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Decision Support System for Determining the Level of Employee Salary Increase in CV. Hera Citra Abadi by Using the Simple Additive Weghtting (SAW) Method

Suryatmo Sijabat
Informatics Engineering, STMIK Pelita Nusantara, Medan, Indonesia

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ABSTRACT

In accordance with the regulations determined by the office to obtain a promotion, criteria are needed to determine who will be elected to receive promotion. Job promotion is carried out with the aim of providing feedback on the performance produced by a civil servant for a certain period. To help determine in applying someone who deserves to be promoted his position for Decision Support Systems is to use the Fuzzy Multi Attribute Decision Making (FMADM) model. In this study a case was raised, namely looking for the best alternative based on predetermined criteria using the Simple Additive Weighting (SAW) method to calculate the FMADM model in that case. Fuzzy is used using a fuzzy system rule that is fuzzification, inference and deffuzification. This FMADM model was chosen because it is able to select the best alternative from a number of intended alternatives, namely those who have the right to choose employees to be promoted in accordance with the specified criteria. The research was conducted by looking for weight values for each attribute, then a ranking process was carried out that would determine the optimal alternative, namely the best civil servants.

Corresponding Author:

Suryatmo Sijabat,
Informatics Engineering,
STMIK Pelita Nusantara Medan,
Jl. Iskandar Muda No. 1 Medan, 20154, Indonesia.
Email: Suryatmosijabat@gmail.com

1. INTRODUCTION

Human resources in a company organization are very important to support the progress and quality of the company in achieving its goals. An increase in employee salaries is a very important factor for employees [1] [2]. Seeing the current condition of CV.Hera Citra Abadi, performance appraisal of employees in the company is very necessary and has become the most important part for the purpose of improving company performance and improving the welfare of employees.

In this case CV.Hera Citra Abadi gives salary to each employee RP.1.400.000 and will increase if it reaches the sales target. The bonus also includes attitude at work, responsibility when carrying

out work and no absences for 1 month. Every employee who does not work outside the leave (apsen) will be subject to a sanction in the form of a salary deduction of Rp. 40,000/apsen.

At CV.Hera Citra Abadi each employee will receive a bonus if the employee has met certain points which are still being evaluated manually which is an obstacle in terms of increasing employee salaries where employees often do not get bonuses where the employee has met the points and ultimately affect the performance of these employees because it is difficult to determine the level of increase in employee salaries.

The development of technology and information that continuously experiences rapid progress can be utilized to facilitate all activities within the company [3] [4]. Decision support systems are part of a computer-based information system that is included in a knowledge-based system or knowledge management that can be used to support decision making in an organization or company [5] [6]. Decision support systems can help decision makers with data information that has been processed by relevant and necessary to make decisions about a problem more quickly and accurately [7] [8] [9].

Simple Additive Weighting (SAW) is a method for making decisions using various criteria and assessments for each criterion, so the basic concept of the SAW method is to find the weighted sum of the performance ratings on each alternative and on all attributes that require a normalization process. decision matrix (X) to a scale that can be compared with all available alternative ratings [10] [11] [12]. The SAW method was chosen because it is able to select the best alternative from a number of alternatives based on the specified criteria.

By using a decision support system the SAW method is estimated to be able to overcome the problems that arise in CV. Hera Citra Abadi, namely by determining the decision criteria for the level of employee salary increases, collecting employee data based on predetermined criteria so that it can be calculated using the SAW method and an application was built to make it easier to determine the level of salary increase decisions for each employee.

SAW method is often also known as the weighted addition method. The basic concept of the SAW method is to find the weighted sum of the performance ratings for each alternative on all attributes. The SAW method requires the process of normalizing the decision matrix (X) to a scale that can be compared with all existing alternative ratings [13] [14].

Beginning in October 1994, Booch, Rumbaugh and Jacobson, three of the most widely used methodological figures, pioneered efforts to unify object-oriented design methodologies. In 1995 released the first draft of UML (version 0.8). Since 1996 the development has been coordinated by the Object Management Group (OMG).

Unified Modeling Language (UML) is a language based on graphics or images for visualizing, specifying, building and documenting a software development system based on Object Oriented [15].

2. RESEARCH METHODS

Several research methods were carried out by the author in order to collect the data needed for research needs. Among them is by way of observations made by the author directly at the research site. For more details below, the authors explain the research methods that the authors use, namely: correlational; evaluation; survey; case study; basic theory.

2.1 System Requirements Analysis

Based on the results of observations that the author made on the case study company, the author described the system requirements in the form of a flow of document, as shown in the image below:

Personnel department	System Admin	Leader

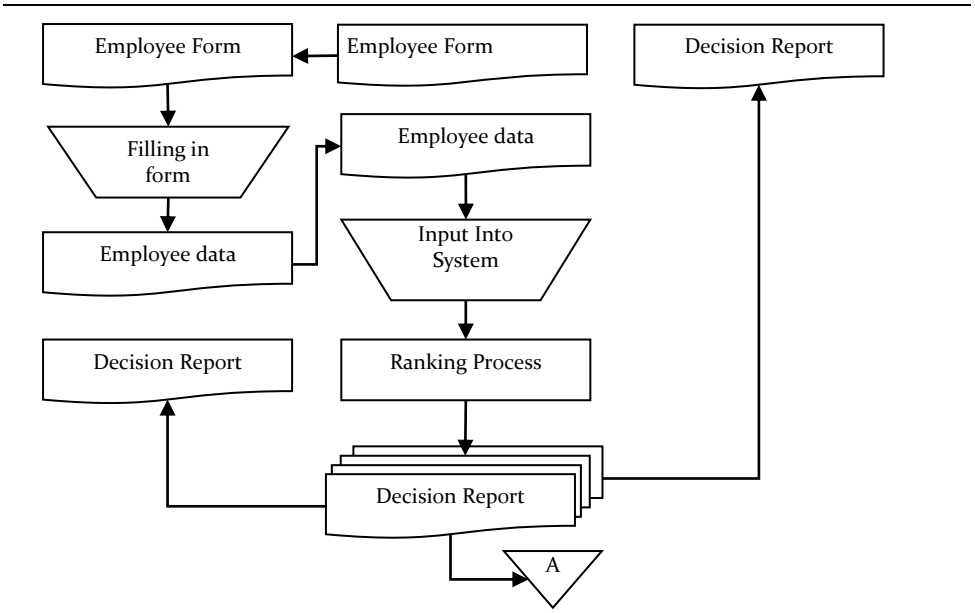

Figure 1. Flow Of Document System Requirements

Based on observations, the analysis of system requirements can be seen from the flow of document table above, the system requires employee data form documents as input data so that the system can perform the ranking calculation process using the SAW method.

2.2 Description of the Simple Additive Weighting (SAW) Method

The SAW method is often also known as the weighted addition method. The basic concept of the SAW method is to find the weighted sum of the performance ratings for each alternative on all attributes. The SAW method requires the process of normalizing the decision matrix (X) to a scale that can be compared with all existing alternative ratings [16]. The formula for the Simple Additive Weighting (SAW) method can be seen below:

$$r_{ij} = \begin{cases} \frac{x_{ij}}{\underset{i}{Max}\, x_{ij}} \; Jika\ j\ adalah\ attribut\ keuntungan\ (benefit) \\ \frac{\underset{i}{Min}\, x_{ij}}{x_{ij}} \; jika\ j\ adalah\ attribut\ biaya\ (cost) \end{cases} \quad \text{.....(1)}$$

Description:

rij = normalized performance rating value
xij = attribute value owned by each criterion
Max xij = the largest value of each criterion
Min xij = the smallest value of each criterion
benefits = if the largest value is the best
cost = if the smallest value of t is the best

Where rij as the normalized performance rating of alternative Ai on attribute Cj ; i=1,2,...,m and j=1,2,...,n . The preference values for each alternative (Vi) can be seen below:

$$V_i = \sum_{j=1}^{n} W_j \; r_{ij} \quad \text{.....(2)}$$

Description:

Vi = ranking for each alternative
Wj = weight value of each criterion
rij = normalized performance rating value

A larger Vi value indicates that alternative Ai is preferred.

2.3 Steps to Solve Using the SAW Method

The steps for solving problems using the Simple Additive Weighting (SAW) method.

a. Determine the criteria that will be used as a reference in decision making, namely Ci.
b. Determine the suitability rating of each alternative on each criterion.
c. Make a decision matrix based on the criteria (Ci), then normalize the matrix based on the equation that is adjusted to the type of attribute (profit attribute or cost attribute) in order to obtain a normalized matrix R.
d. The final result is obtained from the ranking process, namely the addition of the normalized matrix multiplication R with the weight vector so that the largest value is chosen as the best alternative (Ai) as the solution.

3. RESULTS AND DISCUSSION

3.1 System Implementation

Before implementing the system created, it is necessary to pay attention to the needs of the software and hardware requirements to maintain the stability and smoothness of the system when it is run.

3.2 System implementation stages

To implement the system, it is necessary to carry out the stages of implementation, namely as follows:

a. Login

The login form is required for authentication of users who may and may not use the system, the system that is allowed to access the system is a user who has a username and password obtained from the administration system.

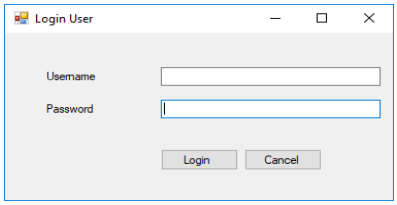

Figure 1. Login Form

b. Main Menu Form

The main menu form will open after the user who has logged in successfully, while the function of the main page is to contain menus that can call each page needed for system purposes.

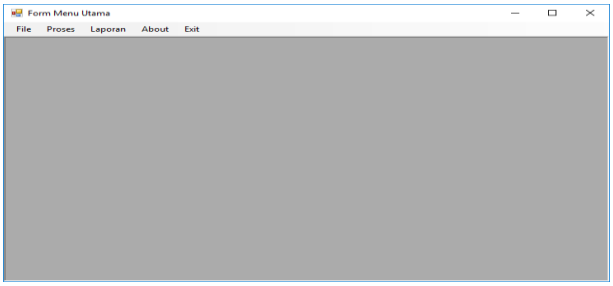

Figure 2. Main Menu Form

c. Employee data

Employee data forms are required to fill out and add employees who will be ranked in the system, additional employees can be accessed by filling out the form and clicking the save button, then changes to employee data can be made by clicking the edit, delete or new button.

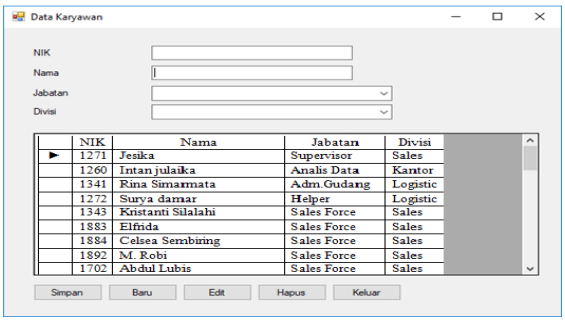

Figure 3. Employee Data Form

Meanwhile, to exit the employee data form page, the user can click the exit button. The employee data form above will be directly connected to the database, so by making changes to employee data, other data related to employee data such as ranking data will also automatically change.

d. Rating Data

The assessment data form can be accessed from the main menu form by clicking on the file menu and the assessment data. While the function of the assessment data is to conduct an assessment of each criterion for each employee, the assessment is carried out by filling in the criteria numbers which can be seen in the fuzzy table in the previous chapter. The numbers in the criteria column will directly affect the ranking results resulting from calculations using the SAW method.

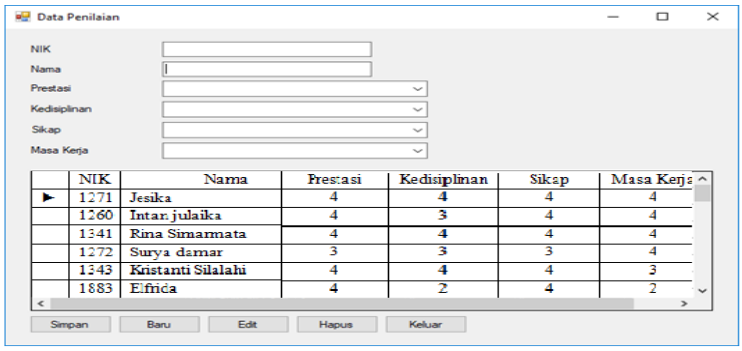

Figure 4. Assessment Data Form

e. Ranking Data

The ranking data form can be accessed from the main menu form by clicking on the process menu and ranking data. While the function of the ranking data form is to calculate and see the highest ranking data as indicated by the percentage increase in salary, the largest salary increase is 0.15 or equal to 15%, while a 0.1 increase in line is the same as a 10% increase in salary.

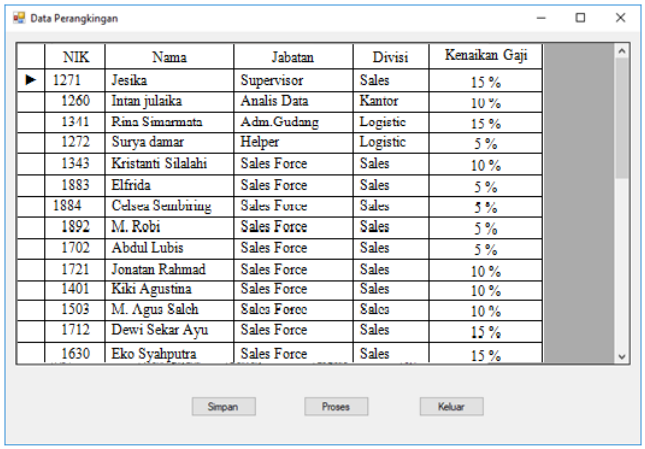

Figure 5. Employee Page

From the results of tests carried out on the system and comparing it with the results of manual calculations, it can be seen that the results of the two calculations are the same and there is no difference at all, it can be concluded that the system built is running as expected or in accordance with the specified goals.

For the ability of the system to rank, it depends on how much alternative data is to be calculated, the more alternative data that is calculated, it is natural that the slower the system works, but as far as the authors carry out the test, there are no significant obstacles that can hinder the running of the system.

4. CONCLUSION

The conclusions obtained from the writing of this thesis are; The process of determining the level of salary increases begins with inputting employee data, inputting assessment data then processing by ranking until results are obtained and then the rate of increase is determined, after which the increase (output) is processed in the form of a report.

The application of the Simple Additive Weighting (SAW) method in making decisions to determine the level of salary increases is done by finding the weighted sum of the criteria for each alternative and on the attributes that require normalization of the decision matrix, then a ranking process is carried out to the preference value to determine the alternative that gets an increase. salary between 5% - 15% or not getting a raise at all.

The decision support system for determining the level of salary increase is designed using the Unified Modeling Language (UML) with Microsoft Visual Basic 2008 (VB.Net) programming language and Microsoft Access 2007 database.

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