



Vehicle Security System Using Sms (Short Message Service) As Monitoring In Motorcycle Vehicles

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ABSTRACT

Private vehicles are valuable assets for everyone. Each vehicle owner usually has their own way of protecting their vehicle from damage or loss, with many cases of motor vehicle theft in Indonesia making vehicle owners to be vigilant. Moreover, the lost vehicle will be difficult to find, one reason is the difficulty to track the whereabouts of the vehicle during the theft. Various efforts of vehicle owners to improve the safety of motorized vehicles that are parked, both in the public parking area or on the yard of the house, so that it is not easy to trigger theft.) Producing a system that can monitor and request the location of a motorcycle vehicle when the vehicle is in danger or is stolen. The research method used is an analysis consisting of analysis of work methods and requirements analysis, a design consisting of hardware design and software design, an application consisting of hardware application and software application and finally a test consisting of testing of GPS , testing of GSM, testing all components and testing SMS applications. the conclusion of this research is (i) The hardware manufacture of "vehicle safety system using SMS (Short Message Service) as monitoring on motorcycle vehicles" was successfully made with the Arduino Uno microcontroller which is supported by the software in it and combined with several series supporting each other and (ii) Making software for "vehicle safety systems using SMS (Short Message Service) as monitoring on motorcycle vehicles" is a C language programming system that is made to work properly.

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1. Introduction

Private vehicles are valuable assets for everyone. Each vehicle owner usually has their own way of protecting their vehicle from damage or loss, with many cases of motor vehicle theft in Indonesia making vehicle owners to be vigilant. Moreover, the lost vehicle will be difficult to find, one reason is the difficulty to track the whereabouts of the vehicle during the theft[2-5]. According to the security guard on duty, there were several cases occurring in public areas or crowded places, such as in the campus of UIKA many incidents of motorcycle theft in the campus area. Data that mentions a lot of theft occurred in the UIKA campus parking area $\pm$ 2 to 3 in the last few months of 2019. Why do you lose a lot in this campus area because of the security of those vehicles that don't have double keys or secret keys. Vehicle owners are also very difficult to track the whereabouts of stolen motor vehicles. Various efforts of vehicle owners to improve the safety of motorized vehicles that are parked, both in the public parking area and in the yard of the house, so as not to easily trigger theft. Then the author will discuss the results of a vehicle safety system research that can send a warning to the owner of a motorcycle vehicle if the motorcycle is stolen. Besides that the device is equipped with GPS so the owner can see or know the position of the motorcycle vehicle. The purpose of this study is (i) To produce a system that is able to track a motorcycle vehicle that is lost or stolen, (ii) To produce a system that can monitor and request the location of a motorcycle vehicle when the vehicle is in danger or is stolen.

2. Research Methods

The research method or framework in this research is to carry out a gradual and directed research as



shown below[1]

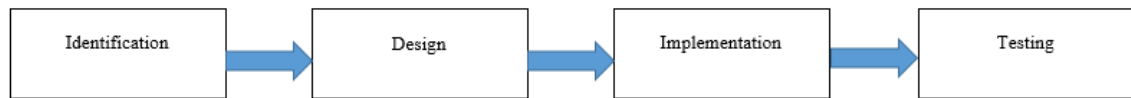


Fig 1. Research Method

3. Result

a. Analysis

Based on the stages of analysis that have been carried out there is some information that is owned, which will be useful for conducting this research. The information is in the form of several needs analysis and work analysis

✓ System requirements analysis

In the needs analysis phase there will be some hardware to support the research of the Vehicle Safety System Using SMS (Short Message Service) as Monitoring for Motorcycle Vehicles as shown in table 1 below.

Table 1
System requirements analysis

No	Hardware Name
1	Arduino Uno
2	800L SIM Module
3	Neo 6 GPS Module
4	5v 1 channel relay
5	USB cable
6	Jumper Cable
7	Step down DC-DC
8	Yamaha Mio Motorcycle
9	Lenovo laptop

In the process of analyzing the workings will be explained how the workings of the system that runs in this research viz.

Algorithm How the System Works

Step 1. Start

Step 2. Turn ON / OFF

Step 3. Active Security System

Step 4. If it does NOT turn back to Step 2

Step 5. If YES the security system will continue

Step 6. Send SMS for Monitoring when the vehicle is on

Step 7. If YES the vehicle owner will receive a Danger warning SMS

Step 8. If NO then return to step 3

Step 9. The vehicle owner sends to request the coordinates of the vehicle

Step 10. If YES the owner will receive an SMS Coordinate vehicle information

Step 11. If NOT go back to step 9

Step 12. Open the Google Maps application on SmartPhone

Step 13. Track location of the vehicle

Step 14. Finish

Based on the algorithm the system works above can be translated or explained into a program that starts from the initial process or starts turning on the ON button, the Security System will be active, the tool will send Notifications via SMS when the vehicle is on, if the vehicle owner receives an SMS then the vehicle is on, the owner can send a warning to request the coordinates, and Arduino will send the coordinates of the vehicle's position via SMS and the vehicle owner can open via the google maps application, then the position of the vehicle will appear on the Smartphone.

b. Design

System design is done to facilitate the implementation. The design of this system is divided into several sections as follows:

✓ Hardware Design (Hardware)

The hardware design phase is carried out by selecting components that are compatible with the function of the hardware itself. Overall the system consists of several parts which are used with the block diagram in figure 1.

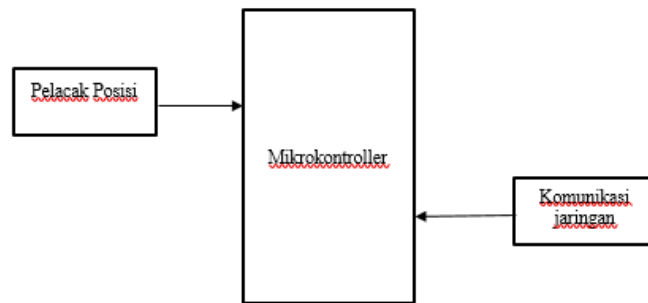


Fig 1. block diagram

✓ Software Design

In the design of this tool needed software (Software) to run it. In this final project, the language used to program the microcontroller is C language, which is compiled by Arduino software before making the program, first making the flow of thinking (algorithm) in accordance with the design of the system, then the program algorithm is poured into a flowchart, then made program in C.

c. Implementation

At this stage everything that has been prepared and designed previously will be fully implemented from this research as a whole which is used using the flowchart as follows.

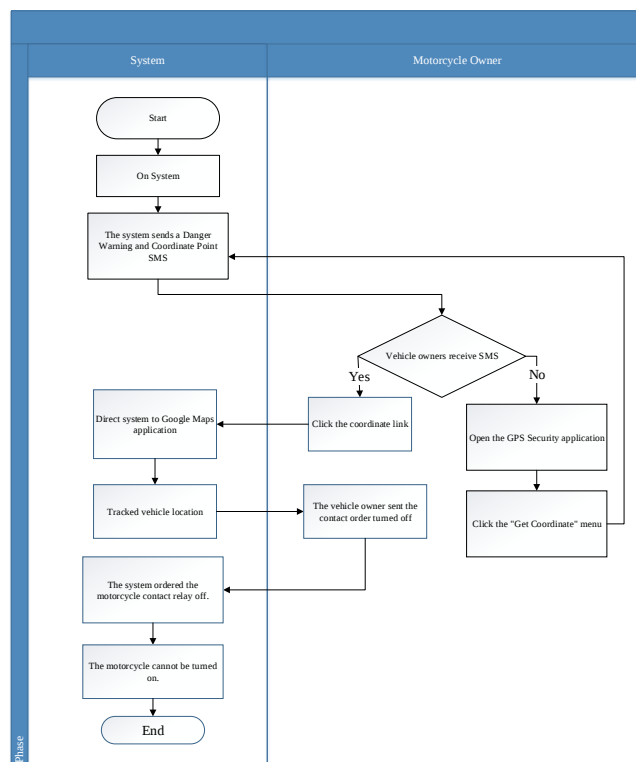


Fig 2. Flowchart System

✓ Hardware Implementation.

The first step in the hardware implementation is the installation of the neo 6 GPS Module and the Sim 800L Module then compiled by installing Arduino as a program process, then continued by installing output hardware such as relays, step-down dc-dc.

✓ Software Implementatiton.

So that the two devices can communicate in C language which is the Arduino programming language needed to program the neo 6 gps module and the 800L sim module as below.

d. Testing

The test results for the entire device are concluded, for testing the data communication delay time between the provider and the SMS application by calculating using a stopwatch. The results of testing the delay time, the farther the distance between the application with the provider will result in greater delay time, this is because the distance traveled by the data sent from the server to the SMS application or from the SMS application to the server is getting longer and affects my operator signal size received by a Smartphone, where the operator's signal power gets smaller when the distance between the Smartphone and the ISP is getting farther away. As table 2 will be made, this comparison of the distance and time delay required by the Sim 800L Module to receive SMS from ISP, as below.

Table 2.
BTS to GSM Distance and Time Calculation Results

No	Sistance traveled	Time (Delay) required	
		On	Off
1	0 - 200 m	15s	10 s
2	500 - 1000 m	15s	10s
3	1500 - 1800 m	20s	12s
4	2000 - 2200 m	23s	18s
5	2300 - 2500 m	25s	20s

4. Conclusion

Based on the results and discussion, the following conclusions can be drawn: (i) Hardware manufacturing of "vehicle safety system using SMS (Short Message Service) as monitoring on motorcycle vehicles" was successfully made with the Arduino Uno microcontroller supported by the device soft in it and combined with several series of mutual support. (ii) Making software for "vehicle safety systems using SMS (Short Message Service) as monitoring on motorcycle vehicles" is a C language programming system that is made to work properly.

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