BULLETIN OF ENGINEERING SCIENCE, TECHNOLOGY AND INDUSTRY
(BESTI Journal) | ISSN(e): 3025-5821
Website: https://bestijournal.org/index.php/go/index | Volume 4 No. 4 (2026)

DECISION SUPPORT SYSTEM FOR DETERMINING TODDLER NUTRITION AT POSYANDU USING THE AHP METHOD

Muhammad Syaifan Andre Nasution [1], Samsir Samsir [2], Selamat Subagio [3]
[123 Al-] Washliyah University Labuhanbatu , Faculty Knowledge Computers , RantauPrapat , Indonesia
E-mail: muhammadsyaifanandre@gmail.com [1] samsirst111@gmail.com [2], ssubagio1306@gmail.com [3]

Received: 11/08/2026 | **Revised:** 23/08/2026 | **Accepted:** 19/09/2026 | **Published:** 26/10/2026

Abstract

A decision support system for assessing the nutritional status of toddlers at * Posyandu * (integrated healthcare posts) using the Analytic Hierarchy Process (AHP) method represents a significant innovation in child healthcare. This system addresses the constraints of time and manpower that often hinder manual nutritional assessments. By employing the AHP method, the system enables an in-depth analysis of nutritional criteria and establishes clear priorities, thereby assisting healthcare workers in making more informed and accurate decisions. The use of the PHP programming language and SQL within a MySQL database is essential for efficient data storage and information management. This system not only enhances the accuracy of nutritional assessments but also has the potential to improve the quality of services at * Posyandu * by ensuring that each toddler receives appropriate attention. This approach optimizes resources and supports further development in the management of toddler nutrition at the community level.

Keywords: support system, toddler nutrition, AHP method, efficiency, AHP process.

1. INTRODUCTION

Fulfillment nutrition in children under five years of age is factor crucial in guard health , remembering toddlerhood is very vulnerable period to lack nutrition . At this stage , the child experience rapid growth and development , so need intake substance optimal nutrition [1],[2],[3] . Deficiencies nutrition in toddlers can result term serious length If No handled with right . In Indonesia, various problem like notes medical that is not complete , service suboptimal health , and non- compliance to protocol clinical contribute to problem nutrition bad for toddlers [4],[5],[6],[7] . In addition , the use of card going to suboptimal health (KMS) worsens situation with result in monitoring grow flowers that do not inaccurate and late handling . For overcome this problem , this study proposes development System Decision Support System (DSS) for evaluation nutrition toddler with use Analytical Hierarchy Process (AHP) method [8], [9],[10],[11] . This system aims to For increase accuracy nutritional status assessment with consider various criteria like age , weight , body length , and breed gender . With provide accurate and precise information time , this system will help parties related like power medical , government , and parents in take more decisions Good related health toddlers [12],[13],[13] . This study aims to For designing , implementing , and evaluating SPK in evaluation nutrition toddlers at Posyandu , in order to improve the retrieval process decisions and contribute to improvement management health toddlers . System Decision Support System (DSS) in context evaluation nutrition toddlers [14],[15], [16] . let's We consider aspects following :

1. Integrated Database : SPK will integrate nutritional data that includes information age , weight , body length , and breed sex toddlers . This data will connected with other health parameters such as history disease and patterns eating , provides a comprehensive database . This database allows data processing and analysis simultaneously , giving a clearer picture holistic and accurate regarding nutritional status toddlers . Database design must be capable handle large volumes of data and diverse variables , as well as support fast data processing For needs real-time analysis [17]
2. Interface User : Interface SPK users must designed with consider convenience access and usability. For power medical , interface must facilitate data recording with fast and accurate . For parents , it is a must There is features that make it easier to input data and monitor nutritional status child in a way independent . For the government , the interface must provide access For monitor aggregate data and implement evaluation policy . Use principle design good interface will minimize input errors and ensure involvement all related parties [18] .

3. Reports and Analysis : The SPK system must capable produce report in -depth analysis based on the data collected . This report includes nutritional status evaluation toddlers , analysis trend growth , and recommendations intervention . Analysis tools statistics and algorithms sophisticated modeling , such as analysis regression or machine learning, can used For give more insight deep about pattern nutrition and health toddlers . The results of this report should can accessible in an easy format understood , including graphs , tables , and summaries executive [19] .
4. Notifications and Alerts : Notification features in the SPK aims For ensure that intervention nutrition done appropriate time . System must designed For emit warning automatic related timetable examination , measurement periodic , and intervention necessary health . This feature utilizes algorithm based time and health status child For give relevant and useful notifications , support action preventive and responsive [20] . With integrate aspects mentioned , SPK can become very effective tool in monitor and improve nutritional status toddler in a way systematic , objective , and precise time .

2. RESEARCH METHOD

This research aims For design and implement System Decision Support System (DSS) for increase assessment and priorities at Posyandu in matter management health and nutrition toddlers . The Analytical Hierarchy Process (AHP) method was chosen For help taking decision in a way systematic and objective [21] . Identification Problems and Objectives. Determining problem main in management Posyandu , such as evaluation performance and management nutrition toddlers . Determine objective the system you want achieved , namely make things easier taking decision related health toddlers and management Posyandu [22],[23],[24] . Collecting related data condition health and nutrition toddler through observations and documents Integrated Health Post (Posyandu). Identifying criteria and alternatives For evaluation use method interview with cadre Posyandu and officers health . Preparation of AHP Model Preparation Hierarchy : Creating structure AHP hierarchy consisting of from objectives , criteria , sub- criteria , and alternatives decision . Assessment Criteria : Doing evaluation comparison in pairs For determine weight relatively of each criterion and sub- criteria [25],[26],[26] . Assessment Alternative : Assess alternative based on criteria that have been set use scale assessment . Data Analysis and Processing Using device AHP software for count weight and priority from existing alternatives . Validating results with compare AHP results with historical data and opinions Experts . Implementation and Evaluation Develop prototype AHP -based SPK system using tools such as PHP, CSS, and Bootstrap. Testing system at Posyandu For evaluate its effectiveness in help taking decision . Collect feedback from users For repair system [2],[3],[4], [5] . Documentation and Reporting Compiling reports results study including design system , methodology , results analysis and recommendations repair . Communicating results to relevant stakeholders For implementation more continue . Eligibility Implementation : System must can implemented in a way practical in context Posyandu . This method is designed For ensure that developed SPK system effective in improve the decision-making process decisions at Posyandu with utilise superiority AHP method in multi- criteria assessment [6],[7],[8], [9],[10],[11],[12] .

3. RESULTS AND DISCUSSION

For Obtaining Analysis Results In this research , must get description about data at Posyandu about Toddler Nutrition, it is necessary method research as following :

1. Interview

   Interview is something very supportive communication in the research process .

2. Observation

   Do observation directly at the Posyandu regarding Toddler Nutrition, this method is able to produce good picture .

3.Literature Study

   Done For get information with method collect data through books , journals , and existing sources the relationship with Posyandu and Toddler Nutrition Data will be made .

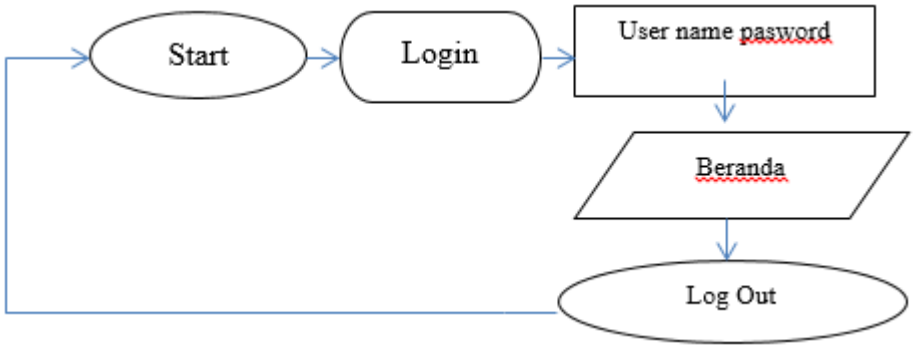
Modeling

Before designing programs, writing will describe some System Flows that will be used as channel program work , as follows The flow :

a. Login Flowchart
b. Main Menu Flowchart
c. Data Flow Diagram (DFD)

OPEN ACCESS

d. Entity Flow Diagram (ERD)



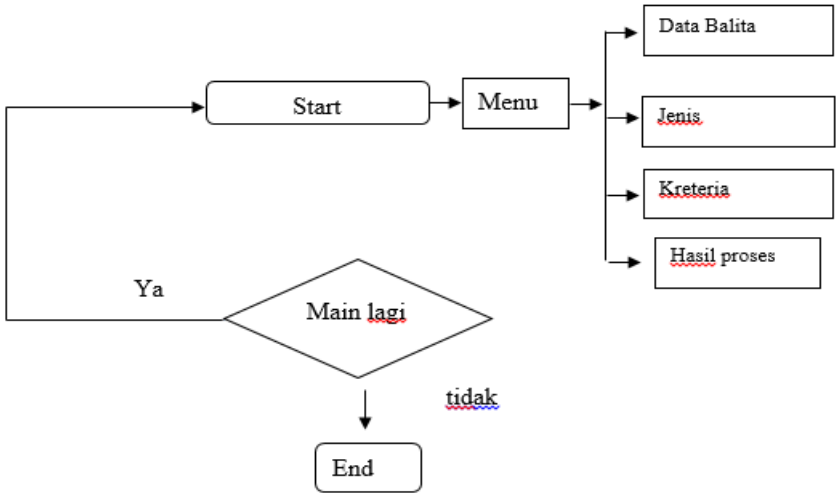


Figure b. Main Menu Flow Chart

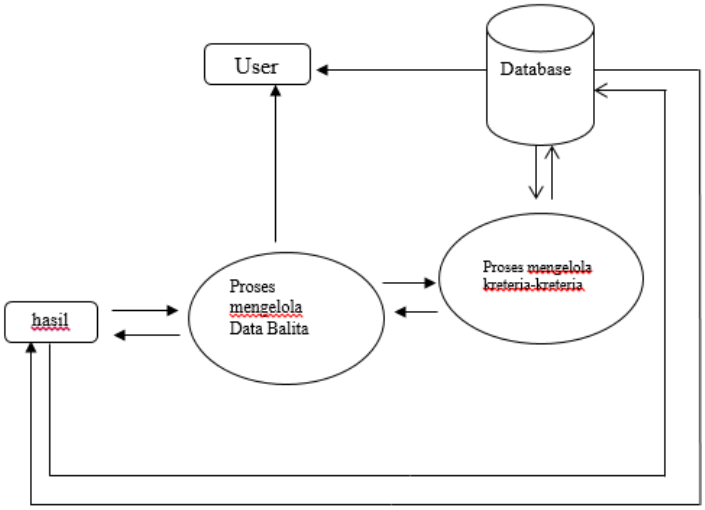


Figure c. DFD of Determination SPK Toddler Nutrition

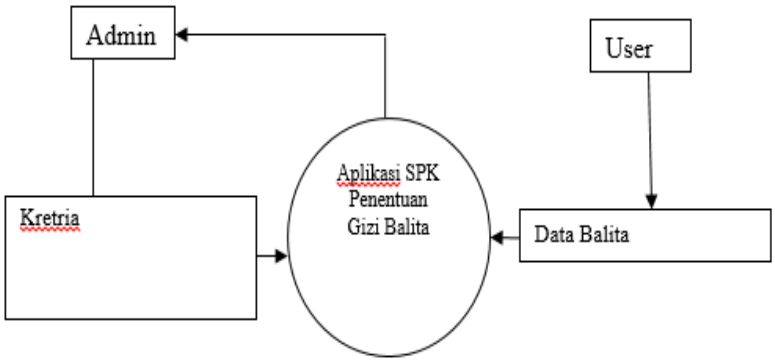


Figure d. ERD SPK Determination Toddler Nutrition

In building system decision support for determining toddler nutrition , here writer will explain algorithm in adjustment For displays Methods and some criteria type recipient and the results , namely :

2. *Analytical Hierarchy Process (AHP) Method*

Basically steps in AHP method includes :

1. Add values from every columns in the matrix .
2. Share every mark from column with the total of the relevant column For get normalization matrix .

$\sum aij\ n\ j = 1 = 1$

Where

a: Matrix comparison in pairs

i : Row in matrix a

j : Column in matrix a

3. Adding up values from every matrix and divide it with amount element For get average value .

$wi = 1\ n \sum aij\ h\ j = 1$

Where n : The number of criteria and wi : Average of the i-th row

1. Toddler Data

In this study , toddler data was used . as system input supporters the decision that will be made later will used .

a. Toddler Data Table

Toddler data table is table containing about The toddler data that will be examined is in the following table :

Toddler Data Table Types Table

No	Name	Information
1 .	Toddler Name Identity	Name of toddler whose nutritional status will be checked
2.	Toddler Age and Weight	Age and weight of toddlers whose nutritional status will be checked

OPEN ACCESS

b. Criteria table

Is a table types criteria In determining toddler nutrition , the following is a table of criteria his :

Criteria table

Kriteria	Bobot	Kategori	Nilai
Berat Badan	20 %	Gizi Lebih	>120 % Median BB/U baku WHO NCHS
Tinggi Badan	20 %	Gizi Baik	80 % -120% Median BB/U baku WHO NCHS
Umur	20 %	Sedang	70 %-79,9% Median BB/U baku WHO NCHS
Lingkar Pergelangan	20 %	Gizi Kurang	60 %-69,9% Median BB/U baku WHO-NCHS
Lingkar Perut	20 %	Gizi Buruk	< 60 % Median BB/U baku WHO-NCHS

In designing application system supporters toddler nutrition decision , here writer will make a number of database and table requirements in supporters application

1. Admin Table

The admin table is functional table as owner account , or Can called as manager application , following table admin :

No	Field	Type	Size	Information
1	Username	Varchar	30	Entering user
2	password	Varchar	10	Enter password
3	full name	Varchar	30	Fill in Name complete

Admin Table

1. Toddler Data Table

Toddler Data Table is functional table as table containing about toddler data , as follows table his :

No	Field	Type	Size	Information
1	Toddler Code	Integer	11	Enter Toddler code
2	Toddler Name	Varchar	50	Enter Name Toddler
3	Toddler Data Details	Varchar	500	Fill in the toddler's data details
4	Results	Varchar	500	Fill in results
5	Picture	Varchar	500	Enter picture

Toddler Data Table

2. Criteria table

This criteria table works as table containing about criteria Toddler Nutrition , following table :

No	Field	Type	Size	Information
1	Criteria_code	Integer	20	Enter code criteria
2	Criteria_name	Varchar	50	Enter Name criteria

Criteria Table - criteria

OPEN ACCESS

3. Condition table

Functional condition table as table that knows condition Toddler Nutrition , following table condition :

No	Field	Type	Size	Information
1	ID	Integer	20	Enter id
2	Condition	Varchar	50	Enter condition
3	Information	Varchar	500	Enter information

Condition Table

4. Results table

This results table is for know results SPK for Determining Toddler Nutrition , as follows table results :

No	Field	Type	Size	Information
1	Result ID	Integer	20	Enter the result id
2	Toddler Data	Text	20	Fill in Toddler Data
3	Criteria	Text	20	Fill in Criteria
4	Result_id	Integer	20	Fill in ID results
5	Result_value	Varchar	16	Fill in results mark

Results Table

In designing system supporters decisions on determining toddler nutrition at integrated health posts , here writer will explain a number of design description the application that will built , based on input and output design , such as following :

1. Input Design

Here are some description input design that will be built that is :

a. Admin Login Input

Admin login input is working as managers who can fill in various type need For users who will do diagnosis , such as picture under :



Login menu image

b. Toddler Data Input

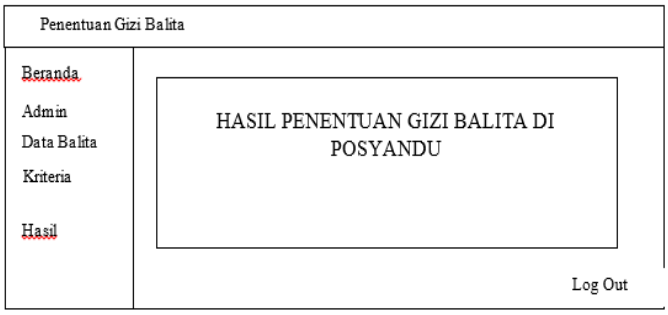
This Toddler Data Input works For enter Toddler Data like picture under This :



Data input image

c. Toddler Nutrition Determination SPK Results Page

This page contains about results Determination of Toddler Nutrition , such as picture under :



Spk Result Image

4. CONCLUSION

This research has succeed design and implement System Decision Support System (DSS) for Integrated Health Post use Analytical Hierarchy Process (AHP) method . This system aims For increase efficiency and accuracy in taking decision related management health and nutrition toddlers at Posyandu . Based on results research , some conclusion main can withdrawn : Effectiveness AHP Method: AHP method is proven effective in compile and analyze criteria as well as alternative decision in a way systematic . Implementation This method in SPK allows taking more decisions objective and data -driven , minimizing subjectivity and increase accuracy evaluation . Data Collection and Analysis : Data collection through observation and interviews with cadre as well as officer health give comprehensive overview about condition health and nutrition toddlers . Analysis using AHP produces clear weights and priorities For every criteria and alternatives decisions , facilitating the selection and prioritization process . Implementation SPK System : Implementation prototype AHP -based SPK system shows that this system can implemented with Good in context Integrated Health Post (Posyandu). Testing system show improvement in efficiency taking decision , with positive feedback from users about convenience use and relevance results decision . Benefits and Feasibility : The developed DSS system own potential big For increase quality management Posyandu . This system does not only support taking more decisions Good but also provides a user-friendly platform for cadres and officers health . Eligibility implementation This system is supported by integration adequate technology and response positive from stakeholders.

REFERENCES

[1] K. Masyarakat, “ENHANCING DIGITAL SKILLS,” vol. 04, pp. 137–142, 2026.
[2] MSMS Ritonga, “Development of a Decision Support System for Selecting High-Achieving Students Based on Multi-Criteria Using the Simple Additive Weighting (SAW) Method in Vocational High Schools,” *CSRID J.* , vol. 18, no. 2, pp. 205–217, 2026, [Online]. Available: https://csridjournal.potensi-utama.org/index.php/CSRIDjournal/index
[3] UA Labuhanbatu, JLH Adam, M. Kab, and L. Indonesia, “Development of a Web-Based Student Field Work Practice Report Information System Using the Waterfall Method at Alwashliyah University Labuhanbatu,” vol. 18, no. 2, pp. 232–244, 2026.
[4] S. Subagio, S. Samsir, and M. Rusdi, “Development of a Web-Based E-Canteen Information System Using the SDLC Method to Improve the Efficiency of Al Washliyah Labuhanbatu University Canteen Services,” *June* , vol. 18, no. 2, pp. 395–408, 2026, [Online]. Available: https://www.doi.org/10.22303/csrid.18.2.2026.395-408
[5] SR Munthe, Samsir, and RA Levianti, "Hybrid Framework Addressing Imbalanced Data in Indonesian E-commerce Multimodal Sentiment Analysis," *Teknika* , vol. 14, no. 3, pp. 363–370, 2025, doi: 10.34148/teknika.v14i3.1332.
[6] S. Samsir, JY Yani, W. Azhar Ritonga, R. Alfauzan Harahap, and D. Andriyani, “Technology Integration in Medicinal Plants and Traditional Medicine in Tanjung Medan, North Sumatra Based on Android,”

OPEN ACCESS

KOMUNITA J. Community Service and Empowerment , vol. 4, no. 4, pp. 1009–1021, 2025, doi: 10.60004/komunita.v4i4.263.

[7] K. Anwar, S. Subagio, and SA Rambe, "Application of UCD (User Centered Design) Method on Web-Based E-COMMERCE CV Keswa Creative Production," *Simtek J. Sist. Inf. and Tek. Comput.* , vol. 10, no. 1, pp. 206–210, 2025, doi: 10.51876/simtek.v10i1.1541.

[8] S. Samsir Selamat Subagio, Fauji Harahap, "Expert System for Diagnosing Nearsightedness Using the Certainty Factor (CF) Method at Tanjung Sarang Elang Community Health Center," *CSRID J. Potensi Utama* , vol. 17, no. 2, pp. 55–67, 2025.

[9] M. Ritonga, N. Nursalimah, R. Ruwaidah, B. Megawati, and S. Samsir, "Analysis of the Types of Prophet's Educational Media from the Perspective of Modern Education Theory," *QALAMUNA J. Education, Social and Religion* , vol. 17, no. 2, pp. 1331–1350, 2025, doi: 10.37680/qalamuna.v17i2.7941.

[10] S. s.subagio, selamat subagio, nisa indriani rambe, "Expert System for Early Detection of DEPRESSION Using Psychological Symptoms Certainty Factor Method," *CSRID J. Potensi Utama* , vol. 17, no. 2, pp. 93–105, 2025.

[11] Selamat Subagio; Rahmayani; Samsir Samsir; Wahyu Azhar;, "Expert System for Diagnosing Smokers' Diseases Using the Backward Chaining Method," *CSRID J.* , vol. 17, no. 3, pp. 340–353, 2025.

[12] L. Samsir, A. Syahputra, and S. Subagio, "Expert System for Stroke Diagnosis Using the Forward Chaining Method for Lecturers at UNIVA Labuhanbatu," *June* , vol. 17, no. 2, p. 176, 2025, [Online]. Available: https://www.doi.org/10.22303/csrid

[13] A. Ainun, S. Samsir, and S. Subagio, "Expert System for Diagnosing Dengue Fever in Tanjung Sarang Elang Community Health Center Patients Using the Certainty Factor Method," *CSRID J.* , vol. 17, no. 2, pp. 118–126, 2025.

[14] I. Syahputra Panjaitan, S. Subagio, U. Al, W. Labuhanbatu, JH Adam, and M. Lingkar, "Expert System for Detecting Culvularia Disease Using the Forward Chaining Method," vol. 17, no. 1, p. 106, 2025, [Online]. Available: https://www.doi.org/10.22303/csrid

[15] AS Siregar, WA Ritonga, and S. Samsir, "Expert System for Selecting College Majors Based on Interests and Talents Using the Certainty Factor (CF) Method," *June* , vol. 17, no. 2, p. 163, 2025, [Online]. Available: https://www.doi.org/10.22303/csrid

[16] S. Expert System for Selecting College Majors Based on Interests and Talents Using the Certainty Factor (CF) Method *et al.* , "Expert System for Selecting College Majors Based on Interests and Talents Using the Certainty Factor (CF) Method," *June* , vol. 17, no. 2, p. 163, 2025, doi: 10.22303/csrid.

[17] R. Surbakti Saragih, I. Chayatun Nufus, S. Samsir, U. Al Washliyah Labuhanbatu, JH Adam Malik Lingkar By Pass KabLabuhanbatu -Indonesia, and K. Kunci, "Diabetes Diagnosis Expert System Based on Family History Analytic Hierarchy Process (AHP) Method Diabetes Diagnosis Expert System Based on Family History Analytic Hierarchy Process (AHP) Method," *Juni* , vol. 17, no. 2, pp. 229–242, 2025, doi: 10.22303/csrid.

[18] N. Indriani Rambe and S. Subagio, "Expert System for Early Detection of Depression Using Psychological Symptoms Certainty Factor Method," 2025, doi: 10.22303/csrid.

[19] S. Subagio *et al.* , "Expert System for Diagnosing Eye Disorders (Refractive Errors) Using the Certainty Factor (CF) Method at Tanjung Sarang Elang Community Health Center," *June* , vol. 17, no. 2, p. 204, 2025, doi: 10.22303/csrid.

[20] L. Samsir, A. Syahputra, and S. Subagio, "Expert System for Stroke Diagnosis Using the Forward Chaining Method for Lecturers at UNIVA Labuhanbatu," *June* , vol. 17, no. 2, p. 176, 2025, doi: 10.22303/csrid.

[21] I. Syahputra Panjaitan, S. Subagio, U. Al, W. Labuhanbatu, JH Adam, and M. Lingkar, "Expert System for Detecting Culvularia Disease Using the Forward Chaining Method," vol. 17, no. 1, p. 106, 2025, doi: 10.22303/csrid.

[22] RS Saragih and S. Samsir, "Expert System for Diabetes Diagnosis Based on Family History Using the Analytic Hierarchy Process (AHP) Method," *JETI (Journal of Electronics and Information Technology)* , vol. 17, no. 2, pp. 229–242, 2025.

[23] RA Desi Deliyanti Ritonga, Sahbudin Ritonga, S.Subagio, "Decision Support System for Determining the Selection of Supervisors for Thesis at the Faculty of Computer Science, UNIVA-LB Based on Student Interests Using the AHP Method," *U-NET J. Tech. Inform.* , vol. 1, no. 2, pp. 48–59, 2024.

[24] U. Jurnalteknikinformatika, SA Daulay, WA Ritonga, T. Informatika, U. Alwashliyahlabuhanbatu, and A. Info, "EXPERT SYSTEM FOR DIAGNOSING DISEASES IN THE HUMAN DIGESTIVE SYSTEM

OPEN ACCESS

USING THE FORWARD CHAINING METHOD: A CASE STUDY OF THE HUTAGODANG PUBLIC HEALTH CENTER," *U-NET J. Tech. Inform.* , vol. 8, no. 02, pp. 22–27, 2024.

[25] US Presidential, R. Samsir, WA Ritonga, R. Aditiya, and R. Watrianthos, "Bulletin of Information Technology (BIT) Machine Learning-Driven Sentiment Analysis of Social Media Data in the 2024," vol. 5, no. 4, pp. 326–332, 2024, doi: 10.47065/bit.v5i2.1762.

[26] S. Subagio, A. Hakim Dalimunthe, and R. Watrianthos, "Bulletin of Information Technology (BIT) A Text Mining Approach to Analyzing the Role of Negative Sentiment Words in News Articles on Suicide and Related Incidents," vol. 5, no. 4, pp. 318–325, 2024, doi: 10.47065/bit.v5i2.1745.

OPEN ACCESS