

Best Cafe Assessment Information System Using the ARAS (Additive Ratio Assessment) Method in Soppeng Regency

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ABSTRACT: The development of cafe businesses in Soppeng Regency has increased rapidly, but it has not been supported by an objective evaluation system in determining the best quality cafe. So far, cafe assessments are still subjective and unstructured, often causing dissatisfaction from consumers. This study aims to build the best cafe assessment information system using the ARAS (Additive Ratio Assessment) method that can assess cafe quality objectively and measurably based on the criteria of taste, price, comfort, and service. The ARAS method is used because it is able to manage various types of criteria both benefit and cost, and produce a final ranking of each alternative based on its contribution to the ideal solution. The system was developed using the Waterfall model and tested using the Blackbox method. Data collection techniques included observation, interviews, and literature studies. The results show that the system successfully displays the complete assessment process, from value input, normalization, contribution calculation, to ranking results and printed reports. The best cafe assessment information system built using the ARAS method has proven effective in supporting a more accurate and transparent decision-making process.

Keywords: Information System, Cafe Assessment, ARAS Method, Decision Support System, Soppeng Regency

I. INTRODUCTION

The development of cafe businesses in Indonesia shows an increasing trend, especially in urban areas. This growth is influenced by changes in people's lifestyles who desire variety in

food and beverage options, as well as the need for comfortable and attractive social spaces. Cafes are now not only places to eat but also work areas, relaxation spots, and even part of local tourism. The same phenomenon is seen in Soppeng Regency, where many new cafes have emerged with different concepts, attractive designs, and diverse services to attract consumers.

However, the increase in the number of cafes is not always balanced with adequate information for the public to choose according to their preferences and needs. Many visitors rely on information from social media or friend recommendations to determine which cafe to visit. Unfortunately, this information is often subjective and does not always reflect the actual quality of the cafe, which can lead to customer dissatisfaction and challenges for cafes in maintaining customer loyalty.

On the other hand, many cafe businesses in the region still face obstacles in evaluating their service quality comprehensively and measurably. Without appropriate tools, they rely only on verbal feedback from customers or reviews on social media, which may not reflect the actual condition.

In this situation, a system is needed that can assess cafe quality objectively, systematically, and based on data. The assessment must consider various important criteria such as taste, cleanliness, comfort, price, facilities, and service. To process various criteria efficiently and accurately, a suitable multi-criteria decision-making method is needed. One method that can be applied is the ARAS (Additive Ratio Assessment) method. This method can handle various criteria values, both beneficial and cost, and produces preference values used to select the best alternative from available options.

Based on these problems, this study aims to design an information system for assessing the best cafes using the ARAS method in Soppeng Regency. The research questions, problem limitations, and contributions are detailed in the following sections.

II. RELATED WORK

Several previous studies have applied the ARAS method in various decision-making contexts.

Adillah, Hendrawaty, and Mulyadi (2024) conducted research entitled "Design and Development of a Cafe Selection Recommendation System in Lhokseumawe City Using the Additive Ratio Assessment (ARAS) Method". The problem addressed was the rapid growth of cafes in Lhokseumawe, which increased competition and made it difficult for visitors to choose a cafe according to their preferences. The system considered seven main criteria: drink price, food price, menu variety, location, facilities, and cafe atmosphere. Black-box testing showed the system was accurate and efficient in generating recommendations.

Sanroni Sintoro (2023) conducted research entitled "Decision Support System for Determining the Best Barista Using Rank Sum and Additive Ratio Assessment (ARAS)". The study addressed that as appreciation for coffee brewing art increases, barista selection focuses not only on technical skills but also on creativity, dedication, and interpersonal skills. The ARAS method with Rank Sum weighting was implemented to provide optimal barista

recommendations.

Muhammad Syahputra (2022) conducted research entitled "Decision Support System for Supervisor Selection at Coup D'Etat J.City Cafe Applying ARAS". The study addressed the lack of standardized methods in evaluating supervisor candidates, where selection processes were often subjective and inaccurate. The ARAS method provided objective assessment based on criteria weights and values, including age, education level, personality, skills, and work experience.

Based on these previous studies, differences exist in objects, objectives, and scope. The first study focused on recommendation systems for cafes in Lhokseumawe City, not comprehensive quality assessment. The second study assessed the best baristas without discussing overall cafes and used a different weighting approach. The third study focused on supervisor selection at a single cafe without comparing existing cafes. This study specifically assesses the quality of various cafes in Soppeng Regency based on several service criteria, applying the ARAS method to build an objective assessment information system beneficial for consumers, business actors, and the local government.

III. METHOD

This section explains how the research was conducted in a structured and systematic way.

A. Research Object Identification

The research objects were four cafes in Soppeng Regency:

1. Infinite Coffee
2. D'Malaka Cafe
3. Na.Ka Coffee and Pastry
4. Humblespace

The main criteria used for assessment were:

- Taste (Benefit)
- Price (Cost)
- Comfort (Benefit)
- Service (Benefit)

Table 1: Criteria Weights

No	Criteria	Weight
1	Taste (Benefit)	0.40
2	Price (Cost)	0.25
3	Comfort (Benefit)	0.20
4	Service (Benefit)	0.15

Table 2: *

Source: (Khotimah et al., 2018)

B. Data Collection

Data collection methods included:

- Observation: Direct observation and recording of phenomena at the four cafes.
- Interviews: Direct interviews with cafe owners as key informants.
- Literature Study: Gathering references from scientific journals, articles, and previous research results.



Figure 1: Research Location 1 - Infinite Cafe (Google Maps)



Figure 2: Research Location 2 - Humblespace



Figure 3: Research Location 3 - Na.Ka Coffee

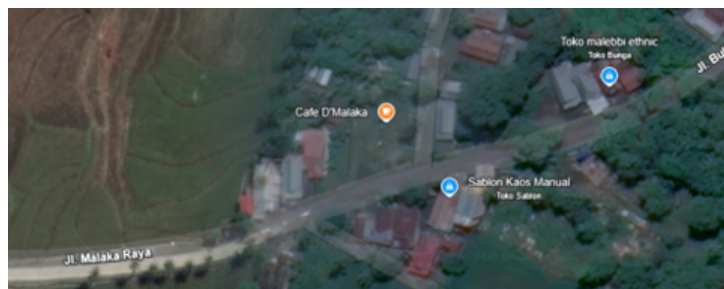


Figure 4: Research Location 4 - Cafe D'Malaka

C. Research Procedure

The research procedure followed the Waterfall development model:

1. System Analysis: Collecting data and information related to system needs from stakeholders (cafe owners and visitors).
2. Design: Designing system architecture, database using ERD, user interface wireframes, and assessment process based on the ARAS method.
3. Implementation: Coding the application using PHP with Laravel framework, Laragon as local server, and MySQL as database.
4. Integration and Maintenance: Operating the completed software and performing maintenance as needed.

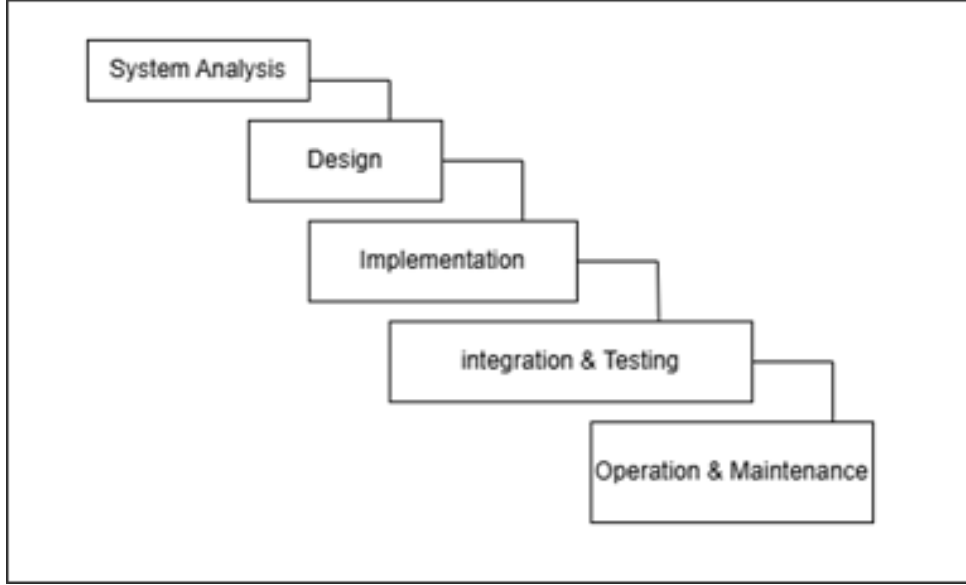


Figure 5: Waterfall Development Method

D. Data Analysis using ARAS Method

The ARAS (Additive Ratio Assessment) method steps are as follows:

Step 1: Decision Making Matrix Preparation

$$X = x_{01}x_{02} \dots x_{0n}x_{11}x_{12} \dots x_{1n} \ddots \ddots \ddots x_{m1}x_{m2} \dots x_{mn} \quad (i = 0, \dots, m; j = 1, \dots, n)$$

Step 2: Normalization of Decision Matrix

For benefit criteria:

$$X_{ij} = \frac{x_{ij}}{\sum_{i=0}^m x_{ij}}$$

For cost criteria:

$$X_{ij} = \frac{1/x_{ij}}{\sum_{i=0}^m (1/x_{ij})}$$

Step 3: Weighted Normalized Matrix

$$D = [d_{ij}]_{m \times n} = r_{ij} \cdot w_j$$

Step 4: Optimality Function

$$S_i = \sum_{j=1}^n d_{ij}, \quad (i = 1, 2, \dots, m)$$

Step 5: Utility Degree (Ranking)

$$K_i = \frac{S_i}{S_0}$$

E. System Evaluation

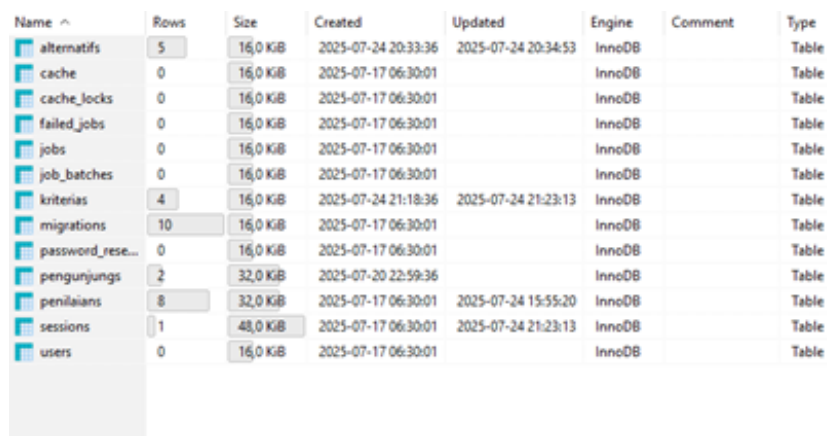
System evaluation was conducted using Blackbox testing, focusing on input-output functionality without examining internal processes. The following features were tested:

- Login page for admin and visitors
- Input form for assessment values
- Results page displaying complete ARAS calculation
- PDF print function for ranking results
- CRUD functions for alternatives (cafes)
- CRUD functions for criteria

IV. RESULT AND DISCUSSION

A. System Implementation Results

The system was successfully built using PHP with Laravel framework, Laragon as local server, and MySQL database. The database consists of four tables: users, alternatives, criteria, and assessments.



Name	Rows	Size	Created	Updated	Engine	Comment	Type
alternatifs	5	16,0 KGB	2025-07-24 20:33:36	2025-07-24 20:34:53	InnoDB		Table
cache	0	16,0 KGB	2025-07-17 06:30:01		InnoDB		Table
cache_locks	0	16,0 KGB	2025-07-17 06:30:01		InnoDB		Table
failed_jobs	0	16,0 KGB	2025-07-17 06:30:01		InnoDB		Table
jobs	0	16,0 KGB	2025-07-17 06:30:01		InnoDB		Table
job_batches	0	16,0 KGB	2025-07-17 06:30:01		InnoDB		Table
kriteriais	4	16,0 KGB	2025-07-24 21:18:36	2025-07-24 21:23:13	InnoDB		Table
migrations	10	16,0 KGB	2025-07-17 06:30:01		InnoDB		Table
password_res...	0	16,0 KGB	2025-07-17 06:30:01		InnoDB		Table
pengunjungs	2	32,0 KGB	2025-07-20 22:59:36		InnoDB		Table
penilaians	8	32,0 KGB	2025-07-17 06:30:01	2025-07-24 15:55:20	InnoDB		Table
sessions	1	48,0 KGB	2025-07-17 06:30:01	2025-07-24 21:23:13	InnoDB		Table
users	0	16,0 KGB	2025-07-17 06:30:01		InnoDB		Table

Figure 6: List of Database Tables

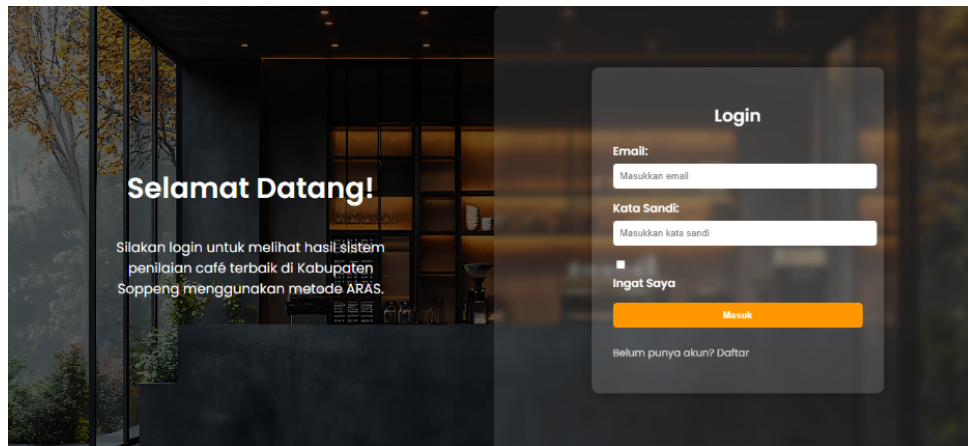


Figure 7: Login Page Display

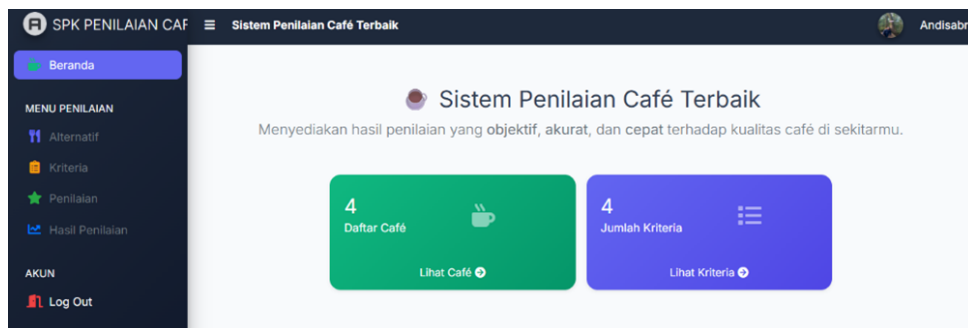


Figure 8: Dashboard Display

No	Kode	Nama Café	Alamat	Gambar	Aksi
1	A1	naka coffee & pastry	Jalan Salotungo, Lalabata Rilau, Kabupaten Soppeng Kode Pos 90812		
2	A2	Infinite coffee	Jalan tujuh wali-wali, Kec Lalabata Kabupaten Soppeng kode pos 90812		
3	A3	D' Malaka cafe	jalan malaka raya, Kec Lalabata, Kabupaten Soppeng kode pos 90814		
4	A4	humblespace	Jl. Merdeka, Kec Lalabata, Kabupaten Soppeng kode pos 90811		

Figure 9: Alternatives (Cafes) Page for Admin

No.	Kode	Nama Kriteria	Bobot	Jenis	Deskripsi	Aksi
1	c1	Rasa	0,40	Benefit	Rasa adalah faktor utama dalam penilaian kualitas makanan dan minuman di café. Penilaian mencakup kelezatan, keseimbangan bumbu, dan konsistensi rasa. Café dengan cita rasa yang khas dan memuaskan akan lebih disukai oleh pelanggan.	 
2	c2	Harga	0,25	Cost	Harga menilai seberapa sebanding biaya yang dibayarkan pelanggan dengan kualitas dan porsi makanan atau minuman yang diterima. Harga yang terjangkau dan sesuai akan memberikan nilai tambah dalam penilaian café.	 
3	c3	Kenyamanan	0,20	Benefit	Kenyamanan mencakup suasana café, kebersihan, pencahayaan, dan fasilitas seperti tempat duduk, WIFI, serta ventilasi. Tempat yang nyaman akan membuat pelanggan betah dan ingin berkunjung kembali.	 
4	c4	Pelayanan	0,15	Benefit	Pelayanan mengacu pada sikap staf dalam melayani pelanggan, termasuk keramahan, kecepatan, dan ketepatan. Pelayanan yang baik meningkatkan kepuasan dan menjadi nilai tambah bagi pengalaman pelanggan.	 

Figure 10: Criteria Page for Admin

Skala Penilaian Umum		Skala Penilaian Harga (Cost)		Bobot Kriteria	
Nilai	Keterangan	Nilai	Keterangan	Kriteria	Bobot
5	Sangat Baik	5	Sangat Murah	Rasa	0.40
4	Baik	4	Murah	Harga	0.25
3	Cukup	3	Standar	Kenyamanan	0.20
2	Kurang	2	Mahal	Pelayanan	0.15
1	Sangat Kurang	1	Sangat Mahal		

Figure 11: Initial Values Table (Admin and Visitor View)

Rumus Normalisasi ARAS:				
- Benefit: Normalisasi = nilai / total nilai kolom - Cost: Normalisasi = (1 / nilai) / (total (1 / semua nilai kolom))				
2. Tabel Normalisasi (ARAS)				
	C1	C2	C3	C4
Alternatif	Benefit	Cost	Benefit	Benefit
INFINITE COFFEE	0.35	0.33	0.33	0.33
D' MALAKA CAFE	0.31	0.36	0.35	0.33
NAKA COFFEE & PASTRY	0.34	0.31	0.32	0.34
HUMBLESPLACE	0.00	0.00	0.00	0.00

Figure 12: Normalization Table (ARAS)

3. Kontribusi Nilai (Normalisasi × Bobot)					
Alternatif	C1	C2	C3	C4	Total Skor
INFINITE COFFEE	0.34	0.08	0.07	0.05	0.34
D' MALAKA CAFE	0.32	0.09	0.07	0.05	0.33
NAKA COFFEE & PASTRY	0.34	0.08	0.06	0.05	0.33
HUMBLESPLACE	0.00	0.00	0.00	0.00	0.00

Figure 13: Contribution (Normalization × Weight) Table

4. Rasio terhadap Solusi Ideal		
Alternatif	Skor Akhir (Si)	Rasio (Ki)
INFINITE COFFEE	0.34	1.00
D' MALAKA CAFE	0.33	0.99
NAKA COFFEE & PASTRY	0.33	0.97
HUMBLESPLACE	0.00	0.00

Figure 14: Ratio to Ideal Solution

Rumus rasio terhadap solusi ideal $(K_i) = S_i / S_0(\max S_i)$		
5. Hasil perbandingan ARAS		
Peringkat	Alternatif	Rasio (Ki)
1	INFINITE COFFEE	1.00
2	D' MALAKA CAFE	0.99
3	NAKA COFFEE & PASTRY	0.97
4	HUMBLESPLACE	0.00

Figure 15: ARAS Ranking Results



SEKOLAH TINGGI MANAJEMEN INFORMATIKA DAN KOMPUTER
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HASIL PENILAIAN CAFE TERBAIK
MENGUNAKAN METODE ARAS DI KABUPATEN SOPPENG

Berdasarkan data penilaian yang dihimpun melalui sistem informasi penilaian café terbaik menggunakan metode ARAS yang dilakukan di Kabupaten Soppeng , maka berikut adalah hasil akhir peringkat café berdasarkan skor metode ARAS:

Peringkat	Nama Café	Rasio (K _i)
1	INFINITE COFFEE	1.00
2	D' MALAKA CAFE	0.99
3	HUMBLESPEACE	0.99
4	NAKA COFFEE & PASTRY	0.97

Total Alternatif: 4

Figure 16: PDF Print Results

B. Functional Testing Results

Blackbox testing was conducted on all system features. The results showed that all functions worked as expected.

Table 3: Functional Testing Results

No	Feature	Expected Result	Result
1	Login Page	Display login page for admin and visitors	Successful
2	Assessment Input Form	Input assessment values from multiple respondents	Successful
3	Results Page	Display complete ARAS calculation (from normalization to ranking)	Successful
4	PDF Print Function	Print ranking results in PDF format	Successful
5	CRUD Alternatives	Add, edit, and delete cafe data	Successful
6	CRUD Criteria	Add, edit, and delete criteria data	Successful

C. Evaluation Results

The ARAS method successfully processed the assessment data. Based on the assessment results from the four cafes, the ranking was determined as follows:

Table 4: Final Ranking Results

Rank	Cafe Name	Ratio (Ki)
1	INFINITE COFFEE	1.00
2	D'MALAKA CAFE	0.99
3	HUMBLESPLACE	0.99
4	NAKA COFFEE & PASTRY	0.97

D. Discussion

The system built has proven effective in supporting decision-making processes for determining the best cafes in Soppeng Regency. The ARAS method successfully managed both benefit and cost criteria efficiently and provided transparent calculation results.

From the testing results, the system shows:

1. The system successfully simplifies the cafe assessment process from previously manual and subjective to more structured, objective, and measurable.
2. The ARAS method is proven capable of managing benefit and cost criteria efficiently and provides transparent calculation results.
3. The system displays the complete assessment process from value input, normalization, weight contribution, final calculation, to ranking output and report printing in PDF format.
4. The web-based interface is simple and responsive, using Laravel framework and MySQL database.

However, several limitations were identified:

- The system currently only uses four criteria.
- The assessment data is entered manually by admin.
- The system only covers cafes in Soppeng Regency.

E. Operation and Maintenance

Based on implementation results, system operation runs effectively and efficiently. Types of maintenance conducted based on research results:

Corrective Maintenance: During testing, improvements were made to several non-responsive interfaces on some devices. Corrections were made to weight calculations that could not be read when criteria data was incomplete.

Adaptive Maintenance: The system was tested on several PHP versions and successfully adapted. Server and database configurations need adjustment for integration to public domain.

Perfective Maintenance: Based on user and supervisor suggestions, future development will include:

- Adding new criteria such as "Facilities" and "Cleanliness"
- Adding direct input feature from visitors through public page
- Developing mobile-friendly display for easier smartphone access

V. CONCLUSION

Based on the research results and development of the best cafe assessment information system using the ARAS method in Soppeng Regency, the following conclusions can be drawn:

1. The information system successfully simplifies the cafe assessment process from previously manual and subjective to more structured, objective, and measurable through ARAS method implementation.
2. The ARAS method is proven capable of managing both benefit and cost criteria efficiently and provides transparent calculation results in determining the best cafe ranking.
3. The system displays the complete assessment process from value input, normalization, weight contribution, final calculation, to ranking output and report printing in PDF format.
4. The application can be easily used by visitors and admin through a simple, responsive web-based interface using Laravel framework and MySQL database.
5. System implementation can encourage service quality improvement of cafes in Soppeng Regency, as each business actor can identify which aspects need improvement based on objective assessment results.

Suggestions

Suggestions for future development and utilization of this system include:

1. **Addition of Assessment Criteria:** The system can be further developed by adding other criteria such as facilities, cleanliness, accessibility, or environmental sustainability for more comprehensive assessment.
2. **Expansion of Regional Coverage:** The system can be expanded to include cafe assessments in other regions outside Soppeng Regency to support broader decision-making in the culinary sector.

3. **Direct Respondent Feedback:** A feature for direct input from cafe visitors should be added so the system can record data in real-time from various sources and increase data validity.

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