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Optimization of Employee Bonus Decision Support System with Simple Additive Weighting Method

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Abstract

The success of a company amid intense competition depends not only on its products and services but also on the quality of its human resources. Offering performance-based bonuses is a crucial strategy to motivate employees, boost productivity, and enhance job satisfaction and loyalty. However, many companies struggle to determine fair and objective bonuses due to the absence of a standard formula applicable to employee achievements. This research aims to develop a Decision Support System (DSS) based on the Simple Additive Weighting (SAW) method to provide more objective and transparent performance appraisals. The DSS is expected to improve the accuracy and efficiency of employee evaluations compared to less effective manual methods. Data for this study was collected through observations, interviews, literature review, documentation, and questionnaires, with system validation performed using the black-box method to ensure accuracy and effectiveness. The SAW method was selected for its ability to integrate multiple assessment criteria to produce optimal solutions. Results indicate that the SAW-based DSS enhances the efficiency, fairness, and transparency of performance appraisals compared to previous systems. This system enables companies to determine bonuses based on objective performance, thereby increasing fairness and accountability. In conclusion, the DSS utilizing the SAW method is effective in facilitating decision-making regarding employee bonuses, streamlining the assessment process, and boosting employee motivation and satisfaction.

I. INTRODUCTION

In fierce business competition, a company's success depends not only on its products and services, but also on the quality of its human resources. Giving bonuses based on performance is an effective way to motivate employees and can increase productivity. Appropriate and fair bonuses can increase job satisfaction, loyalty, motivation, and employee performance in a company. This is a form of appreciation to employees who have achieved the best performance and achieved the work targets that have been set [1]. The amount of bonus given to employees is based on their work performance. Increased productivity in a company can be influenced by the amount of additional income (bonus) given to employees. Thus, companies need to evaluate employee performance better [1].

In the company's organizational structure, every company depends on its employees as resources that carry out all company activities. Employees are valuable company assets and have the potential to significantly influence the overall success of the organization [2]. Therefore, they deserve to be rewarded, such as salaries and bonuses that match their contributions. In the context of rapid technological development, many individuals utilize technology to improve efficiency and productivity in work, including in decision-making [3]. However, many companies still use subjective methods of awarding bonuses, so a transparent and objective system is needed to determine employee bonuses. The method previously used by PT. Aura Unggul in determining bonuses tends to be subjective and non-transparent, which often causes dissatisfaction among employees.

Decision Support System (DSS) is a computer system designed to assist decision making on semi-structured or unstructured problems, aiming to ensure that the decision-making process is of high quality [1]. In this context, many companies, including PT Aura Unggul, utilize DSto maintain business continuity and ensure accurate

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decisions, especially regarding employee bonuses. PT Aura Unggul, located at Duta Gardenia Boulevard Blok H-20, Jl. Husein Sastranegara, Kel. Jurumudi Baru, Kec. Benda Kota Tangerang-Banten (15124), is engaged in providing various packaging needs, such as carton boxes, partitions, OPP tapes, and others. Although this company provides bonuses every year as an effort to increase employee motivation, the determination of bonuses in the previous year was still not appropriate and effective because there was no objective assessment of performance.

There are several problems related to determining employee bonuses at PT Aura Unggul. First, the company does not have an objective assessment system, resulting in unfairness in bonus distribution, where outstanding employees do not get rewards proportional to their efforts. Previous bonuses were only given once a year with a fixed amount without considering individual performance, resulting in low employee motivation to increase productivity and dissatisfaction.

To solve this problem, the company needs a Decision Support System (DSS) that uses the Simple Additive Weighting (SAW) method. The SAW method is a multicriteria decision-making technique that can provide optimal solutions by considering various assessment criteria. This method sets criteria for assessing alternatives, gives weights according to the level of importance, and produces a total score for each alternative.

SAW was chosen because it offers objective assessment, is transparent, and easy to understand. Compared to other methods such as AHP and TOPSIS, SAW is more flexible and easily adaptable to changes in criteria. This method will improve the performance evaluation system in the company by setting relevant assessment criteria, assigning appropriate weights, and collecting employee performance data.

With the implementation of this system, it is expected that employee job satisfaction and company productivity will increase, and provide a competitive advantage in the market. This research aims to develop and implement a decision-making system for awarding bonuses based on employee performance using the SAW method, which is expected to increase fairness, objectivity, and transparency in awarding bonuses.

II. Related Works/Literature Review

Research by Yulisman & Refni Wahyuni entitled Sistem Pendukung Keputusan Penentuan Bonus Karyawan Dengan Metode SAW Pada PT. Delima Makmur Aceh Singkil highlights the application of the SAW method in DSS for determining employee bonuses. This research shows that the SAW method brings objectivity, transparency, and efficiency to the decision-making process. Even so, challenges in system implementation and evaluation need attention for effective implementation. By using the SAW method, companies can make more structured decisions, but system development is still needed to maintain quality [4].

Research conducted by Muhammad Arfi Nadhif & Rina Fiati entitled Penerapan Metode Simple Additive Weighting (SAW) Dalam Penentuan Bonus Karyawan provides an understanding of the implementation of the SAW method in calculating employee bonuses supported by a web-based information system. The SAW method has proven effective in improving the accuracy and efficiency of performance assessment. In addition, the use of the waterfall system development model helps provide an organized structure in project management. The synergy between the SAW method and efficient information systems can be an ideal solution to encourage employee motivation and performance within the company [3].

Research by Sofyan, Siti Nur Asia & Muh Imam Quraisy entitled Penentuan Bonus Karyawan Berbasis Web Menggunakan Metode Simple Additive Weighting discusses the benefits of the SAW method applied in web-based DSS for employee bonus management. With the SAW method, companies can achieve more accurate and efficient decisions, and minimize errors in the bonus awarding process. In addition, they suggested that further studies be conducted to compare the SAW method with other methods to find the most suitable approach in bonus-related decision making [5].

Muhammad Sahdan, Muhammad Innuddin & Mokhammad Nurkholis Abdillah in their research entitled Sistem Pendukung Keputusan Penentuan Bonus Karyawan dengan Metode Fuzzy-SAW Berbasis Web (Studi Kasus PT. Bunga Raya) highlighted the advantages of the Fuzzy-SAW method in improving the accuracy of bonus decision making. The application of this method through a web-based system allows companies to make more efficient and fair decisions, based on the right criteria. Even so, this research also emphasizes the importance of continuous development to overcome various challenges that may arise [6].

Research by Cahyono Budy Santoso & Dede Sunarya entitled Penerapan Simple Additive Weighting dalam Penentuan Bonus Tahunan Karyawan discusses how the SAW method can improve the efficiency of decision making related to employee annual bonuses. This method provides a more objective and accurate assessment, and reduces the subjectivity that often arises in the performance evaluation process. In addition, the integration of technology in the SAW method accelerates the decision-making process and improves the accuracy of assessment results, which is very important in today's business competition [2].

Jeperson Hutahaean, William Ramdhan & Sartini in their research entitled Penerapan Metode SAW Untuk Pemberian Bonus Tahunan Berdasarkan Kinerja Karyawan emphasized the importance of applying SAW method in PTPN III Mambang Muda for annual bonus assessment. With this method, performance appraisal is done more fairly and transparently, which can increase employee motivation and company productivity. This research shows

that the integration of clear criteria with data-based methods helps companies identify outstanding employees more precisely [7].

III. METHODS

A. Simple Additive Weighting (SAW) Method

The weighted sum method, or Simple Additive Weighting (SAW), is a simple decision-making technique that aggregates the weighted ratings of alternative performances on all attributes. The process begins by normalizing the decision matrix (X) to a comparable scale. In the SAW method, decision makers assign weights to each attribute and calculate the total value of alternatives by summing the results of the multiplication between ratings and weights [8], [9]. The criteria used consist of two attributes, namely benefits and costs, which distinguish the selection of criteria in decision making [10].

The SAW method is widely known in the context of Multiple Attribute Decision Making (MADM), which aims to find the best alternative from a number of options based on certain criteria. This approach makes it easier for decision makers to assess and compare various alternatives objectively and transparently, so that more precise and effective decisions can be made. In the calculation process, the SAW method has several terms as shown in Table 1.

TABLE 1
SAW METHOD CALCULATION TERMS

Term	Information
Criteria	The assessment is used as a basis
Alternative	With its status as an object, the object is different from other objects. Each alternative consists of a number of objects that have the opportunity to be selected by the decision maker.
Attribute	The value of each object in the alternative for each criterion
Crisp Data	As a grouping of values for each attribute. Crisp Data can be used or not because it is optional.

The advantage of the SAW method over other decision-making methods lies in its ability to provide a more accurate assessment based on criteria values and preference weights. This method produces a significant solution with a greater total change in value, and is able to choose the best alternative among the various options available [11].

The following are the completion steps using the SAW method, namely [9]:

1. Determine the criteria (Ci) that will be used in decision making.
2. Give the weight value for each criterion as W.
3. Provide a rating value for the suitability of each alternative.
4. Create a decision matrix based on the criteria (Ci) and normalize the matrix using an equation adjusted for attributes in the form of benefits or costs to produce a normalized matrix (R).

$$r_{ij} = \begin{cases} \frac{X_{ij}}{Max\ X_{ij}} & If\ j\ is\ a\ benefit\ attribute \\ \frac{Min\ X_{ij}}{X_{ij}} & If\ j\ is\ a\ cost\ attribute \end{cases} \quad (1)$$

Descriptions :
r_{ij} = Normalized performance rating value
X_{ij} = Attribute values of each criterion
Max X_{ij} = Maximum value of each criterion
Min X_{ij} = Minimum value of each criterion
Benefit = If the highest value is the best
Cost = If the lowest value

5. The ranking process involves summing and multiplying the normalized matrix with the weight vector. This process produces the highest value which is considered the best alternative (Ai) as a solution.

$$V_i = \sum_{j=1}^{n} w_j r_{ij} \quad (2)$$

Description :
V_i = Ranking of each alternative
w_j = Weight value of each criterion
r_{ij} = Normalized performance rating value

In determining employee bonuses at PT Aura Unggul, five criteria were selected, namely Attendance, Length of Service, Discipline, Responsibility, and Work Results. The selection of these criteria is based on strategic considerations and the relevance of the criteria to company goals:

1) *Attendance*
   This criterion shows an employee's commitment to work. Good attendance directly contributes to the productivity and smooth operation of the team.
2) *Length of Working*
   An employee's experience and loyalty to the company is very important. Employees who have worked for a long time tend to understand the company's culture and work processes better.
3) *Discipline*
   Discipline reflects an employee's ability to comply with company rules and procedures. Disciplined employees play a role in creating an organized and efficient work environment.
4) *Responsibility*
   Responsible employees tend to perform better, as they are able to manage tasks and take initiatives.
5) *Work Results*
   This criterion is a direct indicator of individual performance. The assessment of work results provides a clear picture of the employee's contribution to the achievement of company targets.

The criteria selection process was conducted through observation and interviews with the company director. The director provides in-depth insight into the criteria that are considered important for employee performance appraisal. Observations were made to see employee behavior and performance in the work environment directly. With this approach, the selected criteria are relevant and reflect the strategic needs of the company.

The weight for each criterion was determined based on the judgment of the company director. Through interviews, the director rated each criterion according to its importance to employee performance. This approach ensures that decisions regarding criteria weights are made by those who have a deep understanding of the company's goals and expectations.

B. Waterfall Method

The waterfall software development model is a classic linear and sequential approach, consisting of five to seven phases with different tasks and objectives that cover the software lifecycle from inception to delivery. Each phase must be fully completed before the next phase begins, so if one phase is not performed, the next phase cannot proceed [12], [13], [14], [15]. Fig. 1 is a phase of the waterfall method.

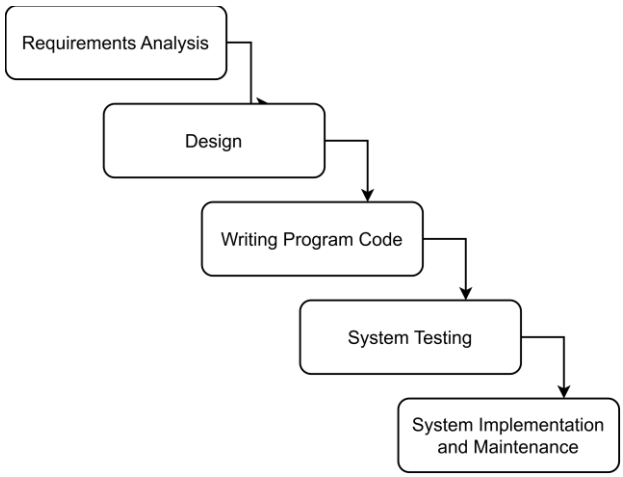

Fig. 1 Waterfall Method

This approach emphasizes a systematic process, shows progress sequentially, and focuses on the results of the previous phase to proceed to the next phase. The development process is divided into separate phases that must be gone through sequentially, similar to the flow of a waterfall, which emphasizes the importance of following a sequence of phases in software development [16].

In general, the waterfall method consists of the following phases:

1) *Requirements Analysis*
   This phase is the initial phase of the waterfall scheme. In this phase, a system needs analysis is carried out by collecting data through interviews, research, or literature studies conducted to obtain information about user needs for the system to be built. The analysis process that researchers do is by conducting Observations, Interviews, Literature Studies, Documentation Studies and Questionnaires.

2) Design

Before the program code writing phase begins, the design phase translates requirements into a structured software design. The design of the decision-making system for giving employee bonuses at PT. Aura Unggul with the SAW method begins with designing input data in the form of user data, alternatives, weights, criteria, and values. The output data is data that has been entered by the user and will later be displayed in the application made. The output that will be generated is an employee bonus report.

Furthermore, researchers carry out system design using UML (Unified Modeling Language). UML is a standard language for visualizing, designing, and documenting software systems, which was created by combining elements from various methods as well as new elements to improve clarity and uniformity [17]. UML serves to specify, visualize, build, and document systems, with the aim of identifying system parts and relationships between subsystems [9].

a) Use Case Diagram

Use case diagram is a representation that describes the interaction of a system with the elements around it, used in software development to identify the functional needs of the system. This diagram focuses on what the system does, not how, by showing the interaction between actors (people or systems) and the system in simple steps, such as accessing the system or creating a shopping list [17].

The use of use case diagrams helps in the process of developing system requirements, designing test cases, and communicating with customers. By combining several use cases, duplication of functionality can be avoided, and the generalization relationship between use cases shows the differences between use cases [17]. The image of the Activity Diagram is shown in Fig. 2.

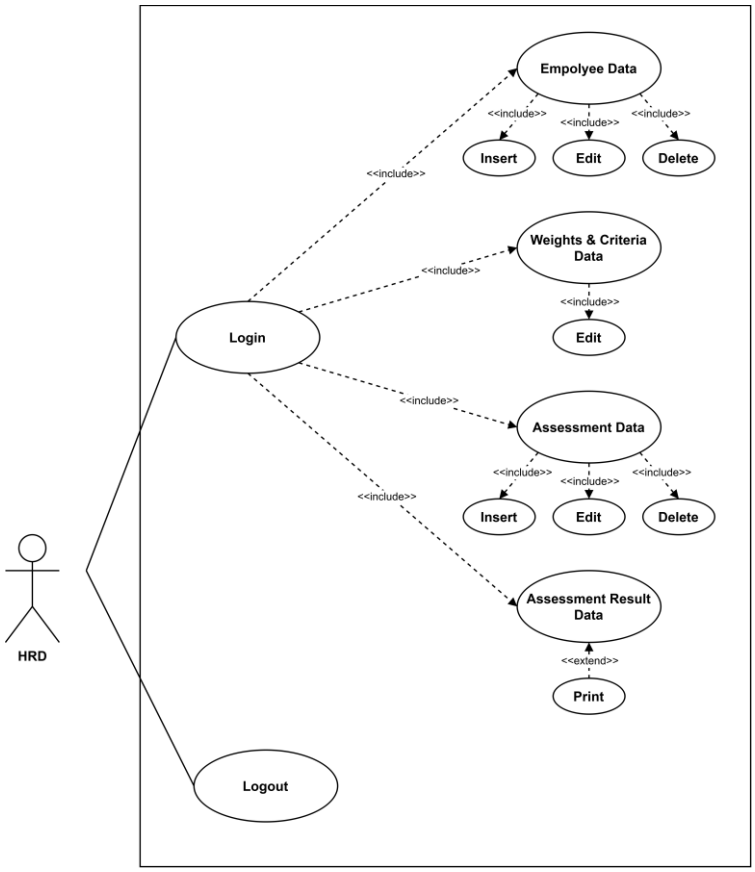

Fig. 2 Use Case Diagram

b) Activity Diagram

Activity diagrams in UML are visual representations that show the dynamic aspects of the system, usually in the form of flow charts that describe the transition between activities. This diagram describes the work steps in a system or business process, focusing on actions that are not performed by the user [17].

Activity diagrams are used to describe the flow of activities, from how the activity starts to the decisions that can be made and the end of each flow. This diagram emphasizes top-level processes and general activity flows, without dependence on objects, and can include various types of processes, from business workflows to specific details of individual use cases [13], [18]. The goal is to facilitate understanding of system activities that will be designed by organizations or companies [17]. The image of the Activity Diagram is shown in Fig. 3.

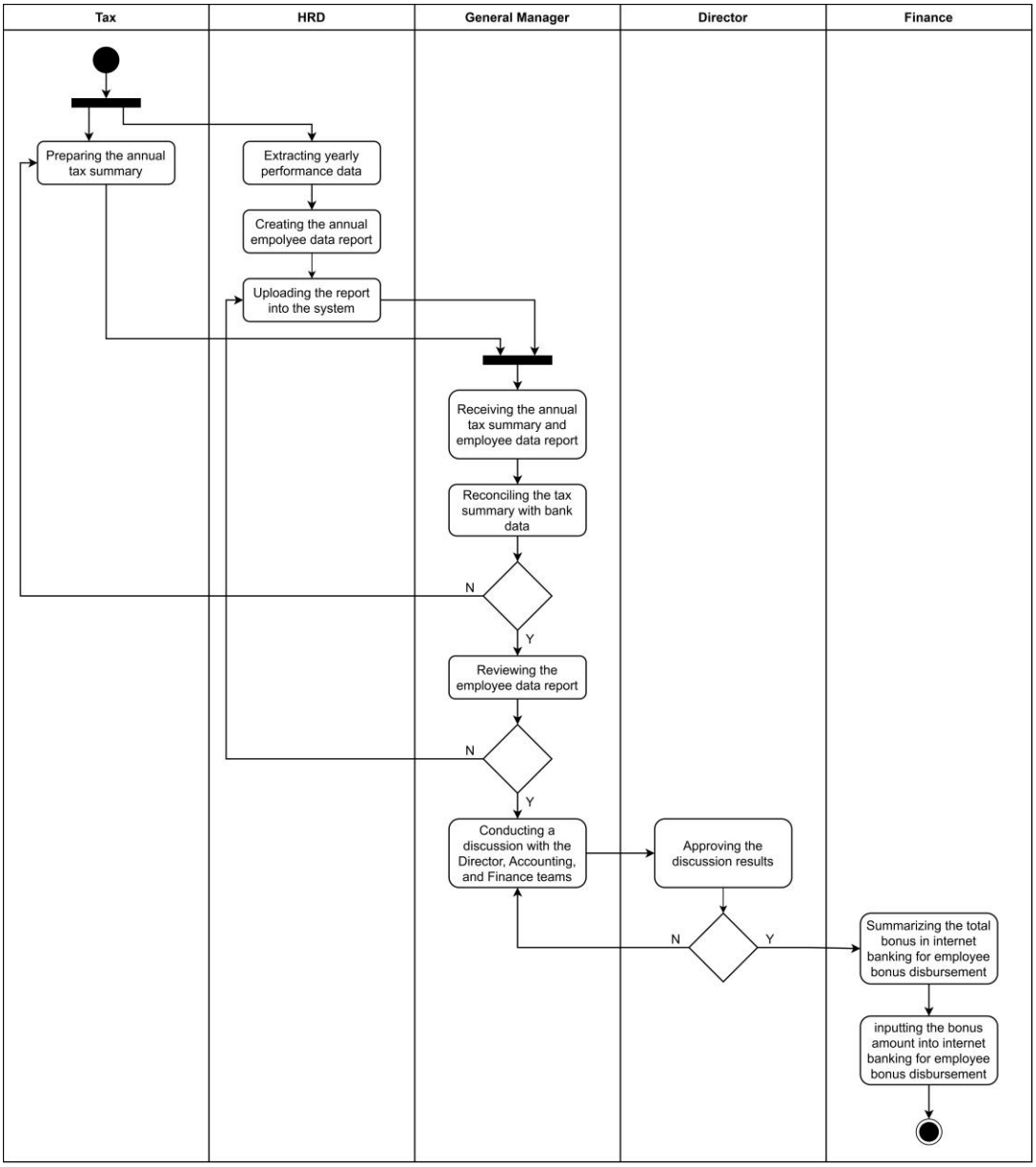

Fig. 3 Activity Diagram

c) Class Diagram

Class diagrams in UML are static diagrams that describe the structure of classes, attributes, methods, and relationships between objects. This diagram focuses on the relationships between classes and does not discuss the activities within them, so it reflects a model that is fixed and does not change over time. Because of its easy-to-use description, class diagrams are very suitable for object-oriented projects [16], [18].

The class diagram model consists of two parts: the database structure and the components of the MVC (Model View Controller) design pattern, which includes interface classes, control classes, and entity classes [16]. The image of the Class Diagram is shown in Fig. 4.

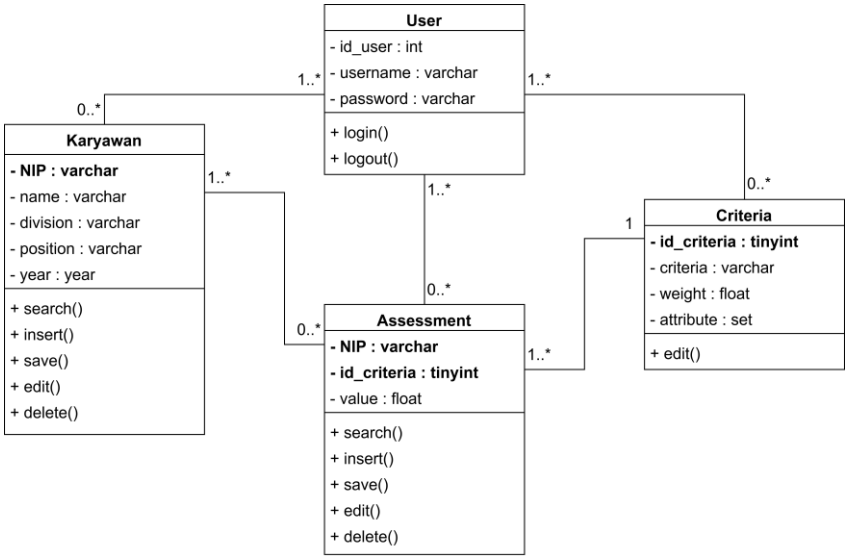

Fig. 4 Class Diagram

d) Sequence Diagram

Sequence diagrams describe interactions between objects in a system, showing messages or commands sent along with the time. In this diagram, objects are arranged from left to right, with vertical sections showing time (lifeline) and horizontal sections showing objects. Messages are shown as arrow lines connecting one lifeline to another [16].

This diagram can cover all possible scenarios for each use case, although it is common for analysts to create multiple sequence diagrams for specific scenarios. Sequence diagrams show a series of actions that occur in response to an event, closely related to use case diagrams, where one use case usually generates one sequence diagram. This diagram is useful for understanding the interaction and communication between objects in the system [17], [18]. The image of the Sequence Diagram is shown in Fig. 5.

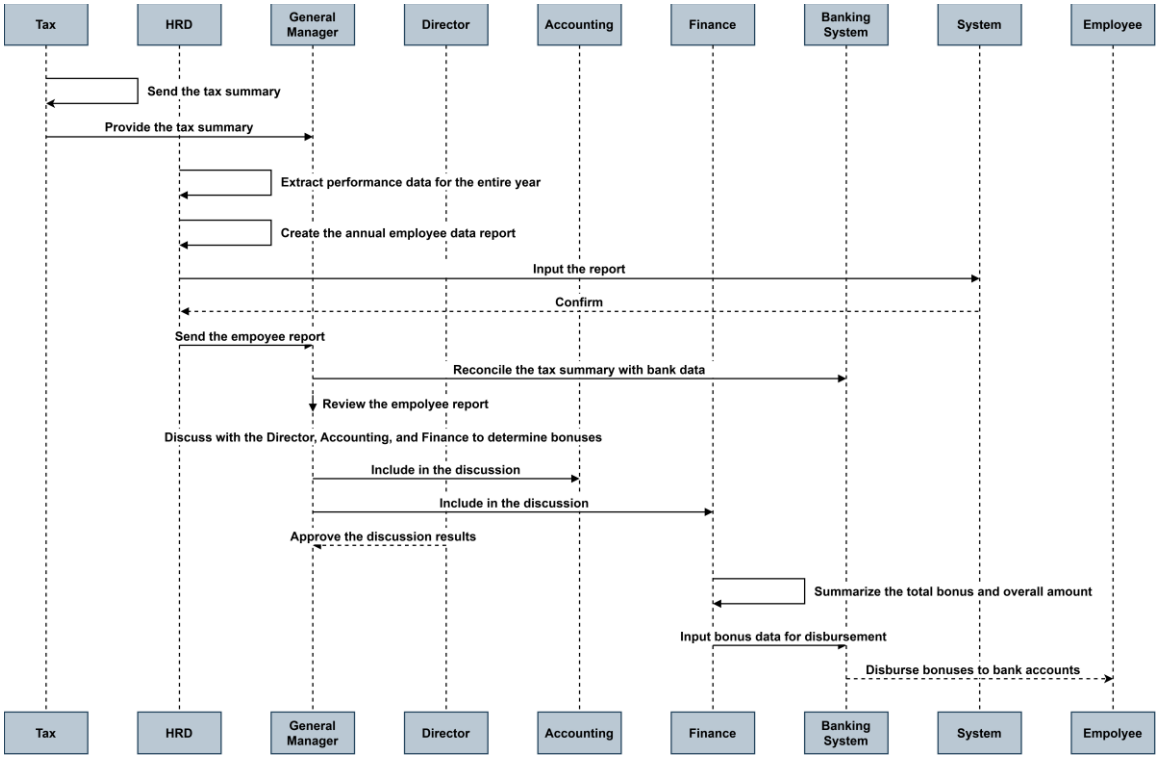

Fig. 5 Sequence Diagram

3) Writing Program Code

This phase involves coding to translate the design into computer language. The programming language used in this employee bonus system is to use PHP (Hypertext Preprocessor). PHP is a server-side programming language that can convert PHP code into a dynamic web display in a browser. By inserting PHP scripts, HTML pages become stronger and more dynamic, so they can be used to create various web

applications such as portals, e-learning, e-libraries, and so on [19]. This PHP coding work is done using Visual Studio Code.

4) System Testing

This phase is a testing phase to find and fix errors in the system. Testing is done to ensure the system runs well and as expected and to find and fix errors or bugs, and so on. The testing method used by researchers is Black Box Testing.

Black box testing, or functional testing, is a software testing method that focuses on functionality without requiring knowledge of the program's internal implementation. This test ensures the software complies with the specifications set by examining inputs and outputs, without considering the program structure [13], [20].

The advantage of black box testing is that it does not require an understanding of programming languages, and is carried out from the user's perspective, so as to identify problems such as vagueness and inconsistencies in specifications. This method focuses on user experience through the interface and ignores implementation details, thus prioritizing domain information over program structure [17], [21]. Table 2 is the result of testing using the black box.

TABLE 2
BLACK BOX TESTING RESULT

No	Test Scenario	Expected results	Conclusion
1	Fill in an incorrect Username and/or Password then click the Login button.	The system does not process and will display a message: “Username atau Password salah!”.	Valid
2	Fill in the appropriate Username and Password then click the Login button.	The system processes the login access and then displays the dashboard page.	Valid
3	Fill in the employee data with the new NIK then click the Simpan button.	The system processes new employee data so that it is added and will display a message: “Data karyawan berhasil ditambahkan”.	Valid
4	Select the employee name, then fill in the appropriate assessment, then click the Simpan button.	The system processes the new employee assessment to increase and will display a message: “Data penilaian berhasil disimpan”	Valid
5	Print the report by clicking the Cetak Laporan button.	The system processes data printing by displaying a window containing the assessment results display containing the company letterhead, assessment table, place & date of printing, and HRD signature.	Valid
6	Users exit the application by clicking the Logout button.	The system processes and the user will exit the application and return to the login form.	Valid

5) System Implementation and Maintenance

If system testing has been carried out and is successful, the next phase is to fully implement the system within the company environment. In this phase, the system will be operated by relevant users, accompanied by the input of larger data into the system.

After the system is implemented, maintenance will be carried out by monitoring to see if there are any problems when the system is put into use. If problems are found that were not apparent during testing, they will be fixed immediately. In addition, evaluations will be conducted to ensure the system is running properly, and if needed, minor adjustments or updates will be made to keep the system working optimally.

IV. RESULTS

This section will describe the results of applying the SAW method in the process of determining employee bonuses. The analysis is done through a series of systematic calculations, where pre-defined criteria data is used to determine the final score of each employee. When setting the criteria, it is important to ensure that they are in accordance with company policy and that the total weight does not exceed 1.00. The next step is to assign weights to each criterion and normalize the weights for balance. The selection of criteria focuses on criteria that have a benefit or cost value in the calculation of the normalized assessment result (r_{ij}). It is said to be a benefit if it provides benefits and is said to be a cost if it incurs costs.

Based on discussions with PT Aura Unggul, five criteria have been determined to be used in determining employee bonuses. Table 3 is a breakdown of the criteria in question.

TABLE 3
CRITERIA TABEL

Criteria Code	Criteria	Attribute	Weight Value
C1	Attendance	Cost	0.2
C2	Length of working	Cost	0.2
C3	Discipline	Benefits	0.2
C4	Responsibility	Benefits	0.2
C5	Work result	Benefits	0.2
	Total		1.00

After making the criteria, the value of each criterion is classified based on employee performance with different classification values. This calculation will use four values in each variable so that the evaluation process becomes simpler and easier to understand by the assessor and minimizes the risk of bias in the assessment. Table 4 is the classification value of the criteria used.

TABLE 4
CRISP VALUE DATA

No	Criteria Code	Variables	Mark
1	C1	100%	4
2	C1	95% -< 100%	3
3	C1	90% -< 95%	2
4	C1	< 90%	1
5	C2	> 5 years	4
6	C2	3 - 5 years	3
7	C2	2 - 3 years	2
8	C2	< 2 years	1
9	C3	Very good	4
10	C3	Good	3
11	C3	Bad	2
12	C3	Very bad	1
13	C4	Very good	4
14	C4	Good	3
15	C4	Bad	2
16	C4	Very bad	1
17	C5	Very good	4
18	C5	Good	3
19	C5	Bad	2
20	C5	Very bad	1

There are five employees selected as samples for receiving employee bonuses. Employee assessment is carried out based on the available criteria. After the employee assessment is complete, the next stage is the employee suitability rating process based on the assessment table. The appraiser will determine the value for each employee based on the value obtained from the previously set criteria, as shown in Table 5.

TABLE 5
SUITABILITY RATING

Alternative	Criteria				
	C1	C2	C3	C4	C5
Aloysius	2	3	3	4	3
Anita	4	4	4	3	4
Jonathan	2	2	3	4	3
Judi	1	2	3	3	3
Yuni	3	3	3	4	3

The normalized matrix is obtained from the match rating results using the benefit and cost formulas of the SAW method, which are applied according to the previously defined attributes. Table 6 is the result of the normalized matrix.

TABLE 6
NORMALIZED MATRIX

Alternative	Criteria				
	C1	C2	C3	C4	C5
Aloysius	1/2 = 0.50	2/3 = 0.67	4/3 = 0.75	4/4 = 1.00	4/3 = 0.75
Anita	1/4 = 0.25	2/4 = 0.50	4/4 = 1.00	4/3 = 0.75	4/4 = 1.00
Jonathan	1/2 = 0.50	2/2 = 1.00	4/3 = 0.75	4/4 = 1.00	4/3 = 0.75
Judi	1/1 = 1.00	2/2 = 1.00	4/3 = 0.75	4/3 = 0.75	4/3 = 0.75
Yuni	1/3 = 0.33	2/3 = 0.67	4/3 = 0.75	4/4 = 1.00	4/3 = 0.75

After making the normalized matrix, the ranking process is carried out using the SAW method. The results of the ranking process are shown in Table 7 below.

TABLE 7
RANKING PROCESS

Alternative	Criteria					Amount
	C1	C2	C3	C4	C5	
Aloysius	0.50(20) = 10	0.67(20) = 13.33	0.75(20) = 15	1.00(20) = 20	0.75(20) = 15	73.33
Anita	0.25(20) = 5	0.50(20) = 10	1.00(20) = 20	0.75(20) = 15	1.00(20) = 20	70
Jonathan	0.50(20) = 10	1.00(20) = 20	0.75(20) = 15	1.00(20) = 20	0.75(20) = 15	80
Judi	1.00(20) = 20	1.00(20) = 20	0.75(20) = 15	0.75(20) = 15	0.75(20) = 15	85
Yuni	0.33(20) = 6.67	0.67(20) = 13.33	0.75(20) = 15	1.00(20) = 20	0.75(20) = 15	70

Table 8 is the ranking result obtained and sorted by alternatives that have the opportunity to get a higher bonus followed by other alternatives.

TABLE 8
BONUS RANKING

No	Alternative Code	Employee Name	Ranking
1	A4	Judi	1
2	A3	Jonathan	2
3	A1	Aloysius	3
4	A2	Anita	4
5	A3	Yuni	5

The SAW method has been applied in calculating and determining employee bonuses, resulting in a sequence of employees who deserve bonuses according to the criteria set. Furthermore, researchers will explain the results of the system that has been designed as follows:

1) Tampilan Penilaian (Employee Assessment) Display

This is a display of the Penilaian (Assessment) menu. On this display there is a table regarding the classification of assessments based on criteria. In addition, there is a search field that can search for Nama Karyawan (Empolyee Name) and buttons for filling in employee grades and below it there is a table containing assessment data that can be changed and deleted as shown in Fig. 6.

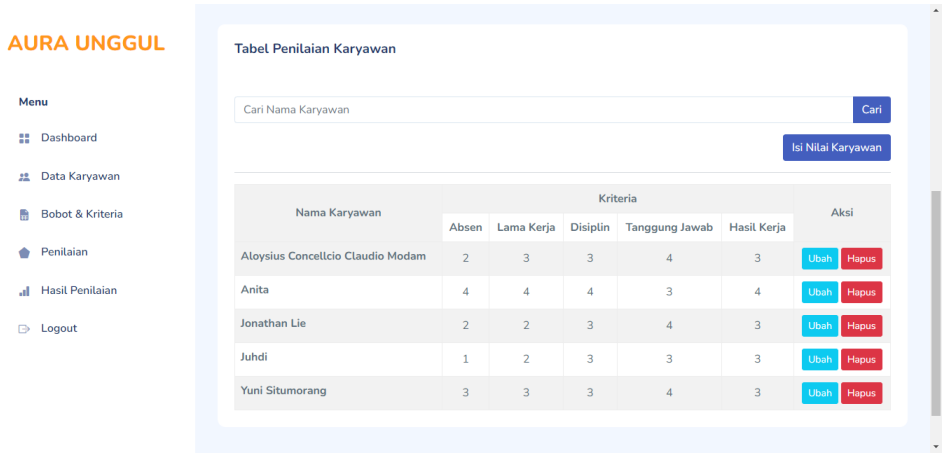

Fig. 6 Employee Assessment Display

2) Display of Hasil Penilaian Karyawan (Employee Assessment Results)

This is a display of the Hasil Penilaian (Assessment Results) menu. In this display there is a Cetak Laporan (Print Report) button to print all the assessment results that have been obtained in the form of a report and there is a table containing the results of the assessment that has been carried out as seen in Fig. 7.

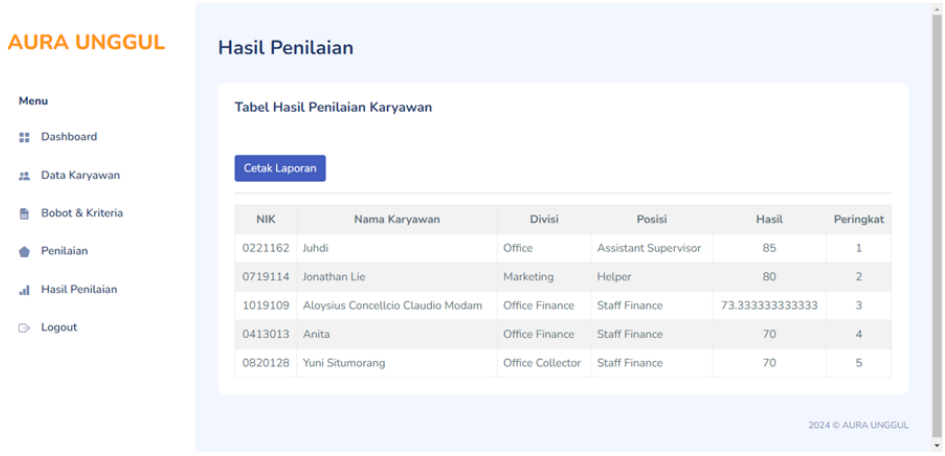

Fig. 7 Employee Assessment Results

3) Cetak Laporan (Print Report) Display

This is the display when the user presses the Cetak Laporan (Print Report) button. On this page, there is a company header, report name, period, assessment table, place & date and there is also a signature of the person in charge as shown in Fig. 8.

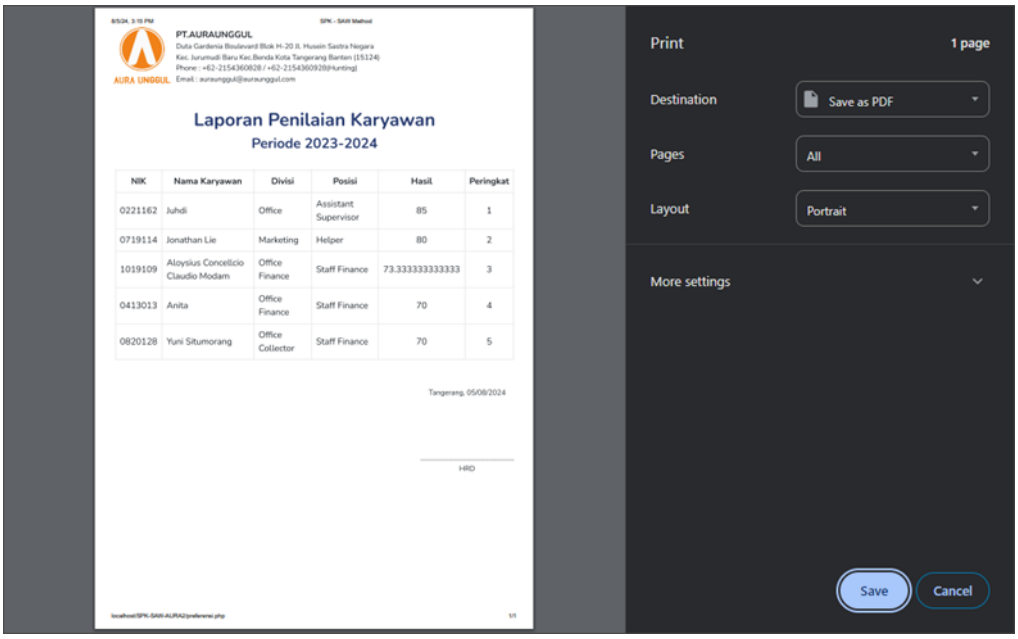

Fig. 8 Print Report

After the program was completed, discussions were held with directors of various levels to assess how the results matched with their observations of employee performance. This provided an opportunity for them to review the results and identify potential discrepancies. In addition, questionnaires were distributed to directors and employees to obtain feedback on the criteria, weightings, and final results. The questionnaire results showed that 85% of the respondents were very satisfied, indicating fairness and accuracy in the appraisal system implemented.

V. Discussion

From the research conducted, it was found that of the 5 employees sampled, there were 3 employees with the top rank, namely Juhdi, Jonathan and Aloysius. The results of manual calculations using the SAW method show compatibility with the implemented system, proving that this method is effective in helping PT Aura Unggul in determining annual bonuses for employees. Although this system provides fast and accurate results, saves time and is effective to use, it should be recognized that there are limitations in this study, such as limited samples and potential bias in performance assessment.

In addition, compared to other studies using methods such as AHP or TOPSIS, SAW offers convenience and speed in the decision-making process, but is less accurate in situations where performance criteria fluctuate. Therefore, further studies are needed to explore the relative advantages and disadvantages of each method.

To improve the accuracy and relevance of the results, it is recommended to implement performance appraisals on a monthly basis in the future. Future research could also consider the integration of machine learning models for predictive performance evaluation, which can provide deeper insights and be adaptive to changes in employee performance.

System testing using the black box testing method shows very satisfactory performance, where all functionality operates properly without experiencing errors. This confirms that the implemented system is effective and efficient for use in making employee bonus decisions.

VI. Conclusions

This research shows that the application of the Simple Additive Weighting (SAW) method in the decision-making system for awarding employee bonuses at PT Aura Unggul significantly improves fairness and transparency. The three highest ranked employees, namely Juhdi, Jonathan, and Aloysius, reflect the effectiveness of this method in providing objective and accurate results. The system results were in line with manual calculations and received positive feedback, where 85% of respondents were very satisfied with the fairness and accuracy of the ratings. Despite limitations such as limited sample size, SAW offers convenience over other methods such as AHP and TOPSIS, although it is less accurate under dynamic conditions. To improve accuracy, it is recommended to implement performance appraisals on a monthly basis and consider the integration of machine learning models. Black box testing shows that the system operates well without errors, confirming the effectiveness and efficiency in making employee bonus decisions.

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