LOGIC
Journal of Engineering Design and Technology
Vol. 19 No.2 July 2019; p. 78 - 83

p-ISSN : 1412-114X
e-ISSN : 2580-5649
http://ojs.pnb.ac.id/index.php/LOGIC

ANTI-THEFT PROTECTION OF VEHICLE USING GPS TRACKER & ANDROID APPS

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Abstract. The vehicle's anti-theft system is a module used to protect motor vehicles from theft by using three layers of security. The first layer uses a registered fingerprint for user authentication that can enable the machine on. The second one uses a GPS tracker to recognize where the position of the vehicle. The third one of security uses a remote engine cut-off system to shut down the machine remotely using the Android app. The system consists of two separate modules that are connected using a mobile data network. The first module is attached to the motorcycle body consists of fingerprints for biometric verification, GPS tracker for vehicle tracking and a microcontroller that controls the entire onboard system, including turning on and off the machine remotely. The second module is an application on the Android system used to detect where the location of the vehicle and applications that can be used to shut down the machine remotely. The method used in this research is the waterfall, it consists of systems and software design, module creation, module testing, module integration, system testing, operation and repair. The results shows this system is trusted to secure the motor vehicle by using a fingerprint as user authentication and GPS Tracker in which accurately detect the location of the motor vehicle, and then the system can shut down the motor power from a distance so that it can discover the theft of the vehicle. The conclusions: 1) The motorized vehicle safety system that is created to ease the owner of motor vehicle to control (On/Off) the vehicle remotely; 2) Si Kemot tool has been created to provide and increase the sense of security for vehicle owners because it can provide information on the position of the coordinates and speed of the vehicle; 3) the system can be controlled simply by using Android-based gadget that is very simple and ease of operation.

Keywords: UAV, network, fanet.

1. INTRODUCTION

Motor vehicles are not equipped with adequate security loophole theft crime. Key for activating the electrical system of a motor vehicle it is still not enough to give a sense of security because they can be activated using the other key. The location of the stolen motor vehicle can not be known by the owner [1,2].

Si Kemot (the Security System Motor) Integrated Fingerprint-Based GPS Tracker Android) is a breakthrough for the security measures of motor vehicles. The system is capable of providing security in a motor vehicle with a layered security system.

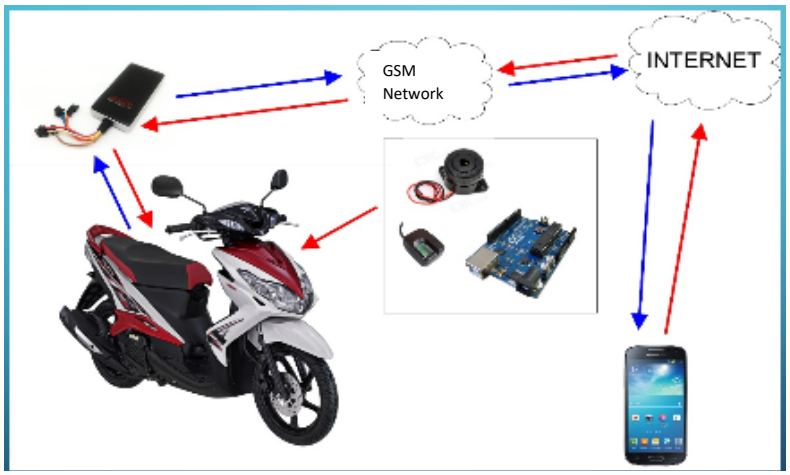

Figure 1 Architecture Design Systems Anti-Theft Vehicle Si Kemot

The system uses fingerprint as an interface to enable and disable the electrical system of a motor vehicle. Fingerprint is also equipped with an alarm that activates if an error occurs tap 3 times. In addition to a fingerprint is used also used a layered security system with Geofence as virtual fence system that activates an alarm if the motor vehicle out of the radius of the virtual fence and GPS tracker that can track the location using Android smartpone. GPS tracker can also be used to turn off the electrical motor vehicle engine remotely with the aid of a satellite connection [3,4].

2. METHODS

The problem is the background of the many cases of motorcycle theft due to the lack of security systems installed on motorized vehicles so that thieves can easily carry off motorized vehicles detected. So that an extra security system is needed to complement the standard security systems that already exist in motorized vehicles in general [5,6].

This study was literature research by reading books and browsing websites related to the physical structure Vehicle motor and electronic components that will be used for the manufacture of tools, and analyze the scientific journals that discuss Finger Print and GPS Tracker and android application so that it can be applied to create a security system motor vehicle with a finger print and GPS Tracker based on android.

Creating Si Kemot requires several component parts including GPS tracker module, fingerprint scanner, arduino uno board, android device, LED (light emitting diode), buzzer alarm, switch button, regulator, motor relay, 12 volt battery, chassis module.

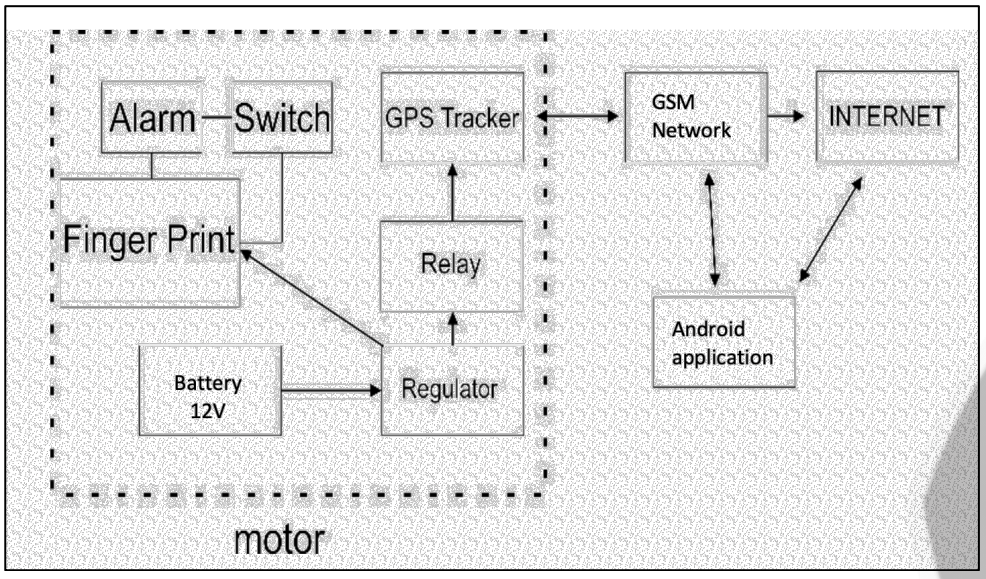

Figure 2. Block Diagram of the Motor Vehicle Safety Systems

3. RESULTS AND DISCUSSION

3.1 GPS Tracker Module

GPS (Global Positioning System) Tracker module is used to send the coordinates of the location of a motorized vehicle with the help of GSM components that have been integrated in it which then uses the GPRS signal to send location coordinates information with Internet aid [7]. Then, the information will be processed by an Android device that will be created. The GPS module is installed using resources from a 12 Volt battery that was previously installed by a regulator to reduce voltage. Next, to make a feature that can turn off the engine remotely, it is connected to the gas hose section. When the button on/off on Android is pressed it will automatically turn off the supply of electrical voltage to the engine so that the engine will shut down.

3.2 Fingerprint Scanner

The fingerprint scanner is used to enter fingerprint information from the user, then the information is processed on Arduino which is connected to the scanner. Information on scanner results in the form of fingerprint data can amount to more than one depending on input data when the program is created. So only registered fingerprints can activate the motor vehicle engine.

3.3 Arduino UNO board

The Arduino used is a type of uno that has qualified specifications for storing commands and fingerprint scanner data. Arduino will be used as the main component of data processing and system commands that will be assembled into a kit with fingerprint and alarm. Arduino power supply will be received from a 12 volt battery that was previously installed by the regulator as a component to ensure more stable voltage.

3.4 Android devices

Android devices used are Samsung's smartphone operating system J7 with Marshmelow for applications made to have a minimum specification of the OS so that applications can run smoothly. Android devices are used to monitor the location where the vehicle mounted GPS is located. Android app created has a feature location tracking and deadly from a distance. The tracking feature would have to see the maps then turn off the feature remotely described as a push button on/off.

The Android device used is a Samsung J7 smartphone with the *Marshmelow* operating system because the application created has the minimum OS specifications so that the application can run smoothly. An android device is used to monitor the location where a GPS-installed vehicle is located. The android application created has a location tracking feature and also shut down remotely. The tracking feature will have a map display then the remote shutdown feature is described as a push button on/off.

3.5 LED (Light Emiting Diode)

The LED is used as a fingerprint scan indicator successfully or not. The LED lamp is green if the fingerprint is scanned according to previously stored data, while the LED lights are red if the scanned fingerprint does not match the stored data. LED lights are installed in the kit package.

3.6 Buzzer Alarm

Alarm buzzer is used as a warning if there is an error when scanning fingerprints 3 times. The alarm will alert the motor vehicle owner that the motor vehicle is in a danger state. Buzzer alarm is installed in the kit package.

3.7 Switch Button

The switch button is used for emergencies when the owner's fingerprint cannot be used due to injury, wet or dirty. This switch is installed in the hidden neck of the motor. This button will manually turn on the electric motor after the motor lock is on.

3.8 Regulator

Regulators are used to stabilize the voltage that enters the component to make it safer because the input voltage on the vulnerable component is unstable. The regulator will be connected directly to the GPS and fingerprint kit package.

3.9 Relay motor

Motor relays are used to cut off electricity or connect electricity. This is to support the remote shutdown feature using the help of a GPS tracker.

3.10 12 Volt Battery

12 Volt battery/accu is used as the primary power source to activate each component in order to work properly. The battery will be connected to any component of the position in accordance with the block diagram.

3.11 Casing Module

Components finger print, alarm, LED and will be assembled into a package arduino kit with chassis modules. In addition to giving the efficiency where it also serves to protect the component from unwanted interference.

(a) (b)

Figure 3 Results hardware design (a) and anti-theft device (b).

3.12 The Working of the System

The result shows that the security system available on motor vehicles is less powerful, this causes many motor vehicle theft, therefore, the *Kemot* can be used as a supplementary motor security system to detect where the motor vehicle is.

The use of fingerprint in the *Si Kemot* device circuit is combined with the Arduino Uno module. Finger print installed on the motor as the first level of security is user authentication with Arduino Uno as a microcontroller program that will detect the thief whether it is allowed to use motorized vehicles or not. If user authentication is successful, the motorized vehicle will turn on by itself. However, if user authentication is not successful the motorized vehicle will not turn on and wait for further authentication to turn on the motor vehicle.

At the time of assembly of the Construction Design Tool there are several obstacles that android application inadequate thereby making Geofence system and VoIP (Voice Over Internet Protocol) can not be applied. As a result of Geofence system that does not work then the alarm that should serve as a warning of a danger are transferred to the system cut off the GPS Tracker.

Si Kemot was made into two parts, the first is the security section in the form of a fingerprint scanner or Fingerprint programmed with Arduino Uno which functions first to activate the engine, only registered fingerprints can activate it. Then the second part is a GPS Tracker system that serves to track the location of the vehicle and can also be used to shut down the engine remotely.

GPS Tracker can find out the existence of motorized vehicles based on google map coordinates with an accuracy of 5-10 meters. These coordinates will continue to be updated by internet signals that are already connected to the GPS. The scattered coordinates can be recognized through the Orange Application or the user will get an SMS from the GPS. The following is a description of the coordinates displayed on the Orange Application.

Figure 4 Tracking the position and speed of vehicles

There are several coordinates that appear, with a record of the time, date and speed of the motorized vehicle. This is because when the vehicle moves, the GPS will detect and the signal from the GPS will be sent via an internet signal to the user. GPS Tracker can find out the existence of motorized vehicles based on google map coordinates with an accuracy of 5-10 meters. These coordinates will continue to be updated by internet signals that are already connected to the GPS. The scattered coordinates can be recognized through the Orange Application or the user will get an SMS from the GPS. The following is a description of the coordinates displayed on the Orange Application

Furthermore, if we do not recognize the detected coordinates or we read that our motorized vehicle has been stolen, we can cut off the electricity of the motorized vehicle with the cutoff switch installed. But the electricity of motorized vehicles can be turned off if the motorized vehicle is not moving or stopping.

From the results of the Construction Design Making Tool above, *Si Kemot* can still be used but there are several differences in system work with the existence of an Android Application that has not been achieved. The initial attempt to cover up this weakness was to shift the role of the Alarm which should be the initial detector of a danger to a cut off system on the GPS Tracker. Development is still ongoing to improve the effectiveness of this tool. This tool has great potential in everyday life.

4. CONCLUSION

It can be concluded that:

1. The motorized vehicle safety system that is created to ease the owner of motor vehicle to control (On/Off) the vehicle remotely.
2. Si Kemot tool has been created to provide and increase the sense of security for vehicle owners because they can provide information on the position of the coordinates and speed of the vehicle.
3. The system can be controlled simply by using an Android-based gadget so that it is very simple and easy to operate.

5. ACKNOWLEDGEMENT

This research was supported by Penelitian Unggulan Doktor (PUD) grand from P3M of Politeknik Negeri Semarang. The financial support is gratefully acknowledged.

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