UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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DEVELOPMENT OF THE DETECTION MOTORCYCLE LOCATION USING GPS AND GSM

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor's Degree of Electronics Engineering Technology (Telecommunication) with Honours

by

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfilment of the requirements for the degree of Bachelor of Electronics Engineering Technology (Telecommunications) with Honours. The member of the supervisory is as follow:

…………………………………

(Pn. Raeihah Bt Mohd Zain)

ABSTRAK

Pembangunan lokasi penjejakan motosikal menggunakan Sistem Global untuk Komunikasi Mudah Alih (GSM) dan Sistem Penentududukan Global (GPS) adalah sistem yang selamat untuk motosikal. Sistem utama adalah untuk mencari kedudukan dan lokasi motosikal menggunakan GPS. Sistem ini akan berfungsi sebagai mencari tempat motosikal, di samping mesin potong dan bunyi penggera yang dicetuskan. Sistem ini menempatkan tempat motosikal apabila pemilik motosikal meminta lokasi motosikal, pemiliknya juga boleh meminta sama ada untuk mematikan enjin. GSM akan menghantar lokasi kepada pemilik motosikal ke dalam telefon bimbit, pemilik dapat menjejaki kedudukan motosikal yang disasarkan pada Aplikasi Maps pada telefon bimbit. Menggunakan pencari GPS, sasaran lokasi semasa ditentukan dan dihantar, bersama-sama dengan pelbagai parameter yang diterima oleh port data kenderaan melalui Perkhidmatan Pesanan Ringkas (SMS) melalui rangkaian GSM ke modem GSM.

ABSTRACT

Development of the motorcycle tracking location using Global System for Mobile communication (GSM) and Global Positioning System (GPS) is safe system for motorcycle. The main system is to locate the position and location of the motorcycle using GPS. This system will function as locating the place of the motorcycle, in addition with the cut off engine and the sound of alarm that are triggered. The system is locating the place of the motorcycle when the owner of the motorcycle request the location of the motorcycle, the owner also able to request whether to shut off the engine. The GSM will send the location to the owner of the motorcycle into cell phone, the owner can track the position of the targeted motorcycle on Maps Application on cell phone. Using GPS locator, the target current location is determined and sent, along with the various parameters received by the vehicle's data port via Short Message Service (SMS) through GSM network to a GSM modem.

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LIST OF ABBREVIATION

GPS   -   Global Positioning System

GSM   -   Global System for Mobile communication

IDE   -   Integrated Development Environment

MCU   -   Multipoint Control Unit

AVL   -   Automatic Vehicle Location

ARM   -   Advanced RISC Machines

GUI   -   Graphical User Interface

NMEA   -   National Marine Electronics Association

PC   -   Personal Computer

USB   -   Universal Serial Bus

PWM   -   Pulse Width Modulation

ISCP   -   In-Circuit Serial Programming

AC   -   Alternating Current

DC   -   Direct Current

SRAM   -   Static Random Access Memory

EEPROM   -   electrically erasable programmable read-only memory

TDMA   -   Time Division Multiple Access

CDMA   -   Code Division Multiple Access

SIM   -   Subscriber Identity Module

GPRS   -   General Packet Radio System

EDGE   -   Enhanced Data GSM Environment

UMTS   -   Universal Mobile Telecommunications Service

HSCSD   -   High-Speed Circuit-Switched Data

QR   -   Quick Response

UART   -   Universal Asynchronous Receiver/Transmitter

SPST   -   Single-Pole, Single-Throw

DPST   -   Double-Pole, Single-Throw

CHAPTER 1

INTRODUCTION

1.0   Introduction

This chapter was about the overview about the background of this project, the root cause of the project depending of the outcomes. On the other hand, the objective of why this project should be done.

1.1   Background of the Project

The development of the project about vehicle tracking system has been increasingly based on the demanding in the market because nowadays the statistic shows the stolen motorcycle has been increasingly year by year, maybe because of the survival to life in Malaysia is hard, so that people take it a short cut to making for living by doing crime which is one of the crime is stolen motorcycle.

The development of tracking using Global Positioning System (GPS) are terrace follow up the technology that more to the future to the changing the whole world used new technology. In addition the demand of the new technology are increase making the people are working on it by research and develop the new idea, new design and new project. The GPS that are used to locate the position of the vehicle and this project used motorcycle as object to be looking for. The GPS are operate The GPS receiver gets a signal from each GPS satellite. The satellites transmit the correct time the signs are sent. By subtracting the time the flag was transmitted from the time it was gotten, the GPS can tell how far it is from each satellite. The GPS beneficiary likewise knows

the correct position in the sky of the satellites, right now they sent their signs. So given the movement time of the GPS signals from three satellites and their correct position in the sky. The uses of Global of Mobile System for Mobile Communication (GSM) are already in used nowadays, even though the GSM are outdated, the system are still relevant used in this project. This project are combining the latest technology and old technology.

1.2   Problem Statement

The project idea that has been proposed is because there several problem that was observed and research was when the motorcycle was stolen, there is almost impossible that the motorcycle will get back to the owner of the motorcycle, it is like searching your hair in flour, it is almost impossible to get back. The next problem is the motorcycle lock is less effective to prevent from the motorcycle theft from stole the motorcycle, the security lock are weak, motorcycle theft are now are smart to unlock the lock using special device. Today's, in this technology era, majority people are not aware of the crimes that occur around them to act.

1.3   Objective

The objective of this project focus on the design and develop a new GPS and GSM technology. The objective is:

1. To understand basic Arduino, GSM and GPS.
2. To develop of the tracker and alarm system by using GPS and GSM.
3. To create new security system with the GPS tracker.

1.4 Scope of Project

The scope of this project is focusing locate the location of the motorcycle that are missing and triggered an alarm on the motorcycle and shutting off engine of the missing motorcycle. Next is focus on tracking using GPS to get real time location with helping of GSM to send and receive SMS about requesting location, shut off the engine and turn on alarm command. And lastly using Arduino as the main controller connecting the GPS, GSM, relay and buzzer alarm

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

In this part, the reason for existing is to survey on a portion of the different huge works that had been finished by other analyst and important to the counter robbery cruiser security framework. Writing that was examined incorporated the innovation received, highlights extraction strategies and advantages and disadvantages by the writers in their activities. Strategies and results in past papers were contrasted all together with create great philosophies for the finish of this project.

2.1 Journal on Previous Project

These days, a high dependability hostile to anti-theft security system turns out to be more urgent to riders in present day society because of the expanding number of motorcycle theft issue. Different research and various models of bike hostile to burglary framework have been produced utilizing different stage. As of not long ago, a neither flawless nor dependable bike security systems haven't exists and designer technologist as yet finding the most ideal approach to build up a high solid, more prominent components and also bring down in term of cost. Late change in GPS, GSM, Quick Response (QR) code and a few of remote advancements have prompted the improvement of different motorcycle security systems.

## 2.2 Automobile Anti-theft System Based on GSM and GPS Module

According to the research and project that was completed by others, the project named Automobile anti-theft system was based on GSM and GPS module, done by Li Jie Li and Guang-Hui from university of technology and education Tianjin, China, today's the the state of car vehicle stolen raises forcefully particularly the new autos and the autos with low hostile to burglary limit. At present, there are three sorts of hostile to robbery supplies: guiding wheel bolted hardware; customary electronic alert and system following fsystem. Net-canny auto protect the system can be close and open the entryway of the vehicle; begin engine; accomplish vehicle area and give report of the vehicle condition. Net-intelligent auto protect system has advantage over different system. The system comprises of the focal control system introduced in the war room; portable GPS terminal introduced in the vehicle and GSM organize. Situating data can be gotten from worldwide situating satellite. Scope, longitude, speed and heading of moving target can be ascertained and be transmitted with informing stage of GSM system. 24 hour continuous and high-exactness observing on the vehicle can understand with the system.

The basic of this project is system comprises of GSM module; GPS get module; vibration sensor; and remote control and MCU unit. Car Anti-theft System Based on GSM and GPS Module. Vehicle-mounted alert with centre of GSM module and GPS accepting module can screen the condition and gather position data of the vehicle. Important data is handled by MCU. The proprietor can get the condition and position data of the vehicle through cell phone and control the alarm. It is advantageous for client to work the caution that client can control the alert most brief separation through remote correspondence module.

2.3 Development of Vehicle Tracking System using GPS and GSM Modem

Pham Hoang Dat, Michael Drieberg, Nguyen Chi Cuang proposed the project about the development of the vehicle tracking system using GPS and GSM modem that able to locate vehicles was helpful in order numerous appositeness as a security

of individual vehicles, open transportation system, the entire all management and others. Moreover, the vehicle quantity is out and about comprehensively is likewise anticipated that would increment quickly. Hence, the improvement of vehicle following system utilizing the Global Positioning System (GPS) and Global System for Mobile Communications (GSM) modem is embraced with point of empowering clients to find their own vehicles easily and in a helpful way. The system will give clients the ability to locate vehicle remotely from the versatile system. The paper exhibits the advancement of the vehicle following system's equipment model. In particular, the GPS was used by the system to get a vehicle's arrange and send it utilizing GSM module to the client's telephone through the portable system. A piece outline of vehicle tracking system. The three primary parts of the systems are the u-blox NEO-6Q GPS receiver module, u-blox LEON-G100 GSM module and Arduino Uno microcontroller. The NEO-6Q GPS receiver module's fundamental capacity is to get the vehicle's directions. Regarding the directions are occasionally sent to the Arduino Uno microcontroller. The Arduino Uno forms this data and will then send the area data to the LEON-GlOO GSM to be transmitted through the versatile system to the client when asked for or on an occasional premise. The modules and microcontroller conveys through the Universal Asynchronous Receiver/Transmitter (UART)   interface.
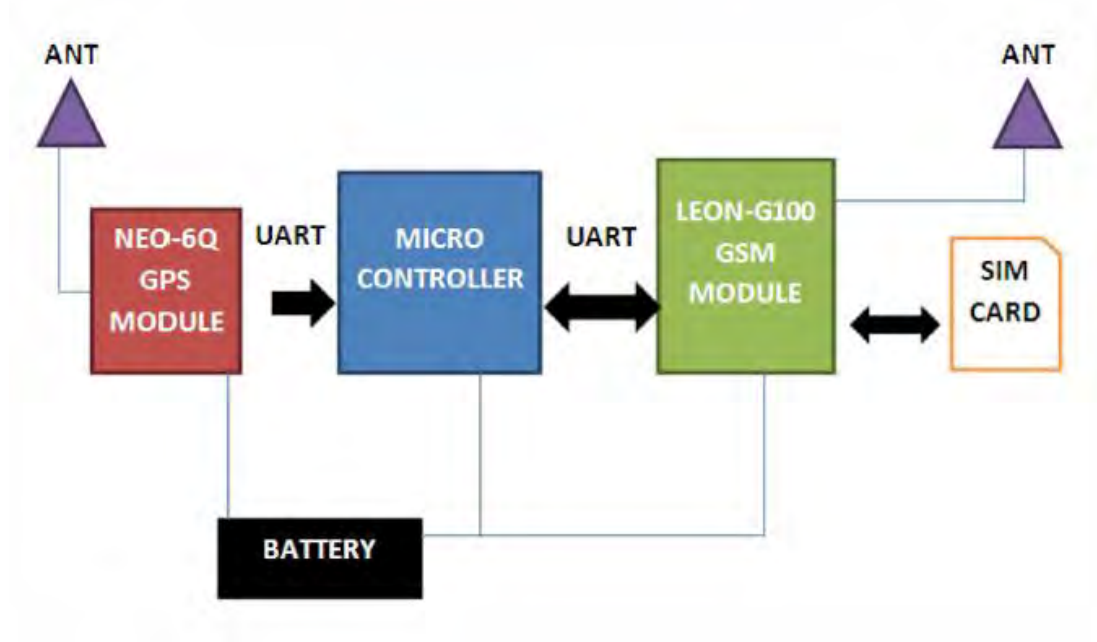
Figure 2.1 the block diagram of systems

2.4 Real Time Vehicle Tracking System Based on ARM7 GPS and GSM Technology

This project are created by Pradip V Mistrary and RH Chile that are proposed Vehicle following system were right off the bat actualized for delivery industry however innovation is developing at a quick pace so vehicle following system is being utilized as a part of an assortment of approaches to track and show vehicle area progressively. As vehicle proprietorship turns out to be more moderate because of the developing economies of nations, for example, India and China, the worldwide number of vehicle possession is required to increment.

An Automatic Vehicle Location (AVL) one of the system that gives vehicle locating the service which is utilized by swift operator to take after the developments of vehicles. This system is principally in view of Global positioning system where GPS collector connect with the one of the satellite on outer space to get the area data alongside other crucial information. Presently in everyday the system that track the location have been accessible in the market yet they are application particular, district particular and in addition an excessive amount of exorbitant, in addition, The Global positioning route system is broadly received in the vehicles today.

The total vehicle following system is isolated into two section. Initial segment was the transmitter and the other one is receiver. The primary segments of the transmitter is Global positioning system receiver, the GSM module and head of the IC microcontroller. The Global Positioning(GPS) beneficiary connect to the satellite and gets the area information and change over information into information string of NMEA 0183 arrangement that contain scope, speed, height, longitude and the other satellite data. This Global Positioning System(GPS) collector give such information string in ceaselessly intermittent way. Presently the piece of the controller work, by utilized ARM7 family's LPC2148 which work as a controller smoothly with 3.3V supply. The Controller gets string nmea and gather just scope and the longitude reading which contain the area data. Presently, this scope and longitude perusing are send to the administrator station with the assistance of GSM module. At operator station the collector will receive the SMS of scope and longitude as NMEA 0183 standard

configuration. At that point the operator was put this perusing into This GUI was contained the calculation that gets NMEA that was analyze as an info and changed over this perusing in to degree that was arrange which organization appropriately for the Google Earth. the point of google earth was calculate to be analyze on them. With these lines, the total vehicle tracking system works.

2.5   Hardware Analysis

2.5.1   Arduino

Arduino is a was an open-source organize used for building contraptions wanders. Arduino includes both a physical programmable circuit board (regularly insinuated as a microcontroller) and a touch of programming, or IDE (Integrated Development Environment) that continues running on your PC, used to make and exchange PC code to the physical board.

The Arduino has turned out to be very well known with an individuals simply beginning with gadgets, and in light of current circumstances. Not at all like most past programmable circuit sheets, the Arduino does not require a different bit of equipment (called a software engineer) keeping in mind the end goal to stack new code onto the board – you can basically utilize a USB link. Furthermore, the Arduino IDE utilizes a disentangled form of C++, making it less demanding to figure out how to program. At last, Arduino gives a standard shape figure that breaks out the elements of the miniaturized scale controller into a more open bundle. The project that are running towards is using the Arduino UNO, this Arduino Uno is one of different type of Arduino such as Arduino mega, Arduino mini, Arduino pro and many more. This Arduino basically used only in simple project and depending on the port that are used. This Arduino Uno is used microcontroller board based on the Atmega 328. It has 14 digital input /output pins which is 6 of it is using PWM outputs, And 6 analog input, 16MHz ceramic resonator, universal serial bus (USB) connection, power jack an In-Circuit serial programming (ISCP) header and reset button. In addition a USB cable or power it with Alternating current (AC) to Direct Current (DC) adapter or battery .

Table 2.1: specification of Arduino Uno

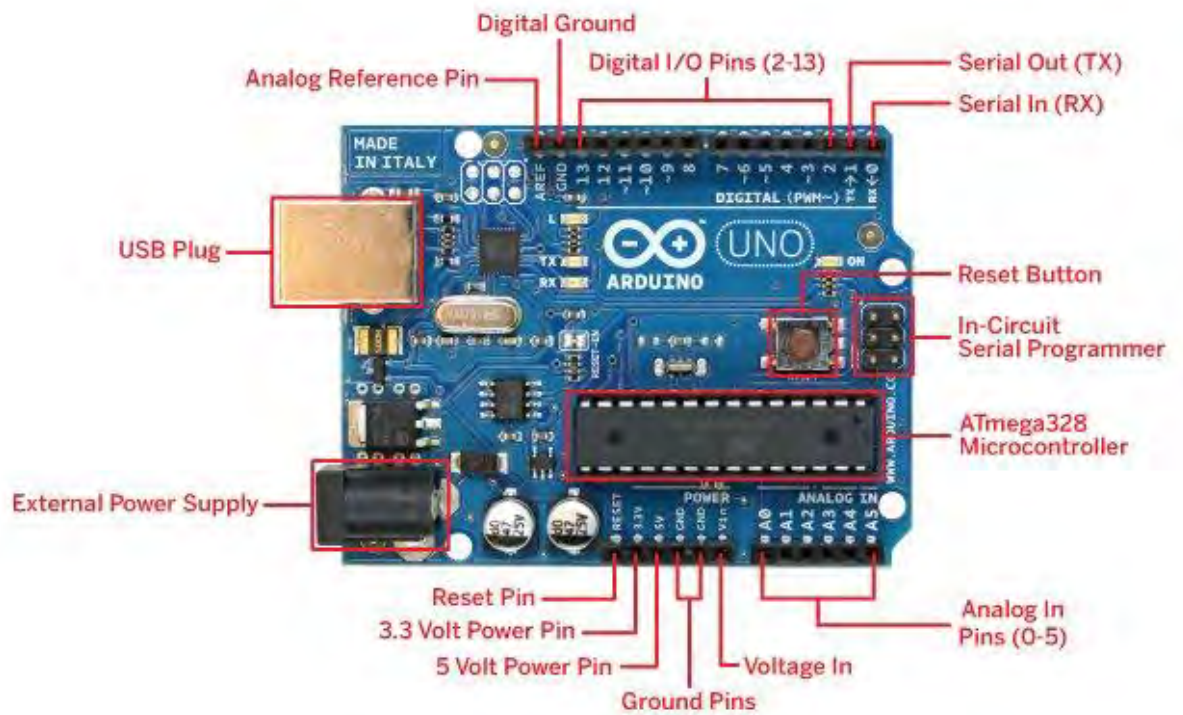| Microcontroller	ATmega328P
Operating Voltage	5V
Input voltage recommended	7-12v
Input voltage limit	6-20v
Digital I/O pin	14
PWM digital I/O pin	6
Analog Input Pin	6
Clock speed	13

Figure 2.2 Arduino Uno

2.5.2 Global Positioning System (GPS) & Global System for Mobile Communication(GSM)
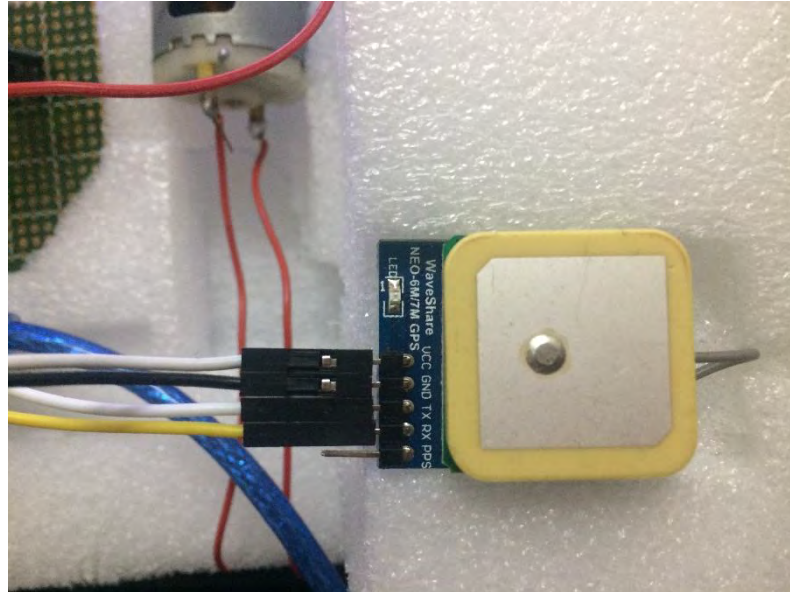
2.5.2.1 GPS

Figure 2.3: U-blox neo 6M GPS module

Global Positioning System is an arrangement of revolving around satellites that was using to send correct purposes of enthusiasm space back to earth of their position. There will be sign are shows by GPS recipients, for instance, course contraptions and are used to figure the right position, time and speed at the vehicles region. Global Positioning System is eminent for its military uses only and was first made by the US purposely to help in its overall understanding undertakings at the Cold War. Back then on mid1980s, nevertheless, the GPS has energetically available to anyone with a GPS beneficiary. Bearers, courier, trucking firms, and drivers wherever use the GPS structure to arrived at the destination in possible time. Ach of the satellites is around that empowers an authority to recognize four of the command of the operational satellites. The satellites pass on microwave signs to a recipient where the characteristic PC uses these signs as correct division from every point this four satellites and a while later match your right position and place on the planet to the nearest meters in light of these detachments.

Actually, only three satellites signal are needed to complete this trilateration ways; the computation of your position on earth in view of your separation from three satellites.

The flag from the fourth satellite is monotonous and is utilized to affirm the after effects of the concealed figuring. In the event that the position figured from parcels to satellites "A-B-C" don't compose the count in light of "A-B-D" by then differing blends are endeavored until the point that a tireless outcome is picked up.

The path toward measuring the detachment from satellite to GPS authority relies upon arranged signs. For example, at 16h45m accurately, the satellite may begin broadcasting its banner. The GPS recipient will in like manner begin running a comparable unpredictable progression at 16h45m adjacent time, yet does not convey the gathering. Right when the authority gets the banner from the particular satellites, there will be a period slack, in light of the way that the microwaves take a little measure of a minute to wander out from the satellite to the beneficiary. The time slack is easily changed over into detachment to each satellite. The slight distinction between signs from each satellite is then used to ascertain the collector's position.

Table 2.2: Specification of U-blox neo 6m GPS module

Operating Voltage	3.3V-5V
Interface	RS232(TTL level,3.3V for 'Hh,0V for 'L'
Default Baud rate	9600bps
Receiver Type	50-channel u-blox 6 engine GPS L1 C/A code SBAS:WAAS,EGNOS<MSAS
Acquisition	Cold start : 27s Aided start:<3s Hot Start:1s