Design of Damage Diagnosis Information Systems on Manual Not Automatic Motorcycles

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Abstract— The development of technology is currently growing rapidly and is needed in everyday life, making it easier for humans to carry out all their activities as promptly as possible. Currently, humans have also used a lot of motorbikes to move around everywhere in doing work, so that the work process runs smoothly. However, motorcycle damage often occurs due to lack of understanding of information in the repair and maintenance of the motorcycle, so that motorcycle deaths often occur in the middle of the trip. Therefore I have the idea to create a Damage Diagnostic Information System for Non-Metik Duck Motorcycles using the Visual Basic.net application, thus motorbike owners can overcome damage & maintenance on their motorbikes.

Keywords— Information Systems, motorcycle damage, visual basic.net.

I. INTRODUCTION

Motorcycles are currently one of the main means of transportation for people to support their daily mobilities, even as a mean for entrepreneurship. Time efficient, cost-effective to the destination, as well as maintenance tools that are quite easy to access. Most of the people now also know some of e-commerce services such as GOJEK, GRAB, MAXIM and many other transportation services that use motorbikes. Therefore, it can be proven that there are more users of motorcycles than users of other means of transportation on the highway

However, it is not always the motorbike that is used that is always fine, there will definitely be problems on the motorbike that cause damage so that it can interfere with the activities of the riders. this is due to a lack of knowledge about maintenance on motorcycles. Negligence of motorcycle riders in carrying out monthly service and routine maintenance results in damage that can arise suddenly or have signs. few riders often hand over their motorbikes to mechanics without knowing that the damage is actually simple or too complicated to repair.

Handing over the damage to a mechanic or taking it directly to a repair shop is a practical step and the easiest solution. However, if the rider has knowledge of motorcycle damage treatment, the motorcycle damage can be handled by the rider himself so that the handling of the damage that occurs can be handled by himself without having to wait for the motorcycle to be repaired at the workshop.

To overcome the problems, we need an application system that is able to analyze, find and provide solutions to problems on the riders' motorcycles. Then the ability of a motorcycle mechanic can be implemented into an application. An application system that can work like a human or an expert

works for real so it can be called an expert system. An expert system that utilizes computer technology to accommodate the abilities/expertise of an expert (Kusrini, 2006). In this case a mechanic play a role to expert the process of analyzing a problem by using a designed application. This application represents an expert in analyzing a problem such as diagnosing damage to a motorcycle, hence repairing motorcycle based on the right treatment can be more effective and efficient.

Based on this description, a final research will be carried out with the title "Designing a Damage Diagnostic Information System for Honda Duck Motorcycles".

II. LITERATURE REVIEW

A. Information Systems

The information system is a collection or series of components that are interconnected, work together and interact with each other to achieve a goal by going through three stages of input (input), process and output (out) (Wongso, 2016). In addition, the system can be defined as a set of interrelated or integrated elements intended to achieve a goal. As an illustration, if a system do not provide elements that can give benefits in achieving the certain goals, these elements will certainly not be a part of the system (Kadir, 2017).

B. Expert system

According to Mudrick and Rios in Al-Fatta (2008:3), expert system defines "a system as a set of elements that are combined with one another for a common goal". According to Kusrini (2009:17), "expert systems are a branch of artificial intelligence and also a field of science that has emerged along with the recent development of computer science.

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 field. An expert system is designed to solve a particular problem by imitating the work of experts. This system can help ordinary people understand and solve complex problems that previously can be solved with the help of experts itself.

C. Visual Basic.Net

Visual Basic NET or VB .NET is an object-oriented programming language (OOP) created by Microsoft. Microsoft leverages VB .NET to develop (what object is developed?) frequently used Windows applications. Visual Basic .NET is is implemented in the .NET framework.

VB .NET can be used if it is supported by the NET framework application/software which has full access to the .NET libraries. VB .NET programming is considered more productive and more reliable in making various kinds of applications using NET framework. This programming is not only used for the Windows operating system, but also used for other systems such as Linux and Mac OS operating system.

D. Flowchart

A flowchart is a chart that shows the flow in a program or system procedure logically. Flowchart is a method to describe the stages of problem solving by representing certain symbols that are easy to understand, easy to use and standard. The purpose of using a flowchart is to describe a stage of problem solving in a simple, unraveled, neat, and clear way using standard symbols. The stages of problem solving presented must be clear, simple, and precise (Sukamto & Salahuddin, 2018),

III. METHOD

System analysis is a technique or method of solving problems by describing the system into its constituent components to figure out how these components work and interact with each other to achieve a goal of the designed system.

System analysis is usually carried out to design system applications. System design is a step in a problem-solving technique in which the components of the system are combined to form a whole system. The result of the system design provides an overview of the components that has been improved. The technique of this design system includes the process of adding, removing, and changing components from the original system.

A. Approach Method

This research starts by identifying the problem, designing the method and reviewing literature study, knowledge representation, system and database design, system creation, testing and analysis of system results and decision making. The first step in developing the application is to identify the problem that occurs in the community. The method employ in-depth interviews with mechanics and the community including apply library studies from books and journals. The problems that will be taken in the application to detect the damage in the motorcycle and provide the solution to handle the damage.

B. Method of Collecting Data

The data collection method used interviews with mechanics at the Joint Venture Workshop and several other mechanics to ascertain the symptoms and overcome the problem related to the damage in motorcycle. The literature study adopted several books and journals of design system in mechanic (may mention the topics of journals and books related to this study more specifically). The problems was found that (reiterate the problems experienced by the motorcycle user community). Therefore, this study focuses on helping the motorcycle community to detect the damage in motorcycles independently and understand the right treatment

to the motorcycle so it can prevent ....(what can be prevented from maintenance errors due to incorrect fault diagnosis).

Types of damage and Symptoms are as follows:

1. Damage to the piston Symptoms are as follows:
    a. White smoke coming out of the exhaust
    b. Engine heats up fast
    c. Rough sound on the starter dynamo
    d. The power generated is weak
    e. Spark plugs die easily

2. Damage to digital CDI Symptoms are as follows:
    a. The engine stalls ± stalls when running
    b. Spark plugs die easily
    c. Little red spark plug

3. Damage to the valve Symptoms are as follows:
    a. Wasteful fuel
    b. Black smoke coming out of the exhaust
    c. The power generated is weak
    d. Engine is not stationary (gas sometimes small sometimes big)

4. Damage to the electric starter Symptoms are as follows:
    a. Hot starter dynamo
    b. When turned on with an electric starter, there is no sound at all
    c. Rough sound on the dynamo

5. Damage to the engine chain Symptoms are as follows:
    a. Engine stutters ± stutters when running
    b. The power generated is weak
    c. Rattling sound on the chain when the temperature is cold

6. Damage to the clutch brake Symptoms are as follows:
    a. Engine heats up fast
    b. There is a jolt when shifting gears
    c. Often loses when entering the transmission gear.
    d. Data Collection and Preprocessing

The benefit of an expert system application relies on the information related motorcycle damage that has been collected and processed into conclusions. The knowledge was collected from interviews and analysis through books and then, converted into a table of damage and symptoms. This table will facilitate the process of finding solutions. This table of damage and symptoms is used as a pattern of matching the information from the user and the knowledge base as presented in table 3.1.

Table 3.1. Damage and Symptoms Table

Gejala	Damage					
	KS100	KS101	KS102	KS103	KS104	KS105
GJ001			*			
GJ002				*		
GJ003			*			
GJ004	*					
GJ005	*					
GJ006					*	
GJ007				*		
GJ008	*					
GJ009	*					
GJ010	*					
GJ011					*	
GJ012				*		

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GJ013						*
GJ014			*			
GJ015						*
GJ016						*
GJ017		*				
GJ018		*				
GJ019		*				

Information :

KS100 : Damage to piston
KS101 : Damage to digital CDI
KS102 : Damage to valve
KS103 : Damage to electric starter
KS104 : Damage to the engine chain
KS105 : Damage to clutch brake
GJ001 : Wasteful fuel
GJ002 : Hot starter dynamo
GJ003 : Black smoke coming out of the exhaust
GJ004: White smoke coming out of the exhaust
GJ005 : The engine heats up fast
GJ006 : Engine stutters when running
GJ007 : When turned on with the electric starter, there is no sound at all very
GJ008 : Rough sound on the starter dynamo
GJ009 : Power generated is weak
GJ010 : Spark plugs die easily
GJ011 : Rattling sound on the chain when the temperature is cold
GJ012 : There is a jolt when shifting gears
GJ013 : Often loses when entering the transmission gear
GJ014 : Engine is not stationary (gas sometimes small sometimes big)
GJ015 : There was a jolt when shifting the transmission
GJ016 : Lost when shifting gears
GJ017: Engine chokes GJ018: Spark plugs often die
GJ019 : Small red spark plug.

C. Needs Analysis

An analysis to understand the need of the users in diagnosing motorcycle damage is certainly recommended in this study. The purpose of this study intends to create an application = that is the user friendly Besides, it is necessary to build the hardware to support and maximize the software performance. Hardware device requirements, software device requirements, human resource requirements (brainware), performance, security, and information are the parts of data that will be collected to the need analysis.

The recommended hardware to run the application is:
1. Processor with a minimum speed of 1 GHz
2. Hard disk capacity of at least 80 GB
3. Minimum 2GB RAM
4. Monitor with 1024 x 768 . resolution
5. Mouse
6. Keyboard
7. VGA Card at least 1GB

Software requirements are the factors to design a software designer in accordance with the intention and purpose of the software. Some of the supporting software is shown in table 3.2.

Table 3.2. Software Analysis Table

No.	Software	Information
1.	Microsoft Windows 10	Operating system
2.	Adobe Photoshop	image editing tool
3.	Google Chrome	Browser
4.	Visual Basiv.Net	programming app
5.	Notepad	Programming Toll
6.	Database	Acces
7	Ms.Office	make a report tool

D. Data Flow Diagram Design

The design of the data flowchart diagram system in the manual Honda motorcycle damage diagnosis application can be seen in Figure 3.1
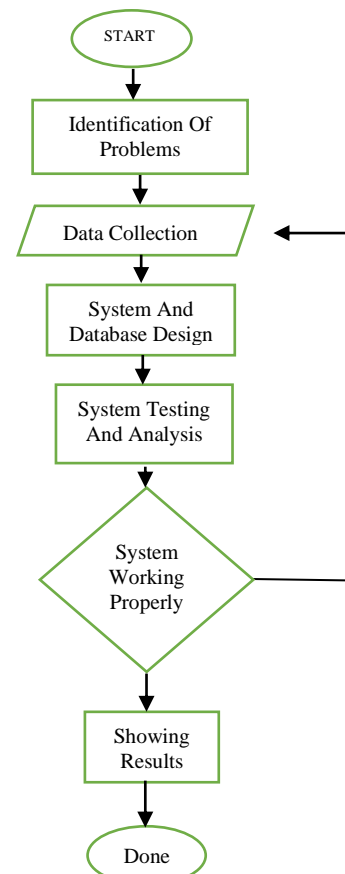

Figure 3.1 Application Development Flow Honda motorcycle malfunction diagnosis system Manual is not automatic

IV. RESULT & DISCUSSION

The result display is a method to introduce a way to operate the implemented system. By implementing this system, the user will more understand how to use the system.

A. Main Menu Result Display

This view showsthe first display when the users want to use and login to the application. If the users play as an admin, they need to inputthe Username and password as an admin. In reverse, it will not work to login if they do not want to login as an admin. Then, click the "Start Detection" menu if the users do not want to go directly as an admin to start detecting the motorcycle damage. In Figure 4.1 it shows the image of the main menu of the application
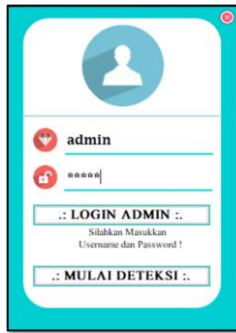
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Figure 4.1 Main Menu Result Display

B. Show Application User Data Menu Results

This display emerges when the users input their name as the mechanic orthe motorcycle owner. After typing the name then click the OK menu. In Figure 4.2 it shows the results of the second menu display.

Figure 4.2 Display of Application User Data Menu Results

C. Display of First Damage Detection Results

This display is shown when visitors or mechanics are directed to choose one of the conditions or symptoms in their motorcycle. Then select Next to continue detecting the next symptom. In Figure 4.3 it shows the display of the results of the first damage detection.

Figure 4.3 Display of the First Damage Detection Results

At this stage, the display will present 6 questions on the screen of the application. Each questions can be answered by selecting YES / NO, then after selecting the answer, the users can click Next to continue the next question until it reaches the last question. Having all questions answered, the results of

the question will be appeared. The result will reveal what solutions to be repaired on the motorcycle.

D. Display of Damage Diagnostic Detection Results

This display shows the results of the questions that have been answered in the crash detection display. In this display, it will be notified whether our motorcycle is fine or it needs to be repaired or what components needs to be replaced. In Figure 4.4 the display shows the results of the damage diagnosing and the solution.
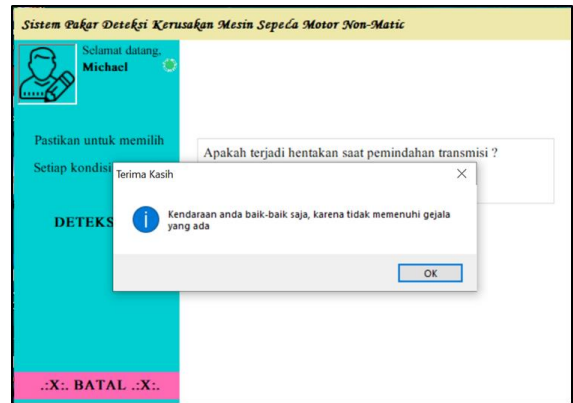

Figure 4.4 Display of Damage Diagnostic Results and Solutions

E. Display of Login Results For Administrators.

In this display, for the benefit of the administrator, this display only provides an information on the damage that occurs to several components of the motorcycle. Some of the damage information can be seen in the pictures below:

Figure 4.5 Administrator Results Display

F. Administrator Display for Piston Damage Information

Figure 4.6 Piston Damage Administrator Results Display

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G. Administrator Display for CDI Damage Information.

Figure 4.7 Display of CDI Damage Administrator Results

H. Administrator Display For Valve Damage Information

Figure 4.8 Display of the results of the administrator of the valve damage

I. Administrator Display for Clutch Brake Damage Information

Figure 4.9 Administrator Result Display Clutch Brake Damage

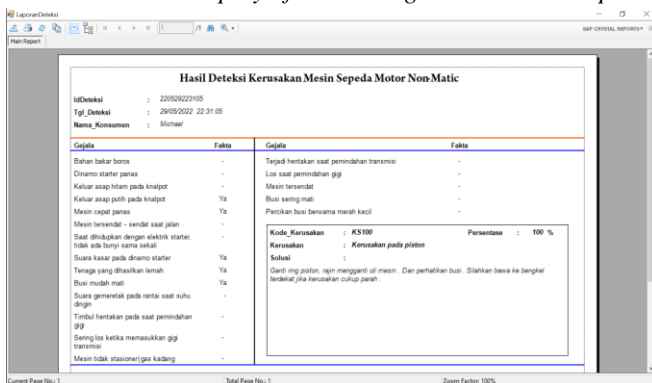*J. Administrator's Display of Fault Diagnostic Results Report*

Figure 4.10 Display of Damage Diagnostic Results

This display, can be exclusively visited by admins. So this report can be printed by the admin, and then submitted to the motorcycle owner. This display can also reveal the solution for the type of symptom damage that arises after the question has been answered in Figure 4.3

K. Administrator Display Report All Damage Diagnostic Results

This display shows all reports on the results of the damage detection occurred in the users' motorcycles. The questions and the answers on the report form will be seen in the result display as well as the solutions. An example of the display can be seen in Figure 4.10 below.
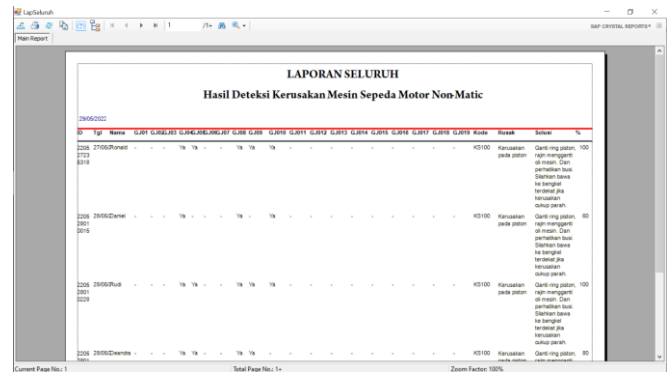

Figure 4.10 Display of all the results of the fault diagnosis report

Figure 4.10 shows the stages and the appearance of the results in the application which works to diagnose the motorcycle damage. The system works to process information about the types of damage to components and their maintenance at the beginning

V. CONCLUSION

Based on the observations made at the Workshop from preparation, accomplishing observation or data collection, the conclusion is drawn as follows:

1. The application system for diagnosing damage that occurs on manual motorcycles is very helpful in determining the replacement of damaged motorcycle parts.
2. Repair maintenance activities on motorcycles can be overcome more quickly by using a fault diagnosis application system.
3. This diagnostic application system helps motorcycle owners in executing maintenance and repairs on their own motorcycles.

VI. OTHER RECOMMENDATIONS

Based on the conclusions, the author suggests that the application system for diagnosis of damage to this motorcycle can be further developed as described as follows.

1. It is suggested that the data collected in the form of symptoms of motorcycle damage is more reproduced, for more of the diagnostic system can be detected.
2. The design of this system is not only applicable for mechanics but also can be applied for consumers or motorcycle owners

3. This application system can be redeveloped to detect automatic motorcycles, so that it can be used for all types of motorcycles.

VII. ACKNOWLEDGEMENTS

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