

SMART CHILD NOTIFICATION SYSTEM

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This Report Is submitted in Partial Fulfilment of Requirements for
Bachelor Degree of Electronic Engineering (Industrial Electronics) with Honours

FakultiKejuruteraanElektronikdanKejuruteraanKomputer

UniversitiTeknikal Malaysia Melaka

June 2016



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

Tajuk Projek : SMART CHILD NOTIFICATION SYSTEM

Sesi Pengajian : 15/16

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Dedicated to my parents for their support and understanding, to my supervisor who always giving help to me. Special thankyou also to my friends and lectures keep give me support to complete this project.

ACKNOWLEDGEMENT

First of all, I would like to thank my supervisor DrNorhashimahbintiMohdSaad who always giving his support, guidance and encourage for completing this final year project. He also always helps in giving more detail and information related to this project.

Furthermore, I would express appreciation to faculty,FakultiKejuruteraanElektronikdanKejuruteraanKomputer(FKEKK) for providing final year student this subject as final year project . It helps student implementing theory and practically subject into this final year project.My greatest appreciation also gives to UniversitiTeknikal Malaysia Melaka on their facilities and equipment to complete this project.

Next, the greatest support is come from my family, especially my beloved parent who gave a moral, spiritual and economic support until this project complete within time provided. They always be my backbone and loyal supporter whenever I face problem and obstacle during to complete the project Last but not least, I would like to thank to my friendsis always give an idea, discuss about the project and advice to improve my project.

ABSTRACT

Nowadays, the number of missing children in Malaysia is increasingly and always become viral on mediasocial. The crime over children is rapidly happened especially to school children. Therefore, they can easily being kidnaped at anywhere and anytime due to lack of system that need to notify parents about time in and out of their children from the school. Hence, Smart Child Notification System is to develop a notification system that can notify parent about their child safety. In this system, it will implement SIM908 GPS Module interface with Arduino Mega 2560. GPS module and Arduino Mega 2560 are attach inside children school bag and the system is operates withouttime setting. In other words, parents can track their child current location at anytime and anywhere. Hence, this system is more easy and efficient to monitor child safety .GPS module act as to find the current location of the children and GSM in SIM908 GPS Module will inform or notify parents of current location their children. As a conclusion, this project to reduce missing children cases in our country.

ABSTRAK

Sejakkebelakanganini, jumlahmasalahkeskehilangananak-kanaksemakinmeningkat di Malaysiadanselalumenjadi viral di laman media sosial.Malah, kejadianjenayahterhadapkanak-kanaksering kali berlaku di negaraini.Seterusnya, masalahinimenyebabkankanak-kanakmudahdiculikdimanasahajadanpadabila-bilamasa di sebabkankekuranganataukelemahansistemnotifikasi yang berfungsimemberitahumasamasukdankeluarkanak-kanakdarisekolah.Olehitu, SistemPintarNotifikasiKanak-Kanakdibagunkanuntukmemberitahukeselamatananak-anakkepadaibubapa. Dalamsistemini,iamengaplikasikan SIM908 GPS Module berhubungdenganArduino Mega 2560. Sisteminiakandimasukandalam beg sekolahkanak-kanakdimanamerekaselalumembawa beg kesekolah. Sisteminijugaberoperasipadabila-bilamasadan di mana-manatempat.Tiadamasa yang speksifikasiditetapkandalamsistemini.Dengancaraialebihmudahdanefisyenbagimengesan keselamtanakan-kanak. SIM908 GPS Module bertindaksebagaimengesanlokasikanak-kanakdan GSM di GPS Module berfungsiuntukmenghantarmesejkepadaibubapalokasiterkinianakmerek.Kesimpulannya , projekinidapatmembantumengurangkanmasalahkespenculikanakanak-kanak di negaraini.

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CHAPTER 1

INTRODUCTION

1.1 Project Background

Recently, news about a missing child is reported, it is always heartbreaking to see missing children posters on signboards, petrol stations, and even on ATM machines, as an effort to get the child back. Based on the statistics from Royal Malaysian Police show that the number of missing children cases in 2009 was 50 and increased to 54 cases in 2010 [1]. Besides, crime over children is rapidly happened especially to school children. Therefore, they can easily being kidnaped at any places and anytime due to lack of system that need to notify parents about time in and out of their children from the school. In real world, there are many of invention tracking system. In this project, it will divide into two parts which track and notify.

The purpose of this project is to notify parents about their child safety. The GPS/GSM Module and Arduino Mega microcontroller are placed in the school bag of the children. When the parents want to know their children location, they just need to send a message using their phone to the GPS/GSM Module at anytime. The module will

reply the message received from the parent by sending them the coordinates of the children (latitude, longitude) and the Google Maps URL.

Therefore, parents could use Uniform Resource Locator (URL) to know the exact location of their child on the map. GPS module is used to find the current location of the children and GSM in SIM908 GPS Module will notify parents of current location their children. This project is majorly for children who carry school bag to school due to their always bring bag going to school and this notification system is developed to help parents to locate their children's.

1.2 Problem Statement

The ideas come to develop this notification when commonly there is no systematic security system in school in our country. Hence, due to the lack of security system in the school by depending manual security with monitoring by guard it may child exposed to danger. Besides, the number of crime over children is increasingly day by day. The news related to missing children always be the main topic on newspaper and quickly viral on internet. Other problem is parents cannot monitor their child safety along the way to school. In other words, some parents do not have privilege to send and fetch them from school [2].

1.3 Objectives

The aim of this project is to produce a children notification system by using SIM908 GPS Module and ArduinoMega 2560. The objectives of this project are:-

- i. To develop a notification system that can notify parent about their child location
- ii. To improve notification system for children via GPS system.
- iii. To integrate a system that consists of hardware and software.

1.4 Scope of work

The scope of work for this project is for notification purpose only. GPS system is used to this project with combination of GPS module. The type of GPS module used is SIM908. The module is placed inside children school bag in order to locate the current location of children and sending message to parents using GSM module once location is detected. The GPS/GSM Module can only respond to one telephone number only. This project will be focusing on children come in and left the school.

1.5 Thesis Outline

Overall of complete thesis consists of five chapters which is including introduction, literature review, methodology, results, discussion, conclusion and some recommendation for this project.

In the Chapter 1, the content of project background, problems statement, objectives, scope of projects and report structure were clearly explained. The concept and overall overview of this project will be discussed in Chapter 1.

In Chapter 2 is relates to the Literature Review. Roughly, in part of literature review, it shows the SIM908 GPS Module connect with Arduino and operates in this project. Chapter 3 is about the project Methodology. The hardware and the software used in this project will be discussed in this chapter. The flow or process of this system also is clearly shows in flow chart.

Results and discussion part will be discussed in Chapter 4. The results from this project and justification of its performance to make sure the objectives are achieved.

In Chapter 5, conclusion and recommendation of this project are made. This chapter will summarize and conclude about the system is and propose some recommendation to improve the project in future.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, the literature review includes the theories of SIM908 GPS Module and ArduinoMega 2560. In this chapter, the concept and basic theory of this project is discussed. The purpose of this chapter to more understanding about the hardware and software implement for the system. Some comparisons about the technology use for enable the suitable scope of project.

2.2 Global Positioning System

The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites is placed into orbit by the U.S. Department of Defense [3]. GPS operates in any weather conditions, anywhere in the world, 24 hours a day. Satellites move around (circle) the earth twice a day for each orbit and transmit the signal information to earth. GPS receivers take this information and use trilateration to calculate the user's exact location.

Triangulation is a process where the location of a radio transmitter can be determined by measuring either the radial distance or direction of the received signal from two or three different points. Meanwhile, trilateration is to determine the locations of points by measure the distances, using the geometry of circles, spheres or triangles. Trilateration method defines a complex version of triangulation to determine its position on the surface of the earth by timing signals from three satellites in the Global Positioning System. Essentially, the GPS receiver compares the time a signal was transmitted by a satellite with the time it was received.

Then, the time difference tells the GPS receiver how far away the satellite is. By knowing the distance measurements from a few more satellites, the receiver can determine the user's position and display it on the unit's electronic map or on more specific Google Map. A GPS receiver must be locked on to the signal of at least 3 satellites to calculate a 2-D position [4]. Moreover, 2-D position represents coordinates of latitude and longitude and track movement. If four and more satellites view, the receiver can determine the user's 3-D position in term of coordinates of latitude, longitude and altitude. GPS also can do other works such as can calculate speed, bearing, track, trip distance, distance to destination, sunrise and sunset time and more.

2.3 ArduinoMega as Microcontroller

Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins which 15 can be used as PWM outputs, 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm center-positive plug into the board's power jack. Leads from a battery can be inserted in the Gnd and Vin pin headers of the POWER connector.

The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may be unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts. Besides, ATmega2560 has 256 KB of flash memory for storing code which is 8 KB is used for the bootloader, 8 KB of SRAM and 4 KB of EEPROM which can be read and written with the EEPROM library.

The Arduino Mega2560 has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega2560 provides four hardware UARTs for Time to live (TTL) 5V serial communication.

Table 2.1: Technical Detail of Arduino Mega [5]

Microcontroller	ATmega2560
Operating Voltage	5V
Input voltage (recommended)	7V-12V
Input voltage (limits)	6V-20V
Digital I/O Pins	54 (of which 6 provides PWM output)
Analog Input Pins	16
DC Current per I/O Pin	40mA
DC Current for 3.3V Pin	50mA
Flash Memory	256 KB of which 8 KB used by boot loader
SRAM	8 KB
EEPROM	4 KB
Clock Speed	16MHz

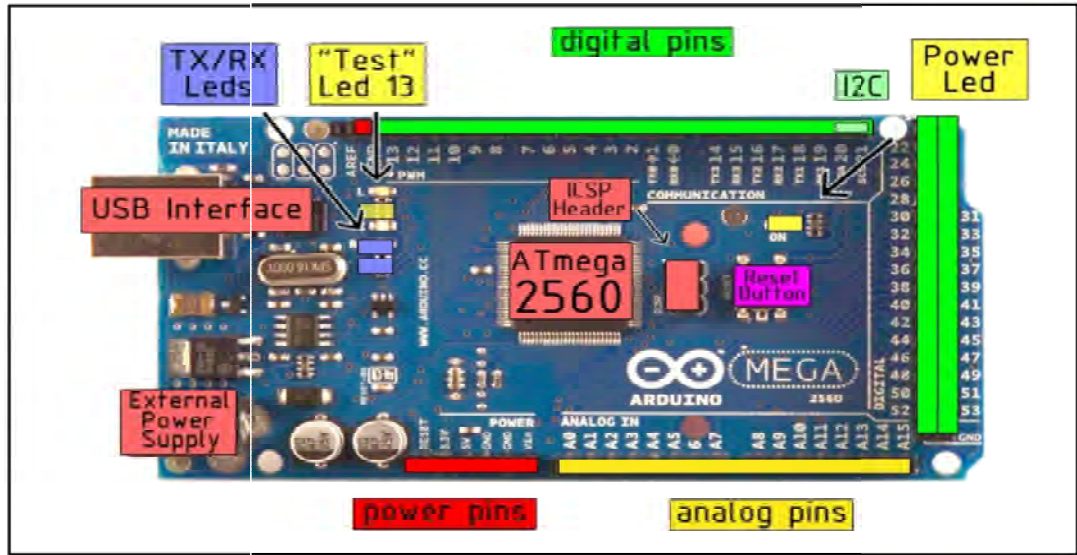


Figure 1: Arduino Mega 2560 with label view [5]

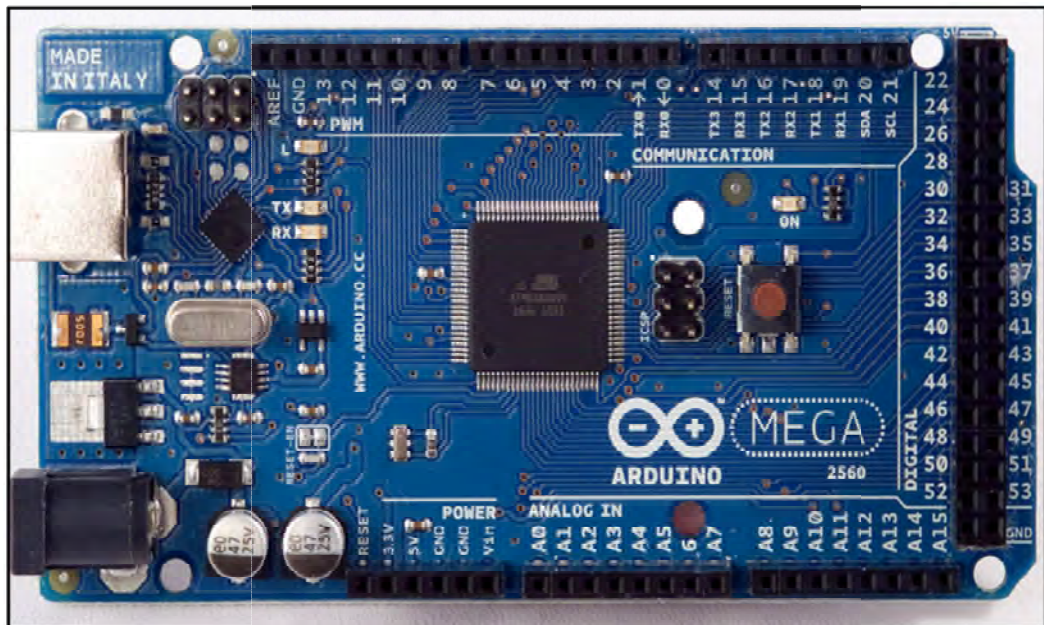


Figure 2: Arduino Mega 2560(Front view)

Table 2.2: Comparison between Arduino [6]

Type of Arduino	Arduino Mega 2560	Arduino Uno R3	Arduino Leonardo	Arduino Due
System Voltage	5V	5V	5V	3.3V
Clock Speed	16 MHz	16 MHz	16 M Hz	84 MHz
Digital Input Output	54	14	20	54
Analog Input	16	6	12	12
PWM	14	6	7	12
Programming Space	256 KB	32 KB	32 KB	512 KB
Programming Interface	USB via ATmega16 U2	USB via ATmega16 U2	Native USB	Native USB

2.3.1 Arduino Programming Languages

Arduino language is generally merely a set of C/C++ functions that can be called from code. The sketch undergoes minor changes like automatic generation of function prototypes and then is passed directly to a C/C++ compiler. In more clearly, IDE programming standard for Arduino is used to give instruction of system. The language references are divided into three parts which are the structure, the variables and the functions. The suitable command of all 14 digital pins are *pinMode()*, *digital Write()* and *digital Read()* either as input or output.

One of the benefit using of Arduino when can create the control program on PC and upload the file to board and then it will operates automatically. If we removed or eject the USB from the

PC, the program is still running. Besides, the program also can run although the duration almost more than six months. Hence, it means that PC is only need to create and debug the code and it not compulsory to run the program once the program is uploaded into Arduino.

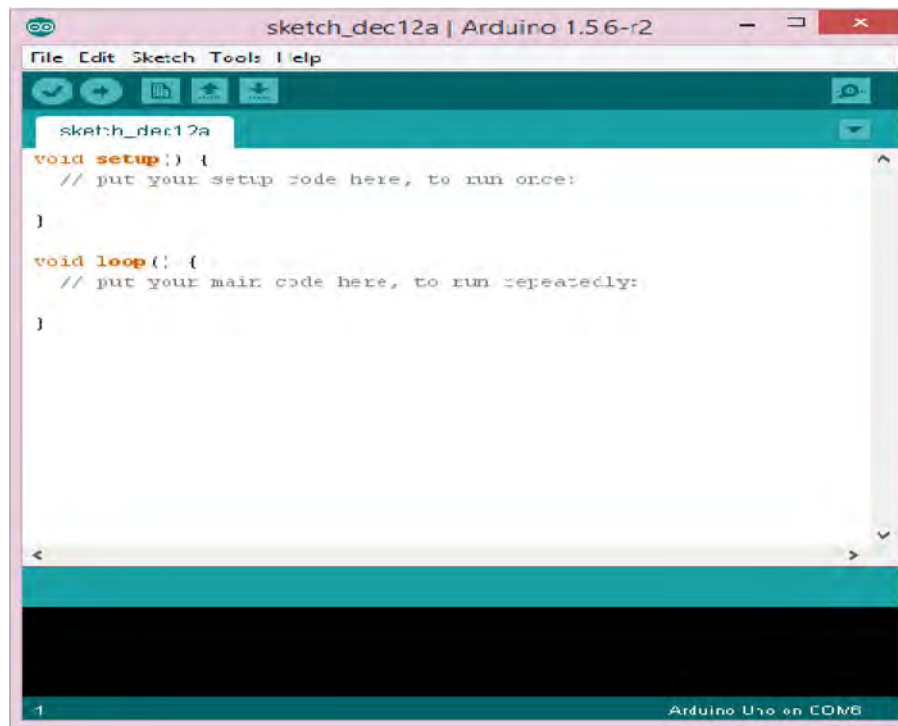


Figure 3: Arduino Programming Workspace

2.4 GPS – GSM Tracker