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Moora Method (Multi Objective Optimization On The Basic Of Ratio Analysis) For The Best Motorcycle Selection Recommendations

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Abstract
Motorcycles are one of the main choices of transportation that are of interest to the public, especially Indonesia, because they are simple in size, fast and cheaper than other means of transportation such as cars. Now many emerging types / types of motorcycles complete with advantages and disadvantages. This of course will make it difficult for consumers to make the right choice, according to the desired criteria. To make it easier for buyers to choose the type of motorcycle that suits their wishes, a decision support system is designed to recommend the appropriate type of motorcycle. This system was built with accurate calculations using the MOORA (Multi Objective Optimization on The Basic of Ratio Analysis) method so that the accuracy of calculations is guaranteed which is applied using PHP MySQL software. With this system, buyers will have no difficulty choosing the type of motorbike that suits their needs and finances so that a comfortable and fast buying and selling process will be created.

Keywords: Honda Motorcycles, MOORA, PHP MySQL, Decision Support Systems

INTRODUCTION

The increase in the use of motorcycles is marked by the increasing number of requests for motorcycles and the more intensively motorcycle manufacturers innovate their products, so that prospective buyers will make the right choice of motorcycle type according to the desired criteria[1]. So we need a way how to choose the right type of motorbike according to the criteria desired by prospective buyers. Decision Support Systems is a specific information system intended to assist management in making decisions related to issues related to semi-structured. many types of motorcycles complete with advantages and disadvantages. This of course will make it difficult for consumers to make the right choice, according to the desired criteria. Therefore, the solution that must be achieved needs to be made a decision support system that helps buyers to determine the type of motorbike that suits the buyer according to the specified criteria. The need for transportation at this time is an absolute necessity in life, especially personal transportation which is needed by the community to carry out their daily activities. Motorcycles are a means of transportation that are in great demand by the public because of the practicality of motorbikes when used on congested highways[3]. According to research conducted by Suha Alvita et al (2018) entitled "Decision Support System for Selection of the Best Motorcycle Mechanic Using the Multi Objective Optimization

Method on The Basic of Ratio Analysis (MOORA)" says that from the results of the best mechanical calculations is A2 with the highest value 0, 428844[2].

METHODS

There are several stages of research methodology carried out in solving the problem. These stages are as follows:

1. Problem Identification
2. Theory Study
3. Data Collection
4. Data Analysis
5. Testing and Implementation
6. Evaluasi

Multi-Objective Optimization On The Basic Of Ratio Analysis (MOORA) Method

The Multi Objective Optimization On The Basis Of Ratio Analysis (MOORA) method is a method introduced by Brauers and Zavadkas. This relatively new method was first used by Brauers in a decision with multiple criteria. The MOORA method has a degree of flexibility and ease of understanding in separating the subjective part of an evaluation process into weighted decision criteria with several decision-making attributes. This method has a good level of selectivity because it can determine goals from conflicting criteria. Where criteria can be profitable (benefit) or unprofitable (cost). The MOORA method is widely applied in several fields such as management, building, contracting, road design, and economics. This method has a good level of selectivity in determining an alternative. The approach taken by MOORA is defined as a process simultaneously to optimize two or more conflicting constraints[3].
This vehicle is a two-wheeled transportation tool that is driven by an engine. If you pay attention, the location of the two wheels is in a straight line and can run at high speeds caused by gyroscopic forces (which can be measured by a gyroscope). This motorbike can also run at low speeds where the balance is affected by the rider's handlebar settings.
The motorbike itself is a vehicle that is easily accessible to public because the price is relatively cheap and can be driven by various groups. The use of fuel is also considered quite economical, making it easier for people to mobilize for various activities, such as work or for touring[4][5].

Decision Support System.

System analysis is very important in research on existing systems. This is done with the aim of designing a new system to make it even better. This system analysis is a very critical and very important stage, because errors in this stage will also cause errors in the next stage[6]. The main purpose of this system analysis is to find errors and weaknesses in the current system, so that improvements can be proposed. In this research, an analysis of the system being studied can also be carried out. It is intended that a solution can be found to deal with the problems that exist in the system. The implementation of the Decision Support System in the recommendations for choosing the best type of motorbike will be processed with the PHP MySQL application using the MOORA (Multi Objective Optimization on The Basic of Ratio Analysis) method which will later become a benchmark for the success of developing the system[7][8]. with the intention of :

1. Assist managers in making decisions on semi-structured problems.
2. Provide support at the discretion of the manager and not intended to replace the manager's function.
3. Increasing the effectiveness of decisions taken by managers more than improving efficiency.

4. Computing speed: where the computer allows decision makers to do a lot of computation quickly at a low cost

RESULTS & DISCUSSION

In determining the selection of the best type of Honda motorbike, a method is needed for its completion. In the MOORA (Multi Objective Optimization on The Basic of Ratio Analysis) method, there are criteria that are used as material for calculation in the assessment process. This is intended to determine the best type of Honda motorbike that will be selected from several alternatives that will be selected. The first step taken to start calculating with the MOORA method is to determine the assessment criteria.

Table 1 Motorcycle Type Criteria

Criteria	Information	Weight	Score	Information	Types of Motorcycles	Score
C1	Type	25	1	Very low	Cub	1
C2	Machine Capacity	35	2	Low	Sport	2
C3	Color Variants	15	3	Enough	Matic	3
C4	Price	25	4	Tall	-	-

Table 2. Motorcycle Engine Capacity Criteria

Engine Capacity	Score
110 CC	1
125 CC	2
150 CC	3

Tabel 3. Criteria for Motorcycle Color Variants

Varian Warna Sepeda Motor	Score
< 2 Variants colour	1
3 - 4 Variants colour	2
5 - 6 Variants colour	3
7 - 8 Variants colour	4
> 9 Variants colour	5

Tabel 4. Motorcycle Price Criteria

Motorcycle Price	Score
Rp. 26.000.000 - Rp. 28.999.999	1
Rp. 23.000.000 - Rp. 25.999.999	2
Rp.20.000.000 - Rp. 22.999.9999	3
Rp. 17.000.000 - Rp. 19.999.999	4
Rp. 14.000.000 - Rp. 16.999.999	5

Tabel 5 Weight Conformity Rating Data and Criteria

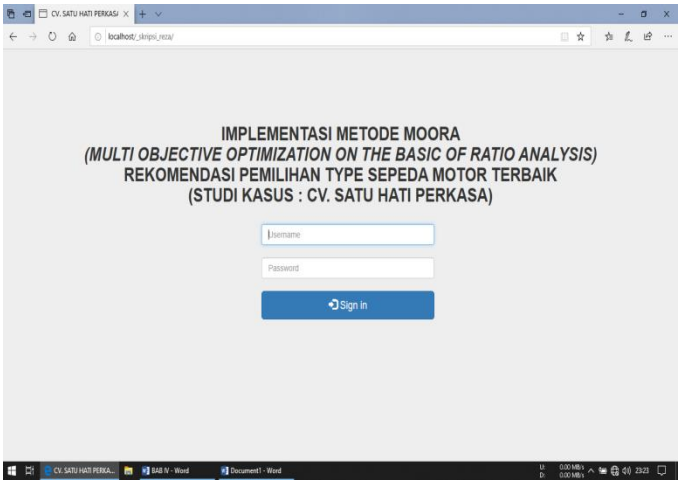
Alternatif	Alternatif	Type	Machine Capacity	Clour	Price
A1	VARIO 125 CBS	3	2	2	3
A2	VARIO 125 CBS ISS	3	2	3	3
A3	VARIO 150	3	3	3	2
A4	BEAT SPORTY CBS	3	1	3	5
A5	BEAT SPORTY CW	3	1	2	5
A6	BEAT STREET	3	1	2	4
A7	BEAT SPORTY CBS ISS	3	1	3	4
A8	SCOOPY	3	1	4	4
A9	SUPRA SPOKE	1	2	1	4
A10	SUPRA CW	1	2	1	4
A11	REVO FIT	1	1	2	5
A12	CB150 VERZA	2	3	2	3
A13	CB150R	2	3	3	1

After designing and performing calculations using the MOORA (Multi Objective Optimization on The Basic of Ratio Analysis) method manually based on predetermined

criteria, the next thing is to implement the system which is the end result of all the designs and calculations that will be applied in the PHP programming language and MySQL database to become a system that runs according to what has been designed and calculated. This stage is the application of software that is tailored to the design or designs that have been made. Applications made will be determined based on needs. In addition, this application will be made in such a way as to make it easier for users to use the MOORA (Multi Objective Optimization on The Basic of Ratio Analysis) Method Application for Recommendations for the Selection of the Best Type of Motorcycle.

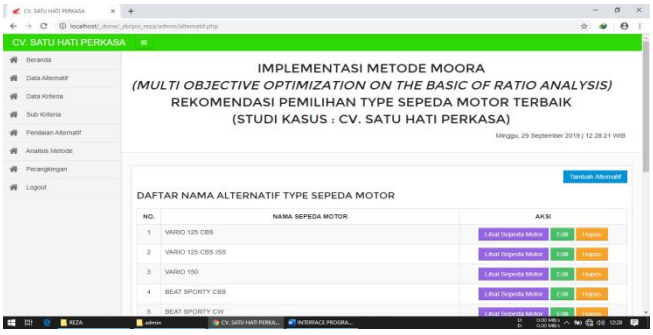
Menu Login

The login page is the initial stage of starting data input into the system by logging in first, the admin needs to fill in the username and password, if the username and password are correct then it will enter into the system.



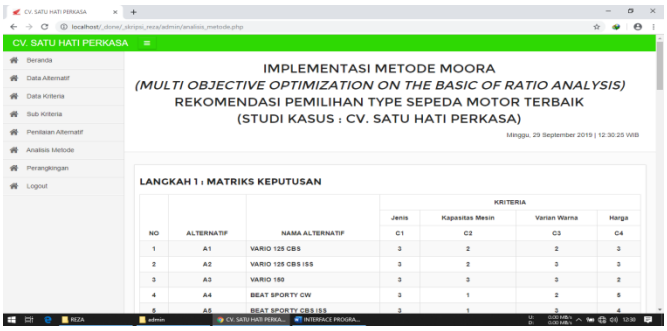
Menu Alternative Data

On the alternative data page display, the admin can input alternative consumer data. In addition to inputting consumer data, the admin can also view data that has been input and edit data if there is an error or delete data.



Menu MOORA Method Analysis

On this page the admin can see an analysis of the MOORA method. Display of the MOORA method analysis page



Menu Ranking

On this page the admin can find out the comparison to choose which type of motorbike has the highest final value as the best alternative.

CONCLUSION

The conclusions that the authors can draw from this study are: The system is used to provide information regarding Recommendations for Selection of the Best Type of Motorcycle, so that it can assist those who need it in making decisions according to existing criteria.This system can assess and decide in selecting the type of motorcycle. From the test results that have been calculated with 17 alternatives, it can be seen that A_3 is the highest alternative with a value of 27.36773. In other words, the A_3 type of Vario 150 motorbike is the best motorbike.

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