452.2019.8940894.
[13] H. Herman, S. Sunardi, and V. Muslimah, "Metode Dempster Shafer pada Sistem Pakar Penentuan Penyakit Bayi," *JURIKOM (Jurnal Ris. Komputer)*, vol. 9, no. 5, p. 1643, 2022, doi: 10.30865/jurikom.v9i5.4908.
[14] L. Affandi, V. N. Wijayanigrum, and P. A. W. P. Yacobus, "Sistem Pakar Rekomendasi Menu Makanan Untuk Mencukupi Kebutuhan Gizi Ibu Menyusui," *Semin. Inform. Apl. Polinema*, pp. 64–69, 2020.
[15] P. Y. Pane, A. Anaria, and A. S. Eveline, "Perbedaan Status Gizi pada Balita Sebelum dan Sesudah Pandemi Covid-19," *J. Penelit. Perawat Prof.*, vol. 4, no. 1, pp. 7–16, 2022, [Online]. Available: http://jurnal.globalhealthsciencegroup.com/index.php/JPPP/article/download/83/65
[16] Á. H. de Mendonça, A. E. Iribarne, and A. Yurkina, *Data mining for the masses*, vol. 8, no. 16. 2017. doi: 10.54789/rince.16.4.
[17] M. Y. Titimeidara and W. Hadikurniawati, "Implementasi Metode Naïve Bayes Classifier Untuk Klasifikasi Status Gizi Stunting Pada Balita," *J. Ilm. Inform.*, vol. 9, no. 01, pp. 54–59, 2021, doi: 10.33884/jif.v9i01.3741.
[18] A. D. W. M. Sidik, I. Himawan Kusumah, A. Suryana, Edwinanto, M. Artiyasa, and A. Pradiftha Junfithrana, "Gambaran Umum Metode Klasifikasi Data Mining," *Fidel. J. Tek. Elektro*, vol. 2, no. 2, pp. 34–38, 2020, doi: 10.52005/fidelity.v2i2.111.
[19] A. S. R. Sinaga and D. Simanjuntak, "Sistem Pakar Deteksi Gizi Buruk Balita Dengan Metode Naïve Bayes Classifier," *J. Inkofar*, vol. 1, no. 2, pp. 54–60, 2020, doi: 10.46846/jurnalinkofar.v1i2.110.

BIOGRAPHY OF AUTHORS

The recommended number of authors is at least 2. One of them as a corresponding author.

Yogi Saputra received his ST degree in informatics engineering from Sunan Gunung Djati State Islamic University Bandung, in 2015, and Master of Computer (M.Kom) degree in Information Systems Engineering from STMIK LIKMI Bandung in 2019 and is currently undertaking a doctoral program (Ph.D) ICT at AEU Malaysia in 2023. Currently serves as head of the ICT training division of PTIPD Sunan Gunung Djati State Islamic University Bandung, where he also serves as Information Technology Planner for PTIPD Sunan Gunung Djati State Islamic University Bandung. He is also a Lecturer in the Information Systems Study Program, Faculty of Computer Science and Information Systems, National University of the Republic of Indonesia. His current research interests include Information Technology, Information Systems Engineering, Knowledge Management Systems, Data Science, System Analyst, Risk Management, IT/IS Audit yogi.saputra@ukri.ac.id

Nur Fitriani was born in Sumedang and graduated from Politeknik Pos Indonesia, majoring in Information Technology, in 2017. Then, pursued her Master's degree in Computer Science (M.Kom) with a specialization in Information Systems at STMIK LIKMI Bandung. She had a four-year tenure at PT Wijaya Karya's IT Division from 2017 to 2021. During her time there, she gained experience as a system analyst, project manager, and IT compliance specialist. She currently holds a position as a lecturer in the D4 Software Engineering Technology program, under the Department of Information Management, at Politeknik Negeri Subang. In terms of research, her interests span across a wide range of topics including Information Technology, Software Engineering, Data Analysis, IT Audit, and IT Governance. She actively engages in research activities and strives to stay updated with the latest advancements in her field.Please feel free to reach out via email at nurfitria@polsub.ac.id.

Syauqi Arinal Haqq was born in bandung and magister graduated from Kazan federal University International Relations Department, in 2022. Then, pursued her post doctoral degree in International Relations (Ph.D) with a specialization in International Relations at Saint Petersburg State University Rusia. He actively engages in research activities and strives to stay updated with the latest advancements in her field.Please feel free to reach out via email at syauqyarinal18@gmail.com.