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Expert Systems: Web-Based Motorcycle Detection Solutions

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Abstract—Motorcycles are one of the main means of transportation for some people in carrying out their daily activities. Efficient, cost-effective time to the destination, as well as maintenance tools that are quite easy to obtain, make this motorcycle a priority among the community, and this is evidenced by the number of motorcycle users compared to other means of transportation on the road. From the description above, the author makes a system that can make it easier for users to find out problems that occur in the motor, which cause damage so that it can interfere with the activities to be carried out. The system that will be made is an expert system for detecting web-based motorcycle damage. This expert system is made using the BFS method, which is a combination of the two methods so as to produce the best decision from the two searches. The Best First Search method is a merger or combination of the Depth First Search and Breadth First Search methods. Depth First Search method or in-depth search, in this method the expert system will conduct an intensive and in-depth search of the given value or variable. And the Breadth First Search method works by analyzing each root node for immediate testing. From these results it can be concluded that the system is feasible to use and can be used as an alternative solution for the community. Make it easy for motorcycle users to find solutions for motorcycle damage, and make it easier for mechanics to repair motorcycles if they forget the symptoms of motorcycle damage experienced.

Keywords: motorcycle, expert system, breakdown.

I. INTRODUCTION

Nowadays means of transportation has clearly become a very basic need. Many people have used transportation to carry out their daily activities, mobility is almost impossible if you don't use transportation. Therefore, a means of transportation is needed that can support the community in encouraging its progress [1].

Motorcycles are one of the main means of transportation for some people in carrying out their daily activities. Efficient, cost-effective time to the destination, as well as maintenance tools that are quite easy to obtain, make this motorcycle a priority among the community, and this is evidenced by the number of motorcycle users compared to other means of transportation on the road. However, some users are not aware of the problems that occur in the motor that cause damage so that it can interfere with the activities to be carried out. Therefore, motorcycle owners are required to have knowledge about the maintenance of their vehicles. However, some motorcycle owners who do not understand the disturbance or damage that occur to their motorcycle, tend to leave it to the mechanic, regardless of whether the damage is simple or too complicated to repair [2].

Even though the handling that can be done alone without having to come to the workshop or is very helpful, especially for people who are new to automotive and do not have time to go to the workshop[3].

Along with the development of technology, technology is also developed that is able to adopt processes and ways of thinking of humans, namely artificial intelligence technology. Expert system is one part of artificial intelligence. An expert system is a computer-based system that uses knowledge, facts, and reasoning techniques in solving problems that can usually only be solved by an expert in the field [4].

An expert system acts as an expert, in which this system tries to duplicate the knowledge and experience of an expert that can be used to solve problems in a particular field. Expert systems can also provide an explanation of the steps taken and provide suggestions or conclusions found. In this case, the expert system, when associated with the ability of an expert or motorcycle mechanic, can produce a computer system whose job is to identify and analyze the symptoms of a motorcycle disorder and then provide direct recommendations on how to fix it. Thus, even a layman can solve various problems with the help of the expert system [5].

According to research conducted by Dedi Suryadi, with the title "Expert System for Identifying Damage to Industrial Machines Using the Certainty Factor Method" which explains that from the results of the design of an expert system for identifying web-based machine damage, the expert system designed is able to identify engine damage based on vibration

characteristics. stated that the accuracy of the application reached 100%. So that this expert system application can be used as a tool for technicians in the vibration analysis processs [6].

According to research conducted by Roni Yanuar Nainggolan, with the title "Motorcycle Damage Diagnosis Software Based on an Expert System" explains that this expert system is able to diagnose damage and produce conclusions and make it easier for motorcycle users to find out the causes, consequences and symptoms caused from motorcycles. And make it easier for motorcycle users to find solutions for motorcycle damage.

According to research conducted by Januardi Nasir, entitled Expert System To Detect Damage to Motorcycles Using the Web-Based Forward Chaining Method will explain the findings based on research results, the output generated from the expert system in this study is in the form of diagnostic results containing information about cause of the malfunction, symptoms and repair solutions as additional information. The expert system in this study can also be used as a learning medium that can store information on matters relating to 4-stroke motorcycles such as common damage to 4-stroke motorcycles, causes, symptoms and solutions to overcome them [7].

II. RESEARCH METHODS

In the 1960s, the system development project was a very costly and time-consuming job because the development of this system was focused on planning and controlling Basili and Musa, 1991. The waterfall model or method was first introduced by Winston Royce in 1970. The Waterfall Model is a model simple classic with liner system flow [8].

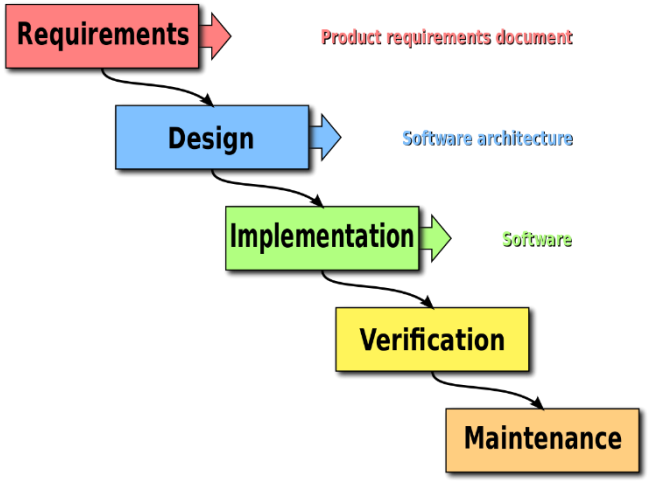

Figure 1. Waterfall System Concept and Development

Based on the picture of the phases in the Waterfall Model according to the reference [9] it can be explained as follows:

1. Needs analysis (Requirements analysis and definitions) is to collect complete requirements then analyze and define the requirements that must be met by the program to be built.
2. System design (System and software design) is a design that is done after the complete system requirements have been collected.
3. Writing program code (Implementation and unit testing) is the program design translated into codes using a predetermined programming language.
4. Program testing (Integration and system testing) is the unification of program units and then tested as a whole (system testing).
5. Program implementation (Operation and maintenance), namely operating the program in its environment and carrying out maintenance, such as adjustments or changes due to adaptation to the actual environment [5], [6], [10], [11].

III. RESULT AND ANALYSIS

The system developed is the old system that will be developed on a computerized system. Inputting damage symptom data and damage solution data that will be entered into the system is one of the models that can be applied because it can provide better results than using the previous system. It requires less funds so that you don't have to change the data location every month because all data will be stored in the database, with the system that will be developed by the employee (admin) it does not require a lot of time so that the work becomes more effective and efficient. There is no doubt to store damage symptom data and damage solution data safely, there is little possibility of data loss or lack of data, in making reports that will be submitted to superiors and leaders do not spend a lot of time without having to re-check the data to be reported.

So that employees who are on duty in operating the system at that time are able to provide fast service to superiors or leaders who are in need of data. System users are also quick to search for data on symptoms of damage and damage solutions as desired [12].

The flow of the system being developed at Ahass UMS Motor is as follows:

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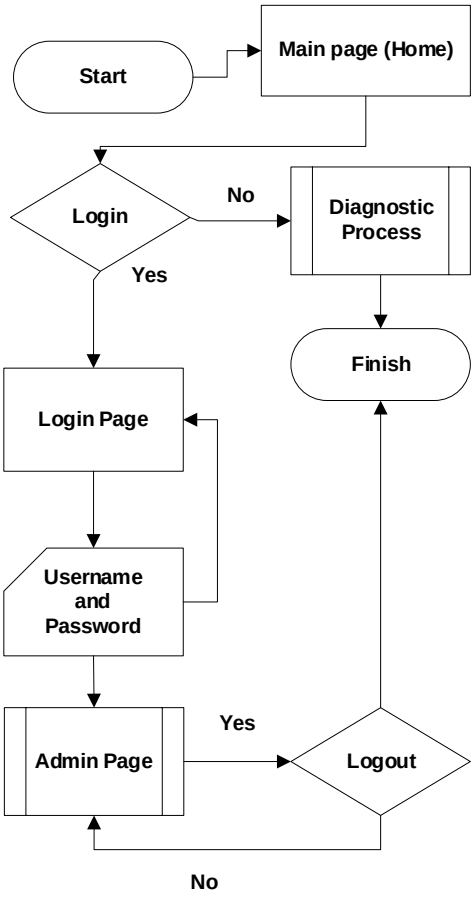

Figure 2. System Under Development

Context diagram is a diagram that describes the outline of the information system and the entities involved in the system. The context diagram also explains the incoming and outgoing data flows.

The following is a context diagram of the WEB-Based Motorcycle Damage Detection Expert System on figure 3.

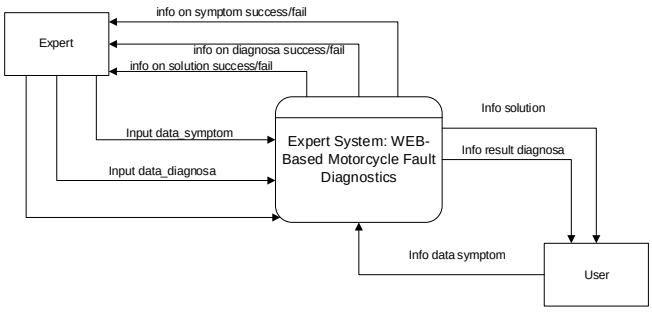

Figure 3. Context Diagram Design

The results of the study should be written clearly and Interface design aims to provide an overview of the application to be built. So that it will make it easier to implement the application and will facilitate the creation of user friendly applications.

The application design to detect the type of damage to the motorcycle will be made as follows figure 4.

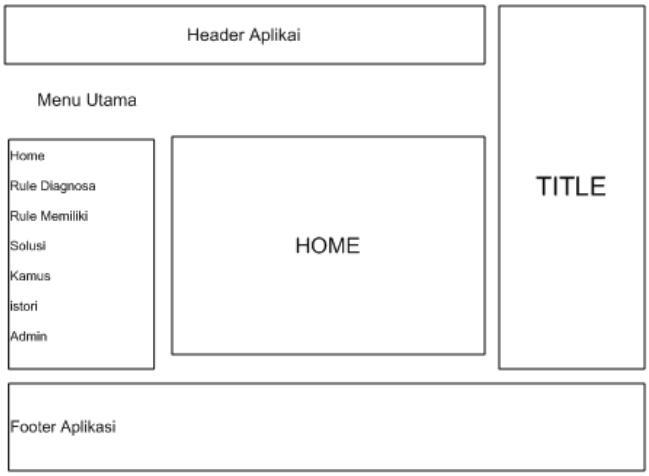

Figure 4. Design Application

while the results of the development of an expert system for diagnosing motor damage can be seen in the picture 5-11 below:

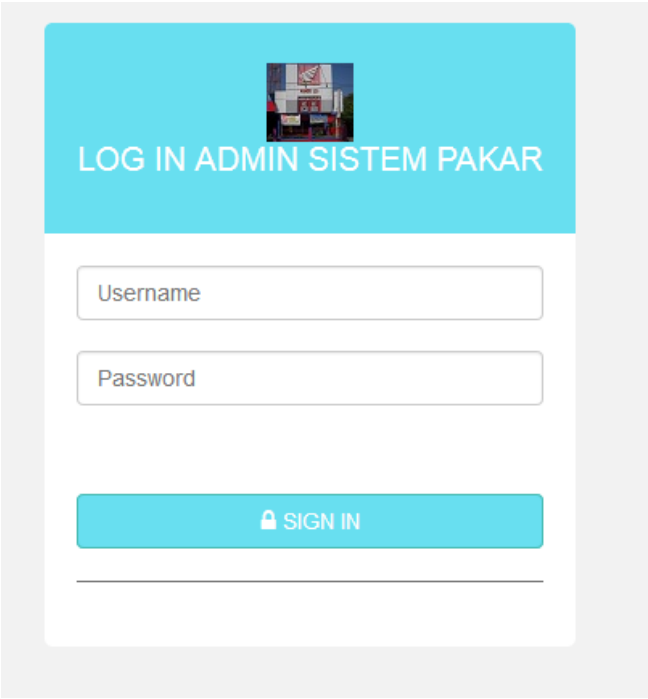

Figure 5. Login Page

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Figure 6. Home Page

Figure 7. Add Page

Figure 8. Data Symptom

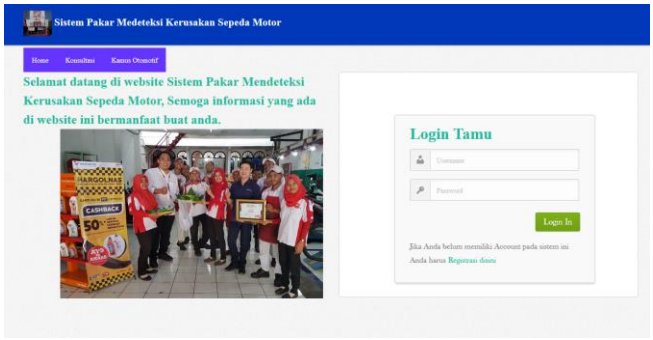

Figure 9. Login Page User

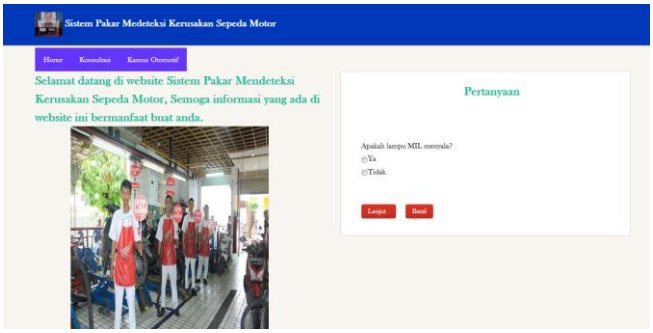

Figure 10. Data Diagnosa

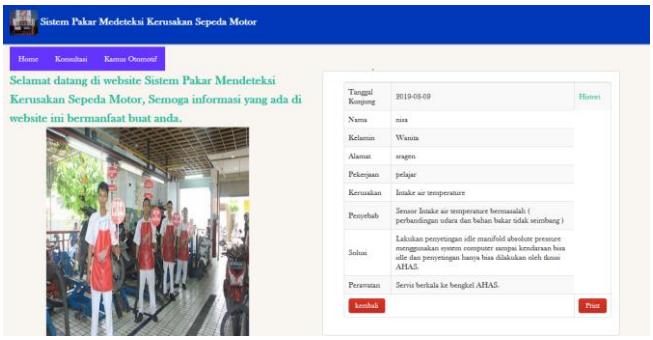

Figure 11. Result Diagnosa

Program testing is an important part in the development of a software, testing is intended to find errors that occur in the program and ensure that the program built is in accordance with what has been designed.

The test design that will be carried out in this application uses the blackbox method. This blackbox test focuses on system functions. This method is used to find out whether the software is working properly and correctly[9] [13].

Table 1. Black Box Test

No	Interface	Type of Unit Tested	Results
1	admin login form	Enter admin username and admin password	Success
2	Home View	Displays the Consultation and Dictionary menu	Success
3	admin home view	Show admin start page	Success
4	Data input menu display	Displays the input form from the data	Success
5	Edit menu display	Show edit form	Success
6	Clear data display	Show delete form	Success

IV. CONCLUSION

Based on the results obtained and the analysis carried out for the diagnosis of motorcycle damage, the following conclusions can be drawn:

1. This expert system is able to diagnose damage and generate conclusions and make it easier for motorcycle users to find out the causes, consequences and symptoms caused by motorcycles.
2. Make it easy for motorcycle users to find solutions to motorcycle damage.
3. Make it easier for mechanics to repair motorbikes, if they forget the symptoms of motorbike damage experienced.

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