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TWO-WHEELED MOTORIZED VEHICLE SECURITY USING E-KTP

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Abstract

Motor vehicle theft from year to year always increases, both when parked and while being driven. Data from the National Police Headquarters for the period 1 to 7 May 2022 recorded 118 cases, and increased to 309 cases in the period 8 May to 14 May 2022. Based on the problem with the increase in motorized vehicle theft, a system is needed that can protect motorized vehicles from these theft cases. In this article we propose an additional system for electronic motorized vehicles. This system consists of additional controls, namely an e-KTP and touch screen, while the switch for the front brake already exists in motorized vehicles. After the ignition is turned on, the driver must press the touch screen button, press the front brake, attach the e-KTP to the RFId reader, each maximum time span for 50 seconds. If it is not in the sequence and the time is more than 50 seconds it will cause the motorized vehicle's horn to sound. After connecting, making controls and testing, the control system can work perfectly..

Keywords: ***touch screen, e-KTP, control, 50 seconds, horn***

1. INTRODUCTION

A motorcycle is a two or three wheeled motorized vehicle without housings, either with or without a sidecar. Motorcycles are the largest component of travel movements in traffic on public roads. Because motorbikes are a type of low-cost vehicle that can be owned by low-income groups and are considered practical and easier to hit traffic jams. Along with the increasing number of motorized vehicles, the theft of these vehicles is increasing. Motor vehicle theft is increasingly common in the community both in cities and in regions, various kinds of modus operandi are carried out by perpetrators of the crime of motor vehicle theft at this time. If this cannot be overcome, of course these actions are very disturbing to the community. However, recently the slowdown in economic growth has had a major impact on society, causing Indonesian society to experience an economic crisis, especially for the lower middle class. This can be seen from the increasing crime and rising unemployment.

Welfare is a complex phenomenon that can be understood from many different angles. That's why in everyday life you can catch various comments about a crime incident that are different from one another. One of the crimes that stands out against this is the case of theft. Talking about crime, especially theft, can occur anywhere and anytime, it can even be said that crime occurs in society because it is detrimental. Therefore, every community tries to prevent and overcome the occurrence of crime [7]. Various attempts have been made to eradicate this crime, however these efforts have so far only succeeded in reducing its intensity and quality. The crime of theft is a problem that is familiar to the people of Indonesia, this theft is a fairly complex problem every time it is faced by law enforcement officials. Day by day the problem of theft that occurs in cities has increased significantly, the unemployment rate is quite high and competition is sharp in making ends meet. It has the potential to cause a higher number of theft cases that occur in the community. Along with the development of the times, the methods used by criminals are increasingly sophisticated and carried out with high technology. The crimes committed are increasingly organized and neat enough. So that sometimes it is difficult for the authorities, in this case the police, to catch him.

Cases of theft that occur today are very diverse types. Conventional theft cases that disrupt security and order in society include motor vehicle theft, violent theft, rape, juvenile delinquency, aggravated theft, and gambling. Lately, there has been an increasing trend of crimes against motor vehicle theft. Even though the vehicle has been parked in a designated parking area and supervised by a security guard. With the tendency of the increasing number of motor vehicle thefts and the perpetrators of crimes becoming more powerful and courageous and the modes of crime that are increasingly free and daring and the modes of crime that are increasingly sophisticated in carrying out acts of theft of motorized vehicles, the authors are interested in making tools to deal with cases of theft of motorized vehicles when parked. . The purpose of this paper is to propose additional equipment/circuits to the ignition/electrical system on two-wheeled motorized vehicles as security when parking. The ignition system on a motorbike is a system on a machine that has the function of producing sparks in the combustion chamber. This system is needed in order to produce combustion after compression in the combustion chamber. That way there will be a boost and the motor can move. An ignition system found on a motorbike requires components that will support its performance. The motorcycle electrical system consists of several components, such as a spool, kiprok, and many others.

This electrical system provides electric current for combustion purposes and for engine work processes and signals to support driving safety. So all components that are directly related to electrical energy are grouped into electrical parts. The parts that include the electrical system on motorcycles include; starter system, ignition system (ignition system), charging system (charging system), and lighting system (lighting system). The starter system functions to start the motorcycle engine. There are 2 starter systems, namely a conventional starter that uses a kick starter by cranking/splitting it, an electric starter by pressing the starter switch. The electric starter system on a motorbike functions as a substitute for a kick starter, so that the rider no longer needs to interrupt the kick starter to start the engine. The charging system functions to produce electrical energy so that it can be recharged and maintains a stable condition of the electric energy in the battery because the amount of electrical energy that can be supplied by the battery as a source of electricity (for motorcycles equipped with batteries) is limited. The source of electricity in the battery will run out if it is continuously used to run (supply) the electrical system on the motorcycle. Besides that, the charging system also functions to supply electrical energy directly to the electrical system. The lighting system is very necessary for driving safety, especially at night and also for giving signals/signs to other vehicles such as head/front lights, tail lights, brake lights, turn signals/turn signals. (turn signal lights),

The ignition system on a gasoline engine functions to regulate the process of burning a mixture of gasoline and air in the cylinder according to a predetermined time, namely at the end of the compression stroke that occurs in the cylinder after the spark plug sparks, so that power is obtained due to the expansion of the (explosive) gas from combustion, driving piston to BDC becomes a business step. The electrical system on a motorbike is the heart of a motorbike so that it can function as a means of transportation. Because with this electrical system, other mechanical functions can synergize to move. The electrical component on a motorbike is a battery or accu. This battery functions as a motorcycle power source storage. In addition, the battery is also very important as a source of power to activate the CDI (Capacitor Discharge Ignition) which functions as an ignition regulator on a motorbike. There are two types of batteries, namely wet batteries and dry batteries. For older motorcycles around the 1990s, wet batteries were still used, while motorcycles in the 2000s used dry batteries which had the advantage of free maintenance. Several studies that have been made, create a security system for parked vehicles, such as making a safety that can turn off the electricity that enters the motorcycle coil. This is a security measure if the motorbike is parked in a place prone to theft, the motorbike cannot turn on, and can minimize motorbike theft. This GPS-based safety device is designed to effectively secure motorbikes, to track the coordinates of motorbikes without being limited by distance. This security system utilizes the HCSR501 and HC-SR04 sensors as well as a series of other hardware mounted on motorcycles and controlled using the Arduino Uno R3, as the transmitter using an Android-based smartphone to communicate with the owner. Arduino-Android based motorcycle security system. This security

system is relay-based and will be controlled via a smartphone with the Android v4.4 (KitKat) operating system. The communication system is designed using the HC-06 bluetooth module which can be integrated with the Arduino Uno R3 microcontroller board. Based on the problem of increasing theft and confiscation of motorized vehicles, an additional security system is needed for motorbikes. However, based on several studies that have been made, most of them make applications or security systems for motorized vehicles only at one level of security. For this reason, the researcher intends to create a system that can secure the vehicle when the vehicle is parked. The security system that will be designed is expected to prevent theft when parked. The way the proposed tool works is to create multiple levels of security. When the sequence of pressing the buttons is wrong and entering the e-KTP, the motorbike cannot start the engine and sounds the horn.

2. IMPLEMENTATION METHOD

The research conducted is research with experimental methods. At this stage of research begins with the collection of information, especially on the problem of crime regarding theft and even confiscation of motorized vehicles through the mass media. From the results of gathering information on several cases of theft or confiscation, it is not only done when the vehicle is parked, a system is needed that is able to protect the motorbike when it is parked. The stages of the research are described in Figure 1 below.

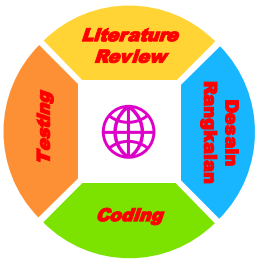

Figure 1. Research Stages

Literature Review

At this stage, collecting various information such as news about theft and confiscation of motorized vehicles through the mass media and articles that have been published. The results of the information search are cases of theft and confiscation of parked vehicles. Based on the problems obtained, additional security is needed apart from the manufacturer. For this reason, we propose research related to security systems for motorized vehicles. Based on previous research, there is no security system for vehicles when parked with a multilevel security system. In addition, at this stage also identify the devices or components needed to make the existing system sold in the market. The tools and materials needed can be seen in table 1.

Table 1. Research Tools and Materials

No.	Component	Function
1.	Arduino Nano	System controller
2.	Relays (2 pieces)	Circuit breaker / connection to the motor starter motor (R1), and to the horn (R2)
3.	Push Button / touch screen (S1)	Input signal for control system (In1)
4.	Front Brake (S2)	Input signal for control system (In2) (already installed)
4.	RFId Reader	e-KTP reader
5.	Start button (S3)	To start the motor vehicle (already installed)
6.	Horn	Indication in case of failure on key press (already built in)

Network Design

The results of a review of news and scientific articles, the next step is to design a series that can provide multilevel security for motorized vehicles when parked. With the aim of reducing criminal acts of theft in motorized vehicles, the design of this series of systems uses fritzing applications. As shown in Figure 2, this circuit is a touch screen (S1) as a secret switch, a switchfront brake (S2), starter switch (S3) and RFID sensor as input from the system. Motor (R1) starter and horn (R2) as the output of the system. Sensor (input) and output relationships with Arduino nano can be seen in Table 1.

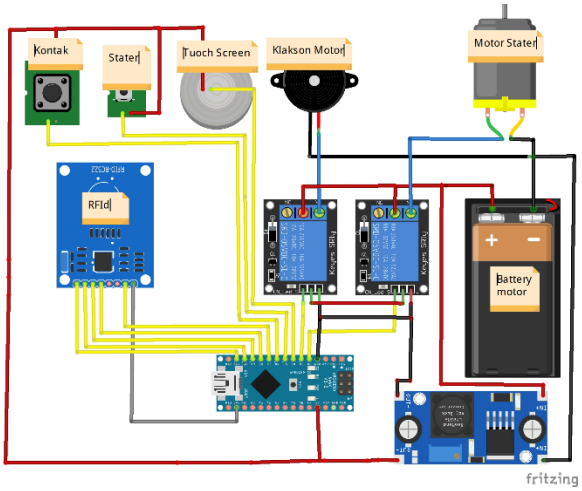

Figure 2. Two-Wheeled Vehicle Safety Series

Table 1. Arduino Nano PINs

No.	In/Output	Arduino Nano (PIN)	Information
1	Touchscreen (S1)	D6	Secret switch
2.	Front brake sensor (S2)	D5	Horn Switch
3.	Starter sensor (S3)	D4	Starter Switch
4.	DC motors (R1)	D3	Starter motor
5.	Horn (R2)	D2	Horn
6.	RFId	D6, D7, D9, D10, D11	Read e-KTP data

Coding

The next stage is to make programming, before programming using the Arduino IDE, first make the algorithm, as shown in Figure 3.

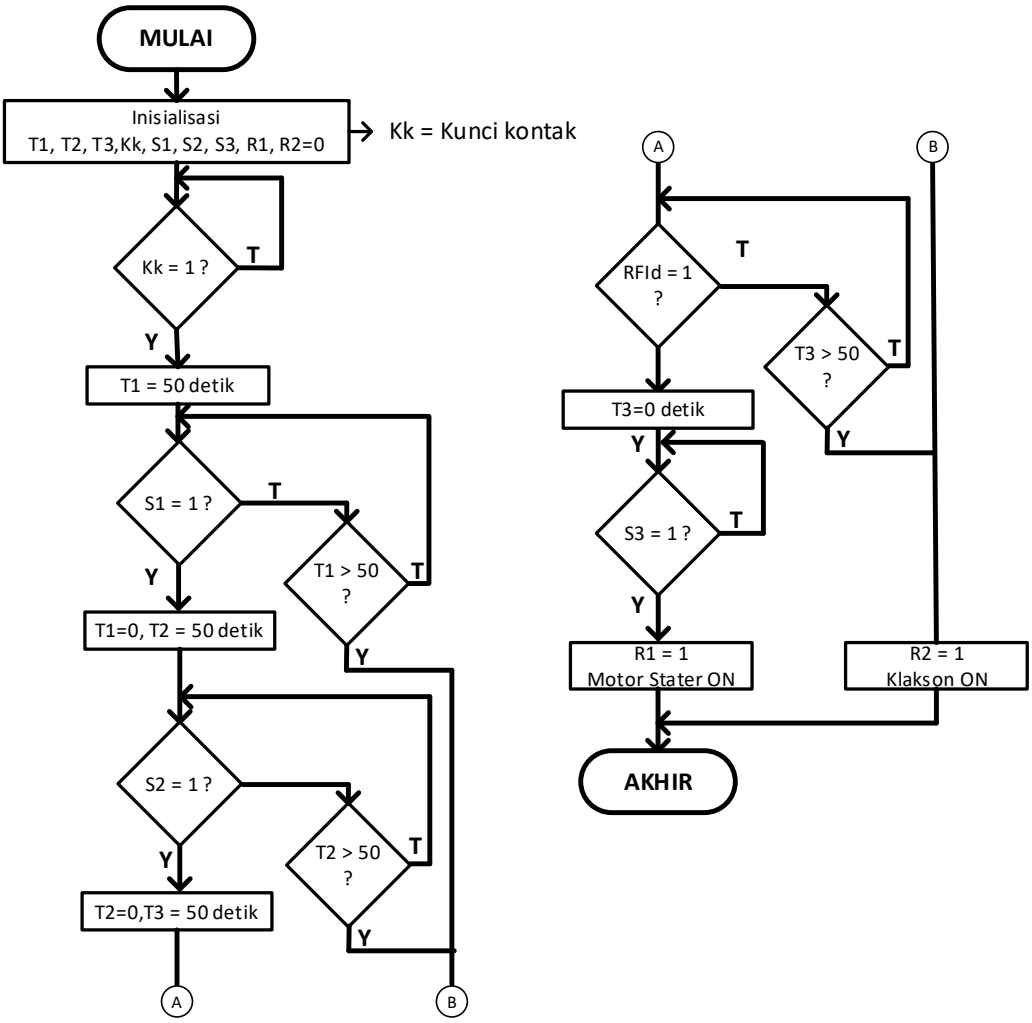

Figure 3. Flowchart

If the pressure from the sensors is sequential and with a pressing time of less than 50 seconds, starting from S1, S2 and S3, then the motor can be started. Conversely, if the sequence is wrong in pressing the sensor sequence and the delay time is more than 50 seconds, the horn will turn on, which will cause other people around to know the efforts of the perpetrators of the crime.

Programming Delay 50 seconds

As a pause between button presses (S1, S2 and S3) a timer is generated for 50 seconds, as shown in Figure 4.

```
long oneSecond = 1000;
long 50Second = oneSecond * 50;

void setup()
void loop()
{
  delay(50Second);
  }
```

Figure 4. 50 second timer program

Switch pressing sequence programming

The multilevel security system in this system is to make the sequence of button presses (S1, S2 and S3) in the correct order, otherwise it will cause the horn to activate. The program can be seen in Figure 5.

```
{
 for(int indeks = 0; indeks < 3; indeks++)
 {
 pinMode(inputPin[indeks], INPUT); //mengubah inputPin sebagai INPUT
  digitalWrite(inputPin[indeks],LOW);
 //membaca dan memberi status inputPin dengan indeks sesuai dengan nilainya.
 }
}

void loop()
{
 for(int indeks = 0; indeks < 4; indeks++)
 {
 int val = digitalRead(inputPin[indeks]); //membaca nilai dari indeks
 if (val == HIGH) // cek switch yang ditekan
 {
 digitalWrite(ledPin[indeks], HIGH);
 }
 else
 {
 digitalWrite(ledPin[indeks], LOW);
 }
```

Figure 5. The main motor vehicle safety program

testing

Test the system that has been made to see if it can run as desired. If it is not appropriate, then the stages will be repeated again in the first stage until the system runs as expected. To further clarify how the system works, it can also be seen through the system workflow shown in Figure 3.

Based on the results of the design and coding that has been done, it can be explained how the system works, namely:

1. At the earliest, input was given to the controller system by pressing the ignition switch. This input provides input to the system to wait for the next input.
2. Then pressing the touch screen switch (S1), will activate a timer of 50 seconds (T1), this is a pause for pressing the next switch. This is the second input of the motor vehicle security system. If the pause time is missed, the horn is active (R2).
3. In the T1 interval, you must press the front brake (S2). By pressing S2, activates T2 (50 seconds) and resets T1 (0 seconds). T2 functions to pause entering the e-KTP, if you enter the e-KTP for more than 50 seconds, then the horn is active (R2).
4. With the detection of the e-KTP, it activates T3 (50 seconds) and resets T2 (0 seconds). Within 50 seconds the driver must start (S3) his vehicle so that it causes R1 to activate, if missed, the horn will activate (R2)

3. RESULTS AND DISCUSSION

At this stage, we will discuss the results of testing a security system that uses an emergency button as the main device used to deactivate the engine. Before testing the motorbike, the author previously tested the system that had been created.

Touch Screen Trial (S1)

At this stage, testing is carried out to try whether the touch screen button (S1) can work after being pressed. Tests were carried out only in the form of prototypes on vehicles. Testing activities are presented in Table 2 below.

Table 2. Touch Screen testing activities

No	Activity	Observation result
1.	Press the S1 Button	Activate the timer for 50 seconds
2	Measure the delay time	Once pressed, if there is no further input. Activate the horn➔succeed

Front Brake Trial (S2)

At this stage, testing is carried out to try whether the front brake light button (S2) can work after being pressed. Tests were carried out only in the form of prototypes on vehicles. Testing activities are presented in Table 3 below.

Table 3. Front Brake Light testing activities

No	Activity	Observation result
1.	Pressing the S2 Button	Activate the timer for 50 seconds
2	Measure the delay time	Once pressed, if there is no further input. activate the horn➔succeed

RFId Reader Trial

At this stage, testing is carried out to see if the RFId reader works according to the data from the RFId card. Where the data from the previous RFId card has been stored in the RFId reader, the RFId card used is data from the e-KTP. Tests were carried out only in the form of prototypes on vehicles. Testing activities are presented in Table 4 below.

Table 4. Starter Button testing activities

No	Activity	Observation result
1.	Bring RFId card (e-KTP) closer to RFId Reader	Success if the attached RFId is stored. Then activate the delay for 50 seconds
2	Measure the delay time	After being brought closer, if there is no further input. activate the horn➔succeed

Trial Starter Button (S3)

At this stage, testing is carried out to try whether the starter button (S3) can work after being pressed. Tests were carried out only in the form of prototypes on vehicles. Testing activities are presented in Table 5 below.

Table 5. Starter Button testing activities

No	Activity	Observation result
1.	Pressing the S3 Button	Activate Relays (R1)
2	Measure the delay time	Once pressed, if there is no further input. activate the horn➔succeed

Prototype Trial.

At this stage, testing is carried out to try the system as a whole based on the prototype that has been made, as shown in Figure 5. While the testing activities can be seen in Table 6.

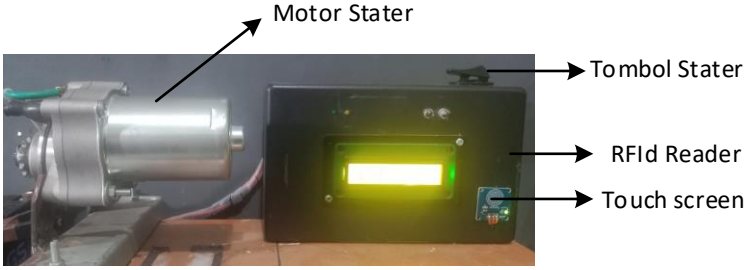

Figure 5. Prototype of a motor vehicle security system

Table 6. Overall system testing activities

No	Activity	Observation result
1.	Press the S1 Button	Succeeded and enabled 50 second delay
2	Pressing the S2 Button	Succeeded and enabled 50 second delay
3.	Bring e-KTP closer to RFId reader	Succeeded and enabled 50 second delay
4.	Pressing the S3 Button	It worked, and the motorized vehicle started.

6. CONCLUSION

Based on the results of system testing, it can be concluded that:

1. The system was tested on a control prototype and was successful, and it has also been carried out on motorized vehicles, the test results are according to plan.
2. The system that is made can run according to the initial plan where when the sequence of buttons is pressed according to the order it will succeed in starting the motorized vehicle engine. If the button is pressed out of sequence, it will cause the motorized vehicle's horn to light up.

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