

Anti Car Theft System using Android Phone

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Abstract— Security is always been an issue due to increasing crime rates most especially in the developing countries. Therefore, technology is being used as a tool to provide greater safety as preventive action to lessen the probability of car theft but due to unavoidable circumstances, corrective action is still an alternative plan. This design project dealt with a system that used to alert the car owner if there is someone who illegally opened the door in the driver's seat and trying to steal the car. A text message will be received by the car owner from the microcontroller unit with SMS module installed inside the car connected from the car door. Once the message was opened, there is an option for the owner to open the Internet Protocol camera to view the image inside the car. There is also a capability for the car owner to determine the location of the car through the use of Global Positioning System.

Keywords— Android Mobile, Car Theft System, Global Positioning System, Microcontroller and Security System

I. INTRODUCTION

Car vehicle is one of the most valued possessions nowadays and having one of this in the Philippines most specially to ordinary company employee is very difficult to become a reality and losing it is really a cruel imagination if it happens. Therefore, looking for other means of securing cars from theft using the present technology, Anti Car Theft System Using Android Phones was realized. Android technology is increasingly being used on a range of devices; the most common hardware to use this platform is mobile phones [1].

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Android technology system is open for modification. Google came up with an innovative operation system termed as ANDROID, which is open system architecture with customizable third party development and debugging environment which helps the user's to manipulate the features [2] and it offers developers free platform to make their own applications [3]. This gives users the opportunity to change and enhance products based on personal preferences. A car alarm system is an old way that one can keep the car safe from miscreants. The working mechanism of a car alarm system is such that if anybody tries to touch the car or open the doors by unlawful means, the alarm starts out loud, thus alerting the owner or anyone in the vicinity to take proper action [4]. Thieves have always been a scourge upon a civilized society, and the theft of means of transportation has been a problem throughout history [5]. There are many alternatives to prevent the car theft, common car alarm system which nearly all cars have the system installed, and also Global Positioning System (GPS) where the whereabouts of the car can be traced [6].

Recovering the car stolen would be possible because this system allows capturing of video through an interfaced IP cam when there is an intrusion and to determine the location of the car through GPS. Short Message Service (SMS) is a good choice of communication as an added feature to immediately determine that something wrong is happening to the car. This study aimed to develop an anti-car theft system using android phones that notifies the car owner by sending SMS when someone illegally opens the door at the driver's seat. The developed car security system via SMS is for car applications wherein target users are people who have their own car as well as those people who are using the vehicles of the company or someone who owned a taxi. The device will be situated in a concealed place inside the car for the detection process and for command of data. Car Security system via SMS contains microcontroller as a main brain to control the whole system. It sends SMS alert to the owner if an undesired incident of car-napped happened, another use of the device which is the GPS will give the location of the car in place.

II. MATERIALS AND METHODS

This study is hardware and software development project which utilized the qualitative research method. Anti-Car Theft System for Android was designed to give a security for the vehicle. Because of using Android phone and all other system components, the system provides security. The researchers created an interface between Ethernet module and microcontroller to give a command to the GSM to send a SMS message and the Ethernet module also give a network to the IP

cam to view the camera. This project also developed a user friendly interface application for the android phone that serves to be the portal to connect to the car door.

A. Research Design

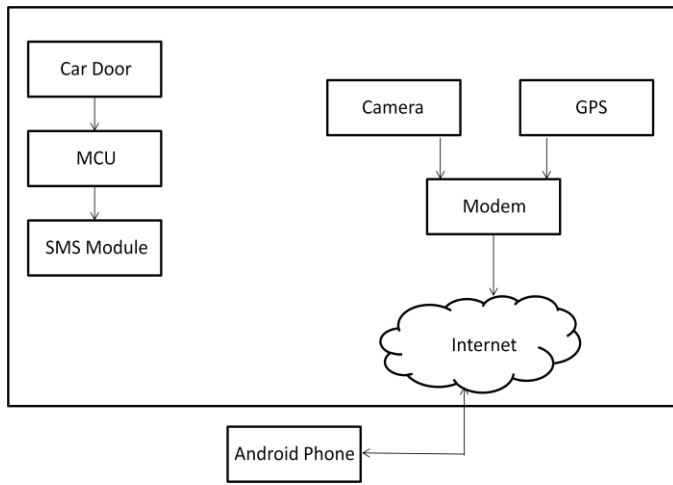


Fig. 1. System Design Block Diagram

Fig. 1 shows the block diagram of the system design. It includes the equipment that was used in the system. The start of the system design is from the door of the car when there is an intrusion. The microcontroller process the signal came from the door and the GPS and SMS module will transfer data to the android phone. The android phone is connected to the internet and the user can view IP cam through internet.

B. Software Design

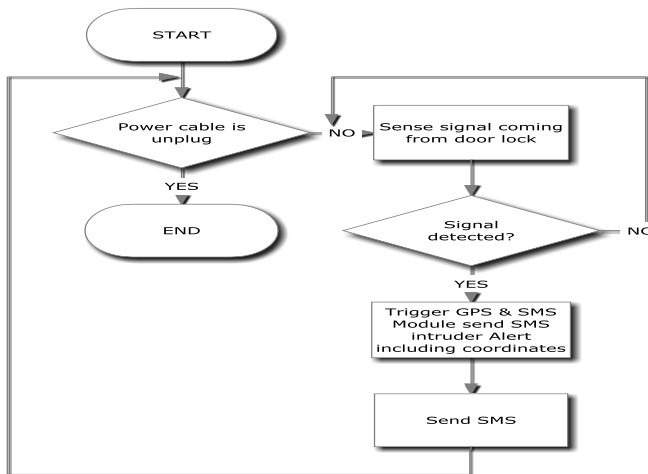


Fig. 2. Microcontroller software Flowchart

In Fig. 2, the software starts to execute processes if it is plugged-in at the power supply. It starts to sense signal coming from a door lock and if signals are sensed, the

program automatically triggers the GPS and SMS module to send SMS “Intruder Alert” including the coordinates of the vehicle. When there is no signal detected, the software will continue to sense signals that come from the door lock. When the system with the installed software is unplugged, the whole system and software could not be totally used.

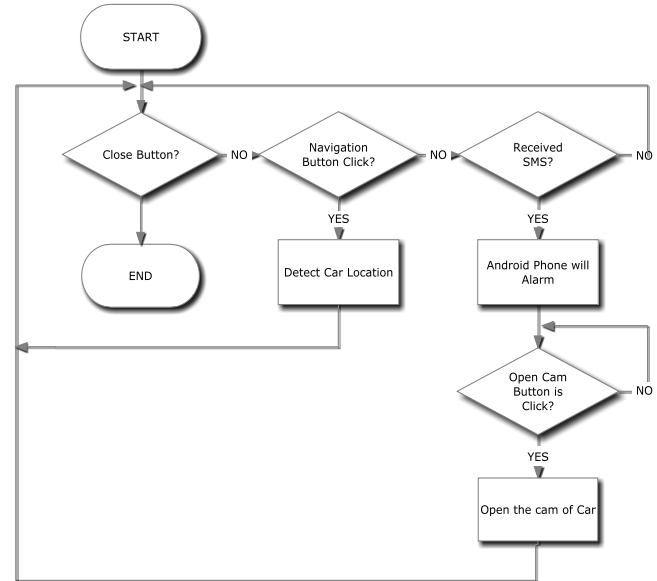


Fig. 3. Android Application Flow Chart

In Fig. 3, the flow chart shows the process of the application on the android phone. It can be described that if the application is closed, the software for it terminates. When the application is open, it will continue to process. It will detect the car location and when it receives an SMS, the android phone will alarm giving the user a signal that the vehicle was car-napped. The user can be able to access the cam so that the user can see what is happening inside the car and who stole the car.

C. Hardware Requirements

The minimum hardware requirements for the “Anti Car Theft System Using Android Phone” to operate functionally are the following: GPS Module Shield, Gizduino Atmega328, GSM Module, Internet Protocol Camera, Android Phone and Globe Tattoo Wimax. All these components were used for the hardware requirements to develop the system. The GPS Module Shield is used to track and locate the position of the car. Gizduino Atmega 328 served as the brain of the system. GSM Module is for sending a warning message to the owner of the car. Internet Protocol Camera (IP Cam) used for viewing the car intruder. Android Phone was served as output with ver. 2.3.6 higher and the Globe Tattoo WiMax served as a source of internet within the car.

D. Software Requirements

The minimum software requirements for the “Anti Car Theft System Using Android Phone” to operate functionally

are the following: Arduino and Eclipse. These two components are software requirements to develop the system. Arduino sends signal to the microcontroller. It is a tool for making computers that can sense and controls more of the physical world than your desktop computer. Eclipse is a multi – language software development environment comprising a base workspace and an extensible plug- in system customizing the environment. It is written mostly in java.

III. RESULTS AND DISCUSSION

The prototype was an enhancement and development of the Anti Theft System concept to attain the economical environment for security, maintenance and productivity basis. The prototype has a GPS to track and locate position of the car. The input automatically sends warning message to the owner when an intruder was detected. Automatically the system informs the owner and block the possible car napped of the vehicle. The maintenance form of the program allows the car owner to track, locate and view the current changes within the car. Monitoring the whole area inside the car will check for intruders attempting to steal.

The software design was constructed and developed to introduce the car owner with a new system that allows tracking and determining the location of the car. It also allows the car owner to use an android phone for detecting an intruder in the vehicle. Updating the location of the car is also one of the features of the software. The software was made in an Eclipse and Arduino programming. Eclipse was derived from the android phone to enable the rapid application development (RAD), using data access from the android phone, it remotes data objects to control the objects. Through this Integrated Development Environment (IDE) the researchers were able to make the android phone useful to locate the car. In this software, the android phone was interfaced to car to know the location of the vehicle.

The output is to satisfy the user's needs and to monitor for intruders. The design project was made in a purpose to change the common Anti Car Theft System. Technology makes ways for security to tighten its system to be more reliable and efficient to a car system.

IV. CONCLUSION

By completing this design, the researchers come up with the vehicle security system to prevent auto theft. Security is a tradeoff, a balancing act between attacker and defender. These security technologies are applied for all people who they want to secure their vehicle from the intruder. The Anti Car Theft System for Android is used for car security. It is an affordable system that upgrades the system already installed to the car. Using this system, owner of the vehicle will be notified directly through SMS whenever intrusion occurs. The car owners will be the number one beneficiary of this system. The design is intended to give the car owner an in hand security. The owner can instantly watch and locate its vehicle. For the company driver, the system can give a security of the company vehicle. Another significance of this project is the police operations and investigation procedures will be much easier and precise outcome can be achieved in order to retrieve

the stolen car and to arrest who is responsible in car theft. This study would also be beneficial to the future researchers who are interested to have other possible android application in creating and developing security system.

For further improvements of designing an Anti Car Theft System for Android Phone, the IP cam should be static IP address to view it to other network; the power supply between all components should be compatible to avoid short circuit; the device should be put in a concealed and safe place which is not easily detected by the intruders and the SIM card will be configured through android application. This study limits its coverage that if the battery of the car is discharge and the outlet is unplugged, it will not execute the system properly. Another thing is a low signal of internet access will interrupt the sending of SMS alert to the owner.

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