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Hospital Recommendation and Mapping System Using Analytical Hierarchy Process Method and Dijkstra Algorithm Based on Website

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Abstract—This study aims to develop a web-based hospital recommendation and mapping system utilizing Dijkstra's algorithm and the Analytical Hierarchy Process (AHP) approach. The AHP method is used to determine the best hospital based on various criteria, such as the number of inpatient rooms, number of doctors, security, hospital class type, and available facilities. Meanwhile, the shortest path to the destination is determined using Dijkstra's method to the recommended hospital. 12 hospitals served as the research subjects for a case study carried out in Lhokseumawe City. The results show that Cut Meutia Lhokseumawe Hospital is the best recommendation with the highest ranking value of 0.21. Furthermore, Dijkstra's algorithm for finding the shortest route showed that the distance from the starting point in Gampong Batuphat Timur to the recommended hospital is 17,375 meters. This developed system can assist the public in selecting the best hospital while also finding the fastest route to reach it.

Keywords—Recommendation System, Hospital Mapping, Analytical Hierarchy Process, Dijkstra Algorithm

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I. INTRODUCTION

This Decision making in determining optimal recommendations requires a systematic method so that the decision making process is more structured and objective. With the right method, the recommendation results can be more in line with the information needed by the user [1]. One important aspect in decision making is the choice of hospital, which is a consideration for the community because each hospital has different levels of service, facilities and patient recovery rates [2].

Lhokseumawe City has 12 hospitals with various types of classes, facilities, and various numbers of medical personnel. Hospitals have a strategic role in improving public health, so a system is needed that can increase accessibility to health services and maintain public trust [3]. Therefore, a decision support system is needed that not only provides hospital recommendations, but may also efficiently map the locations of hospitals to give the public more thorough information [4].

One method that can be used in a hospital recommendation system is the Analytical Hierarchy Process (AHP) method. This method allows decision making based on various predetermined criteria using a paired comparison scale [5]. The AHP method was chosen because this method has the ability to handle decisions involving many criteria by considering the level of importance of each factor hierarchically [6]. In this study, hospital recommendations will be based on several main criteria, such as security level, hospital class type, number of doctors, number of inpatient rooms, and available facilities.

In addition to recommendations, this system also provides a hospital mapping feature which is part of the Geographic Information System (GIS) [7]. This mapping serves to store and present geographic information about hospitals so that users can easily find out the location and distance of the hospital from their starting location [8]. To determine the fastest route to the destination hospital, this study implements Dijkstra's Algorithm. This algorithm works by determining the quickest route from a starting location to a destination point based on a certain weight, in this case the distance traveled [9]. Dijkstra's algorithm was chosen because of its reliability in finding optimal paths with lower complexity compared to other algorithms such as A* [10].

In the research conducted by [1], the research aimed to assess the best hospitals in Central Lampung, making judgments by applying the Analytical Hierarchy Process (AHP). However, this study has a major difference, namely by adding a website-based system approach that not only provides hospital recommendations based on established criteria, but also calculates the quickest path to the recommended hospital using the Dijkstra Algorithm. In addition, This study offers solutions in the form of a more interactive web-based system and focuses on the Lhokseumawe region. A website-based system was chosen because a website is a system that connects various web pages that interact with each other [11].

Therefore, the purpose of this study is to create a website-based hospital recommendation and mapping system by using Dijkstra's algorithm for route optimization and the Analytical Hierarchy Process (AHP) approach for decision making. The main contribution of this research is the development of a system that integrates decision-making methods and GIS-based navigation systems to provide a comprehensive solution for the community in determining the hospital that suits their needs and facilitating access to the selected hospital.

This study aims to create a mapping and recommendation system for hospitals, so that people in Lhokseumawe City can easily choose a hospital that suits their needs. It is anticipated that this will improve the city's health services' efficacy and efficiency, while providing a better service experience for the community.

II. METHODOLOGY

The methods used in this study include literature study, needs analysis, data collection, design of the, implementation of the,testing of the system and evaluation of the system. The method in this study will be described using the waterfall approach which will be illustrated in Figure 1 below.

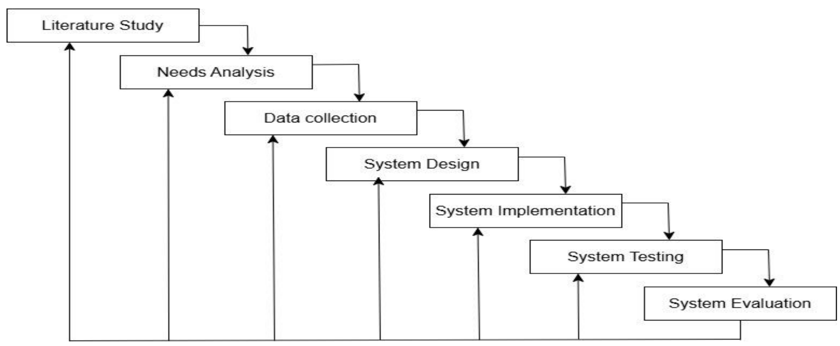


Figure 1. Research Flowchart

A. System Scheme

The System Scheme is a stage in the implemented system, in this system it will go through several stages, namely, inputting criteria and alternative values, data processing using AHP, displaying recommended hospitals, selecting objects, processing the shortest route using the Dijkstra algorithm and displaying objects and distances. The system scheme is illustrated in Figure 2 below.

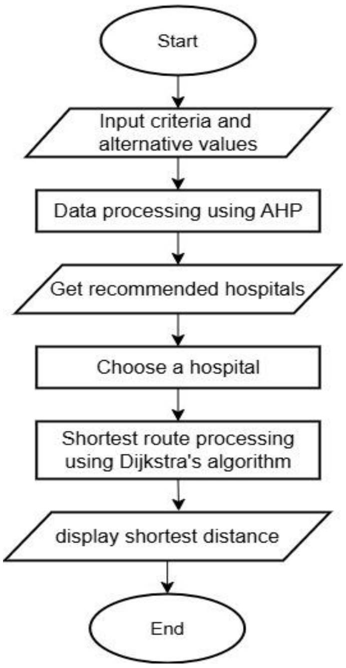


Figure 2**.** System Scheme

B. Analytical Hierarchy Process (AHP)

An approach to decision-making that is frequently employed is the Analytical Hierarchy Process (AHP). Thomas L. Saaty created this technique in the early 1970s, Because it may deconstruct complicated issues into more straightforward hierarchical patterns, AHP is frequently utilize [12]. According to [13], There are several stages in the AHP method, including:

1. Describe an issue and decide on a preferred fix.
2. As shown in Figure 3, create a hierarchical structure that begins with the primary goal.

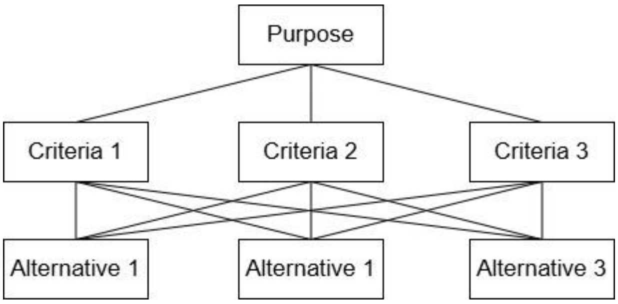


Figure 3**.** Hierarchy Structure

3. Make a matrix for pairwise comparisons. by outlining each element's influence on the criteria or alternatives at the same level above it and conduct a pairwise comparison using an importance scale of 1-9. If an element is compared to itself, the comparison result will be given a value of 1.

Table 1. Scale of Interest

Value	Explanation
1	Criteria or alternatives A is equally significant as additional standards or options.
3	Criteria or alternative A is somewhat more significant than the other criteria or alternatives.
5	Criteria or alternative A is more important than other criteria or alternatives
7	Criteria or alternative A is clearly more important than other criteria or alternatives
9	Criteria or alternative A is absolutely more important than other criteria or alternatives
2,4,6,8	Intermediate values indicate that a Criteria or alternative A is slightly more important, more important, clearly more important, or absolutely important than other criteria or alternatives.
The Opposite	If criteria or alternative B is compared with A, then the inverse value is 1/value of A (example: if A = 3 compared to B, then B = 1/3 compared to A)

4. Normalize the table by dividing the number of rows.
5. Calculate the vector priority value by adding each row and calculating the weight value that can be obtained by using the vector priority / n matrices method.
6. Multiply the weight derived from normalization by the sum of the values for each column in the matrix to determine the eigenvalue.
7. Assessing the degree of consistency in the decisions that support them is crucial. Things done in this step are:
   - Calculate the Consistency Index (CI) value using the formula:

     $$CI = \frac{(eigen\ value - n)}{n-1} \qquad (1)$$

   - Calculate the Consistency Ratio (CR) value using the formula:

     $$CI = \frac{CI}{RI} \qquad (2)$$

   The following table makes the Random Index (RI) value clear:

Table 2. Random Index Table

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	0,58	0,9	1,12	1,24	1,32	1,41	1,45	1,49

8. Verifying the value of hierarchical consistency. The data assessment needs to be adjusted if the value exceeds 10%. Nonetheless, the computation result can be deemed accurate in the event that the consistency ratio is 0.1 or less.

C. Dijkstra's Algorithm

Dijkstra's algorithm was first introduced by Edsger W. Dijkstra in 1959. This algorithm is widely used in various fields, such as navigation systems, computer networks, and geographic information systems, because of its ability to find the shortest path efficiently in a weighted graph that does not have negative weight edges [14].

An efficient algorithm is Dijkstra's algorithm in providing the shortest path from one location to another in a graph [15]. The principle of the Dijsktra algorithm itself is to search for points at a location by searching for the two shortest paths [16]. Dijkstra's algorithm works with a greedy approach, namely at each iteration, it chooses the edge with the smallest weight that connects the processed node to the unprocessed node [17]. This process is repeated until all nodes are connected, with the goal of determining the shortest route between the source node and every other node [18].

The goal of this technique is to determine the lowest weight path between each node in graph G and the source node S, by selecting the edge with the smallest weight at each step [19]. A collection of vertices (GV) and a set of edges (GE) make up a weighted graph G, where each edge has a weight indicating the distance or cost to move from one vertex to another [20].

$$G = (V, E) \qquad (3)$$

In the context of geographic information systems (GIS), Dijkstra's Algorithm is very useful for mapping and finding the fastest or shortest route, for example in mapping applications for hospitals, cafes, salons, or other public facilities [21]. This is because the graph can be represented as a road network, nodes as locations, and weights as the distance or travel time between these locations [22].

III. RESULT AND DISCUSSION

The findings from the website's examination and testing of the hospital recommendation and mapping system utilizing the Dijkstra algorithm and the Analytical Hierarchy Process (AHP) approach. This system can sort hospitals based on the largest to smallest preference values for hospital recommendations and the closest route to the hospital.

A. Manual Calculation Method Analytical Hierarchy Process (AHP)

Hospitals in this study will be assessed based on criteria and alternatives. The following is a table of criteria and alternatives that will be used for the calculation of the AHP method.

Table 3. Criteria

Criteria	**Code**
Number of Doctors	C1
Security	C2
Facility	C3
Number of Inpatient Rooms	C4
Hospital Class Type	C5

Table 4. Alternative

Alternative	**Code**
Arun Hospital	A1
Prima Inti Merdeka Hospital (PIM)	A2
Cut Meutia Hospital Lhokseumawe	A3
Az-Zuhra Hospital Lhokseumawe	A4
Bunga Melati Hospital	A5

Bunda Hospital Lhokseumawe	A6
Kasih Ibu Hospital Lhokseumawe	A7
Abby Mother & Child Hospital	A8
PMI Hospital Branch North Aceh	A9
Sakinah Hospital	A10
Tk. IV Kesdam Hospital Lhokseumawe	A11
Metro Medical Center Hospital	A12

Se have set the criteria and alternatives, Afterward, a pairwise comparison matrix of kriteria must be created. This comparison is done by comparing the value of the elements that match the given criteria.

Table 5. Pairwise Comparison Matrix

Criteria	C1	C2	C3	C4	C5
C1	1	3	3	3	4
C2	1/3	1	1/3	2	1/3
C3	1/3	3	1	2	2
C4	1/3	1/2	1/2	1	1/2
C5	¼	3	1/2	2	1
Amount	2,25	10,5	5,333333	10	7,8333333

The next step is to create a matrix normalization table obtained from the values in each cell/column divided by the amount obtained, then find the vector priority value by adding each row. And find the weight value obtained from the vector priority value divided by n matrices (the number of criteria elements).

Table 6. Matrix Normalization

	C1	C2	C3	C4	C5	P. Vektor	Weight
C1	0,44444	0,285714	0,5625	0,3	0,510638	2,103297028	0,420659
C2	0,15	0,095238	0,0625	0,2	0,042553	0,55	0,109688
C3	0,15	0,285714	0,1875	0,2	0,255319	1,076681583	0,215336
C4	0,15	0,047619	0,09375	0,1	0,06383	0,453346983	0,090669
C5	0,11	0,29	0,09	0,20	0,06383	0,818234971	0,163647

Make sure the total of the weight values is 1, if it is not 1 then the calculation is definitely wrong. Next, find the eigenvalue, the eigenvalue is obtained from the weight value in the matrix normalization table multiplied by the number in the comparison matrix table.

Table 7. Eigen Value

C1	C2	C3	C4	C5	Amount
0,946483663	1,151722813	1,148460355	0,906693966	1,281901	5,435262252

After obtaining the eigenvalue, The Consistency Index (CI) value must then be determined.

CI = (5,435262252-5) / (5-1) = 0,108815563

Finding the Consistency Ratio value (CR) comes next after obtaining the CI value.

CR = 0,108815563 / 1,12 = 0,097156753

The value of 1.12 is obtained from the sum of n matrices based on the Random Index (RI) table.

After that, ensure the Consistency Ratio (CR) value <= 0.1 then the matrix is said to be consistent, but if the CR value > 0.1 then the matrix is inconsistent and can be recalculated.

After the calculation process above, the next step is the ranking process this is displayed in the table that follows.

Table 8. Ranking Results

	C1	C2	C3	C4	C5	Total	Rank
A1	0,14045	0,11	0,14	0,13	0,1	0,12409	2
A2	0,07492	0,07	0,1	0,05	0,05	0,06898	5
A3	0,20524	0,23	0,2	0,23	0,22	0,21705	1
A4	0,03353	0,04	0,03	0,04	0,04	0,03671	12
A5	0,05314	0,04	0,04	0,07	0,04	0,04863	9
A6	0,06637	0,04	0,07	0,07	0,1	0,06927	6
A7	0,03353	0,08	0,08	0,11	0,09	0,07871	7
A8	0,07643	0,15	0,11	0,04	0,1	0,09529	4
A9	0,04894	0,04	0,03	0,04	0,04	0,03979	11
A10	0,05159	0,05	0,04	0,04	0,04	0,04432	10
A11	0,14093	0,09	0,11	0,12	0,12	0,11619	3
A12	0,07492	0,06	0,05	0,08	0,05	0,06298	8

B. Manual Calculation Method Dijsktra's Algorithm

Dijkstra's algorithm is applied after getting the recommended hospital. Cut Meutia Hospital Lhokseumawe is the recommended hospital based on the process known as the Analytical Hierarchy Process (AHP) computation.

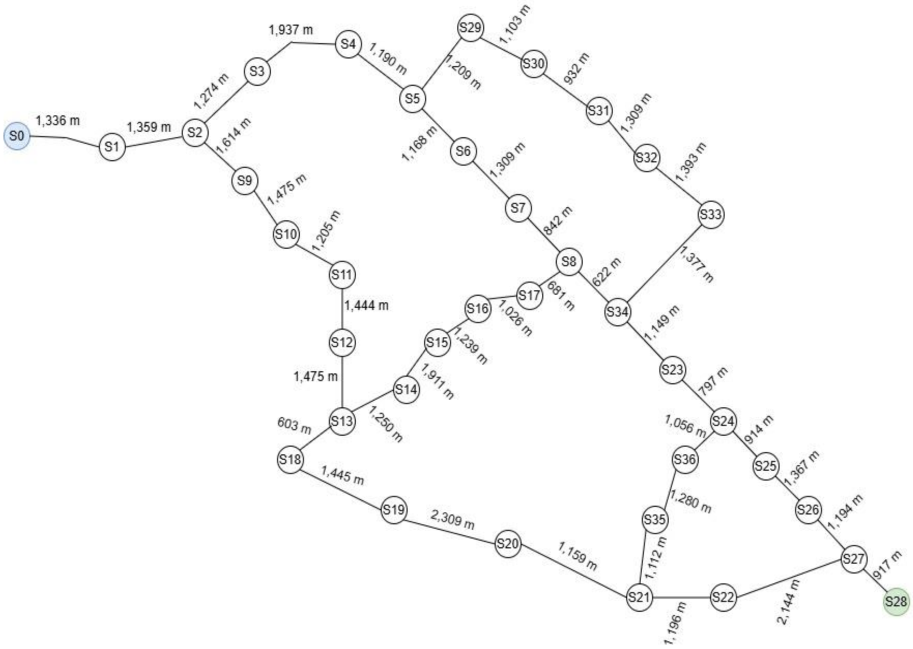


Figure 4. Weighted Graph

Based on the image above, the points of each cut are obtained to go to Cut Meutia Hospital Lhokseumawe. Based on the image, it can also be seen that the points are connected so that the formula can be used:

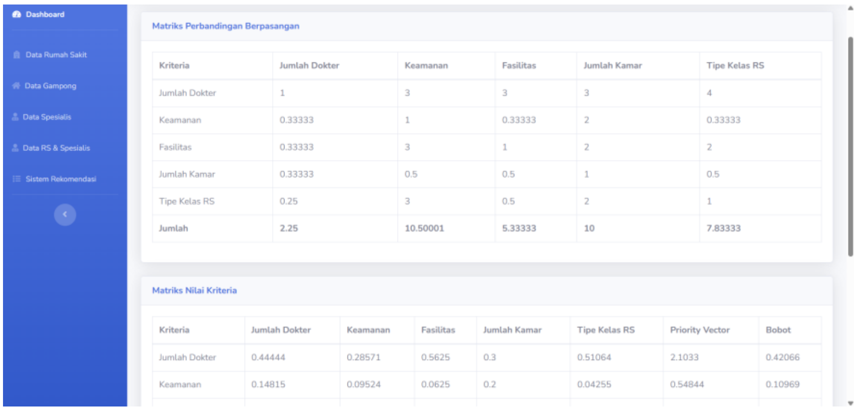
$$dist[x] \leftarrow min\ \{\ dist[x], dist[u] + c[u,x]\} \qquad (4)$$

Dist[x] is the item's lowest value dist[x] the previous one compared with dist[u] which was the previous permanent point + c[u,x] is the distance between the next permanent point and the preceding one. So, the points that will be passed are as follows:

S0 → S1 → S2 → S3 → S4 → S5 → S6 → S7 → S8 → S34 → S23 → S24 → S25 → S26 → S27 → S28

C. Website Implementation

Website implementation is a visualization of the output of the recommendation and mapping system that has been created. System implementation is also useful to see whether the system is running well or there are still things that need to be fixed or added.



Matriks Perbandingan Berpasangan

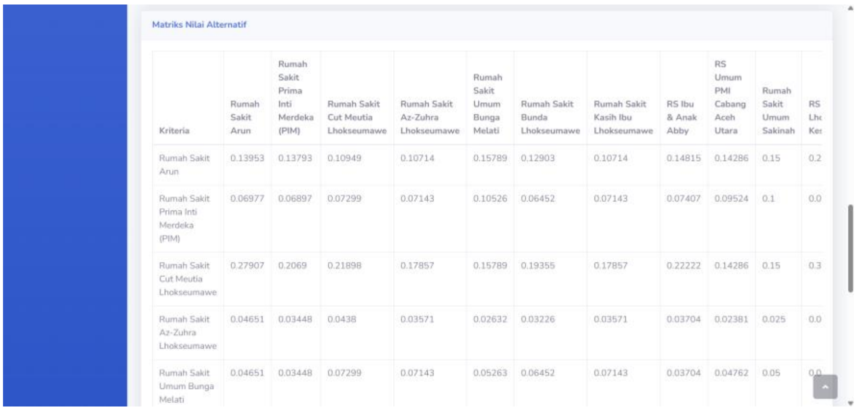
Kriteria	Jumlah Dokter	Keamanan	Fasilitas	Jumlah Kamar	Tipe Kelas RS
Jumlah Dokter	1	3	3	3	4
Keamanan	0.33333	1	0.33333	2	0.33333
Fasilitas	0.33333	3	1	2	2
Jumlah Kamar	0.33333	0.5	0.5	1	0.5
Tipe Kelas RS	0.25	3	0.5	2	1
Jumlah	2.25	10.50001	5.33333	10	7.83333

Matriks Nilai Kriteria

Kriteria	Jumlah Dokter	Keamanan	Fasilitas	Jumlah Kamar	Tipe Kelas RS	Priority Vector	Bobot
Jumlah Dokter	0.44444	0.28571	0.5625	0.3	0.51064	2.1033	0.42066
Keamanan	0.14815	0.09524	0.0625	0.2	0.04255	0.54844	0.10969

Figure 5. Criteria Weighting Page

This page will display the results of the hospital criteria value calculation process. The admin has decided the value of each weight comparison, and this value is the outcome of the AHP method computation.

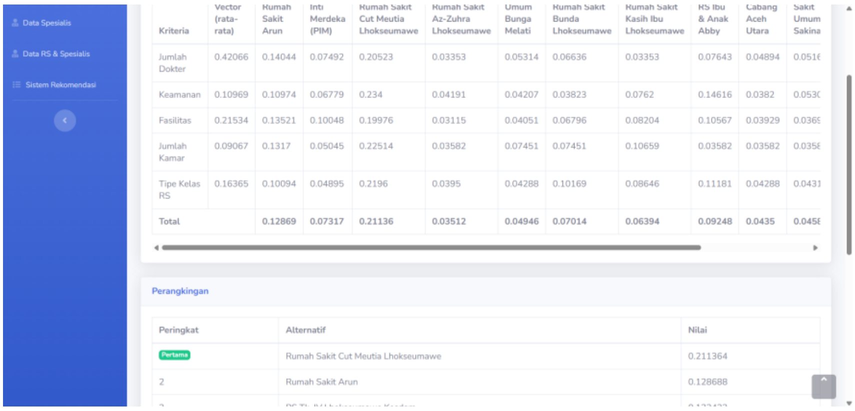


Matriks Nilai Alternatif

Kriteria	Rumah Sakit Arun	Rumah Sakit Prima Inti Merdeka (PIM)	Rumah Sakit Cut Meutia Lhokseumawe	Rumah Sakit Az-Zuhra Lhokseumawe	Rumah Sakit Umum Bunga Melati	Rumah Sakit Bunda Lhokseumawe	Rumah Sakit Kasih Ibu Lhokseumawe	RS Ibu & Anak Abby	RS Umum PMI Cabang Aceh Utara	Rumah Sakit Umum Sakinah	RS Lh Ke
Rumah Sakit Arun	0.13953	0.13793	0.10949	0.10714	0.15789	0.12903	0.10714	0.14815	0.14286	0.15	0.2
Rumah Sakit Prima Inti Merdeka (PIM)	0.06977	0.06897	0.07299	0.07143	0.10526	0.06452	0.07143	0.07407	0.09524	0.1	0.0
Rumah Sakit Cut Meutia Lhokseumawe	0.27907	0.2069	0.21898	0.17857	0.15789	0.19355	0.17857	0.22222	0.14286	0.15	0.3
Rumah Sakit Az-Zuhra Lhokseumawe	0.04651	0.03448	0.0438	0.03571	0.02632	0.03226	0.03571	0.03704	0.02381	0.025	0.0
Rumah Sakit Umum Bunga Melati	0.04651	0.03448	0.07299	0.07143	0.05263	0.06452	0.07143	0.03704	0.04762	0.05	0.0

Figure 6. Alternative Weighting Page

The outcomes of calculating the sub-criteria's alternative value will be shown on this page. This value is the result of the calculation of the AHP method and the value of each weight comparison has been determined by the admin.



Kriteria	Vector (rata-rata)	Rumah Sakit Arun	Inti Merdeka (PIM)	Rumah Sakit Cut Meutia Lhokseumawe	Rumah Sakit Az-Zuhra Lhokseumawe	Umum Bunga Melati	Rumah Sakit Bunda Lhokseumawe	Rumah Sakit Kasih Ibu Lhokseumawe	RS Ibu & Anak Abby	Cabang Aceh Utara	Sakit Umum Sakina
Jumlah Dokter	0.42066	0.14044	0.07492	0.20523	0.03353	0.05314	0.06636	0.03353	0.07643	0.04894	0.0516
Keamanan	0.10969	0.10974	0.06779	0.234	0.04191	0.04207	0.03823	0.0762	0.14616	0.0382	0.0530
Fasilitas	0.21534	0.13521	0.10048	0.19976	0.03115	0.04051	0.06796	0.08204	0.10567	0.03929	0.0369
Jumlah Kamar	0.09067	0.1317	0.05045	0.22514	0.03582	0.07451	0.07451	0.10659	0.03582	0.03582	0.0358
Tipe Kelas RS	0.16365	0.10094	0.04895	0.2196	0.0395	0.04288	0.10169	0.08646	0.11181	0.04288	0.0431
Total		0.12869	0.07317	0.21136	0.03512	0.04946	0.07014	0.06394	0.09248	0.0435	0.0458

Perangkingan

Peringkat	Alternatif	Nilai
Pertama	Rumah Sakit Cut Meutia Lhokseumawe	0.211364
2	Rumah Sakit Arun	0.128688

Figure 7. AHP Calculation Page

The outcomes of the AHP computation and the rating of recommended hospitals will be shown on this page. The AHP calculation can be run if the admin has input the criteria weight value on the criteria weighting page and the alternative sub-criteria weight value on the alternative weighting page. The results of this ranking will be used as a hospital recommendation for users.

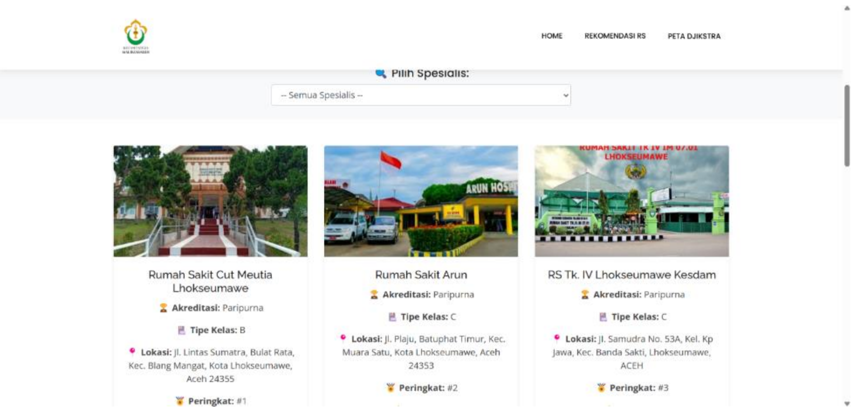


Figure 8. Hospital Recommendations Page

This page will display hospital recommendations that have been calculated by the AHP method so that users can choose the recommended hospital. Users can also choose specialists available at the hospital.

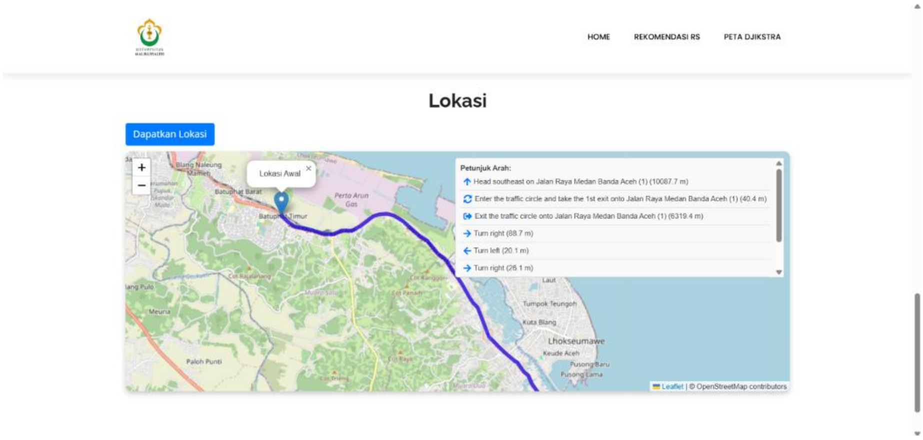


Figure 9. Shortest Routes page

This page will display the shortest route based on the user's initial location to the hospital selected by the user. This page will also display the route and the total distance to be traveled.

D. System Architecture

To provide a more comprehensive explanation of the developed system, this section describes the technical implementation aspects, including system architecture, backend technologies, data privacy, and system performance.

System Architecture

The system adopts a client-server architecture, where the frontend interface is accessed via a web browser, and the backend processes data and manages logic. The application is developed using the PHP programming language, and MySQL as the relational database. The architecture separates the user interface layer from the business logic and data access layers to enhance maintainability and scalability.

Backend Technologies and GIS Integration

The backend handles AHP calculations, alternative rankings, and shortest path analysis using the Dijkstra algorithm. The calculation logic is implemented within controller functions, and data is dynamically retrieved from the database. For geographic visualization, the system uses the Leaflet.js JavaScript library to render interactive maps. Hospital location data and route nodes are stored in spatial format, allowing real-time mapping and route rendering.

Data Privacy and Security

User data privacy is considered in the system design. The system does not store sensitive user information permanently. The only user input required is the starting point location for route calculation, which is processed temporarily. The admin panel is protected by session-based login authentication, and input validation is performed at both frontend and backend to prevent SQL injection and unauthorized data manipulation.

System Performance

Performance testing using browser-based tools (Google Chrome DevTools) shows that the average system response time for core processes, such as AHP ranking generation and shortest route calculation, ranges between 1.2 to 2.8 seconds, depending on the number of alternatives and complexity of the route graph. This indicates that the system can handle user requests efficiently and is suitable for real-time usage.

IV. CONCLUSION

Considering the outcomes of the trial at 12 hospitals in Lhokseumawe City, It was discovered that the test findings using the Analytical Hierarchy Process (AHP) approach produced a ranking value of 0.21, which is owned by Cut Meutia Hospital Lhokseumawe. The results of the top 3 hospital rankings from the AHP calculation are Cut Meutia Hospital Lhokseumawe, Arun Hospital Lhokseumawe and Tk. IV Kesdam Hospital Lhokseumawe. Based on this, Cut Meutia Hospital Lhokseumawe is the recommended hospital in Lhokseumawe City. Based on the results of the trial using the Dijkstra algorithm, the shortest path to the recommended hospital, namely Cut Meutia Hospital Lhokseumawe and using the starting point of Gampong Batuphat Timur, the closest distance was 17,375 meters. To validate the accuracy and applicability of the shortest path generated by the system, a comparison was made with Google Maps using the same starting point (Gampong Batuphat Timur) and the same destination (Rumah Sakit Cut Meutia Lhokseumawe). The comparison results show that the path generated by the system is in line with the main route recommended by Google Maps, both in terms of the road sections traveled and the estimated total distance. This proves that the implementation of the Dijkstra algorithm in the system has accurately reflected the real conditions in the field and can be used as a reference in making decisions about the fastest route. Considering the findings of the study that has been conducted, it can be concluded that this research produces a hospital recommendation and mapping system that can provide hospital recommendations and search for the shortest route from each hospital location based on the user's initial location.

REFERENCES

[1] D. A. Pramudita and R. Christy, “SISTEM PENDUKUNG KEPUTUSAN UNTUK PENILAIAN RUMAH SAKIT TERBAIK DI LAMPUNG TENGAH MENGGUNAKAN METODE AHP,” *J. Data Min. dan Sist. Inf.*, vol. 1, no. 1, p. 10, Aug. 2020, doi: 10.33365/jdmsi.v1i1.800.

[2] F. H. Susanto, N. I. Simbolon, and E. Monica, “Analisis Hubungan antara Kualitas Pelayanan dan Kepuasan Pasien Rawat Jalan Instalasi Farmasi Rumah Sakit Universitas Muhammadiyah Malang,” *Pharm. J. Farm. Indones. (Pharmaceutical J. Indones.*, vol. 18, no. 1, p. 10, 2021, doi: 10.30595/pharmacy.v18i1.5451.

[3] M. Mahfudhoh and I. Muslimin, “Pengaruh Kualitas Pelayanan Terhadap Kepuasan Pasien Pada Rumah Sakit Umum Daerah Kota Cilegon,” *J. Ilm. Manaj. Kesatuan*, vol. 8, no. 1, pp. 39–46, Apr. 2020, doi: 10.37641/jimkes.v8i1.310.

[4] F. Nurfitriani and F. Sembiring, “Sistem Pendukung Keputusan Pemilihan Rumah Kost menggunakan Metode Simple Additive Weighting (SAW),” *J. JTIK (Jurnal Teknol. Inf. dan Komunikasi)*, vol. 7, no. 4, pp. 745–754, 2023, doi: 10.35870/jtik.v7i4.1950.

[5] S. P. G. Setiawan, H. Sujaini, and M. A. Irwansyah, “Sistem Informasi Objek Wisata dengan Algoritma Djisktra untuk Rute Terdekat dan Metode Analitycal Hierarchy Process (AHP) untuk Rekomendasi. (Studi Kasus Kabupaten Bengkayang),” *J. Sist. dan Teknol. Inf.*, vol. 8, no. 2, p. 191, Apr. 2020, doi: 10.26418/justin.v8i2.36804.

[6] S. N. Sianipar, K. Nasution, and T. Haramaini, “Perancangan Aplikasi Sistem Pendukung Keputusan Rekomendasi Material Bubut Terbaik Menggunakan Metode AHP,” *Blend Sains J. Tek.*, vol. 3, no. 1, pp. 85–91, Aug. 2024, doi: 10.56211/blendsains.v3i1.595.

[7] F. F. Musyarraf, S. Sarwido, and R. H. Kusumodestoni, “SISTEM INFORMASI GEOGRAFIS PEMETAAN FASILITAS KESEHATAN BPJS DI KABUPATEN JEPARA DENGAN ALGORITMA DIJKSTRA BERBASIS WEB,” *J. Inform. Teknol. dan Sains*, vol. 6, no. 4 SE-, pp. 883–893, Nov. 2024, doi:

10.51401/jinteks.v6i4.4787.
[8] S. Yuristika Nule, D. Nababan, and A. K. Dety Lestari, "Sistem Informasi Geografis (SIG) Pemetaan Lokasi Tempat Ibadah Di kabupaten Timor Tengah Utara Berbasis Web," *J. Ilmu Komput. dan Sist. Inf.*, vol. 7, no. 1, pp. 16–23, 2024, doi: 10.55338/jikomsi.v7i1.2154.
[9] S. Solin, M. Z. Siambaton, and T. Haramaini, "Aplikasi Pemetaan Objek Wisata dan Pencarian Jalur Terpendek Berbasis Web-Gis Menggunakan Algoritma Djikstra di Kota Subulussalam," *Hello World J. Ilmu Komput.*, vol. 1, no. 1, pp. 10–18, Apr. 2022, doi: 10.56211/helloworld.v1i1.5.
[10] R. Kesuma Dinata, Bustami, A. Razi, and M. Arasyi, "Algoritma Dijkstra dan Bellman-Ford dalam Sistem Pemetaan Barbershop di Kota Lhokseumawe," *Informatics J.*, vol. 7, no. 2, p. 128, 2022, [Online]. Available: https://jurnal.unej.ac.id/index.php/INFORMAL/article/view/33303
[11] Rizki Suwanda, Said Fadlan Anshari, and Wardina Ningsih, "Information System for Operational Goods Management at the Career Guidance and Entrepreneurship Center Malikussaleh University," *J. Inotera*, vol. 9, no. 1 SE-Articles, pp. 164–169, May 2024, doi: 10.31572/inotera.Vol9.Iss1.2024.ID324.
[12] Magdalena Sundari, Asnawati Asnawati, and Indra Kanedi, "Sistem Pendukung Keputusan Penilaian Dosen Terbaik Menggunakan Metode Analytical Hierarchy Process (AHP) Studi Kasus Fakultas Keguruan dan Ilmu Pendidikan Universitas Dehasen Bengkulu," *J. Ilm. Tek. Mesin, Elektro dan Komput.*, vol. 4, no. 1, pp. 28–43, Mar. 2024, doi: 10.51903/juritek.v4i1.2884.
[13] G. Galih, W. Wandi, and H. Herlambang, "SISTEM PENDUKUNG KEPUTUSAN PEMILIHAN SISWA BERPRESTASI BERBASIS WEB DENGAN METODE AHP (ANALYTICAL HIERARCHY PROCESS)," *EDUSAINTEK J. Pendidikan, Sains dan Teknol.*, vol. 11, no. 1, pp. 367–378, Sep. 2023, doi: 10.47668/edusaintek.v11i1.946.
[14] M. C. Bunaen, H. Pratiwi, and Y. F. Riti, "Application Of The Dijkstra Algorithm To Determine The Shortest Route From City Center Surabaya To Historical Places," *J. Teknol. Dan Sist. Inf. Bisnis*, vol. 4, no. 1, pp. 213–223, Jan. 2022, doi: 10.47233/jteksis.v4i1.407.
[15] G. Stevans, A. Eleazar Rangin, J. Timothy Souk, J. Pratama, and V. Handrianus Pranatawijaya, "IMPLEMENTASI ALGORITMA DIJKSTRA DALAM MENENTUKAN RUTE WISATA DI KOTA PALANGKA RAYA," *JATI (Jurnal Mhs. Tek. Inform.*, vol. 8, no. 3, pp. 3518–3523, 2024, doi: 10.36040/jati.v8i3.9701.
[16] D. Fikri, H. Soeprianto, M. Turmuzi, and A. Amrullah, "Implementasi Algoritma Dijkstra dalam Menentukan Biaya Transportasi Berdasarkan Rute Terpendek Pada Tempat Wisata di Daerah Lombok Tengah," *J. Ilm. Profesi Pendidik.*, vol. 8, no. 3, pp. 1470–1476, 2023, doi: 10.29303/jipp.v8i3.1511.
[17] R. Tria Kusumastuti, M. Hasbi, B. Widada, P. Studi Informatika Sinar Nusantara, and P. Studi Sistem Informasi Sinar Nusantara, "PENERAPAN ALGORITMA DJIKSTRA DALAM MENENTUKAN RUTE TERPENDEK FASILITAS KESEHATAN YANG MELAYANI PASIEN BPJS BERBASIS WEB DI KOTA SUKOHARJO," *J. TIKomSiN*, vol. 12, no. 1, 2024, doi: 10.30646/tikomsin.v12i1.826.
[18] R. Perayoga, P. Hendradi, and A. Setiawan, "Implementasi Algoritma Dijkstra Pada Pencarian Rute Terpendek Objek Wisata," *Media Online*, vol. 4, no. 3, pp. 1471–1482, 2023, doi: 10.30865/klik.v4i3.1495.
[19] K. A. Santoso, Z. Afifah, and I. Halikin, "Penerapan Algoritma Dijkstra dalam Pencarian Rute Terpendek Wisata Religi," *J. Ilm. Pendidik. Mat. Al Qalasadi*, vol. 7, no. 2, pp. 162–170, 2023, doi: 10.32505/qalasadi.v7i2.6227.
[20] A. Fatkharrofiqi and W. Gata, "Implementasi Algoritma Dijkstra dalam penentuan

rute terdekat menuju Masjid di Perumahan Bona Indah Lebak Bulus," *J. Inf. Syst. Applied, Manag. Account. Res.*, vol. 6, no. 1, p. 87, Feb. 2022, doi: 10.52362/jisamar.v6i1.674.

[21] A. S. Munthe, S. D. Andriana, and H. Dafitri, "SISTEM INFORMASI GEOGRAFIS AMAL USAHA AL WASHLIYAH KOTA MEDAN MENGGUNAKAN ALGORITMA DIJKSTRA," *J. Sci. Res. Dev.*, vol. 6, no. 2 SE-Articles, Dec. 2024, doi: 10.56670/jsrd.v6i2.635.

[22] Talenta Arta Deva Victoria and Hermansyah, "Penerapan Algoritma Dijkstra dalam Pemetaan UMKM Berbasis Android," *Bull. Comput. Sci. Res.*, vol. 3, no. 6 SE-, pp. 420–426, Oct. 2023, doi: 10.47065/bulletincsr.v3i6.276.