

**INTERNET BASED CAR WARNING SYSTEM WITH SMART PHONE**

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**BORANG PENGESAHAN STATUS LAPORAN  
PROJEK SARJANA MUDA II**

Tajuk Projek : INTERNET BASED CAR WARNING SYSTEM USING  
SMART PHONE  
Sesi Pengajian : 

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## **DEDICATION**

Special dedication to my beloved family especially my parents, all my siblings, my kindhearted supervisor Engr. Khairul Muzzammil Bin Saipullah and thanks to my dearest friends.

## ACKNOWLEDGEMENT

Firstly, I take this opportunity to express my profoundest gratitude and deepest regards to all those who gave me the possibility to successfully complete this PSM. I am deeply indebted to Project Supervisor Engr. Khairul Muzzammil Bin Saipullah and wishes to express a million thanks for his exemplary guidance, monitoring and constant encouragement throughout the development of the project. In those moments of uncertainty and doubts when things used to turn dark without a clear understanding of the knowledge that he tried to share, his kind and patient way of explaining had indeed a soothing effect. The blessing, help and guidance given from time to time shall indeed carry me a long way in the journey of life on which I am about to embark in the near future.

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Last but not least, to all my well-wishers who had helped me both directly and indirectly, I virtually fall to short words to express my gratitude. Therefore, I end this acknowledgement with only two words “Thank You!” in their reminiscence.

## ABSTRACT

Car is one of needs for every person nowadays. Peoples use it every day for travelling from one destination to another. Car is left when peoples reached for their destination. When they are already in the office, train of somewhere else far from the car, sometimes they wonder about the condition of their car when they left the car parked at the parking area. Problems arise when peoples need to go way back to their car just to check on the car's condition whether electronic devices is switched off or the car is locked. This project looks into this matter, which is to design a system that attached to a car, telling the people about their car's condition no matter where they are. By checking the status of the car from smart phone, energy and time can be saved. In addition, the car's battery can't be wasted when electronic devices are on and a person knows the status. By this way, problems such as car died in the middle of the road or can't start the car can be avoided.

## ABSTRAK

Kereta merupakan satu keperluan kepada seseorang pada zaman sekarang. Mereka menggunakan kereta untuk ke satu destinasi dan destinasi yang lain. Kereta ditinggalkan apabila mereka sudah sampai ke destinasi. Kadang-kadang mereka akan merasa keadaan kereta mereka berada dalam keadaan selamat atau tidak apabila mereka berada di dalam pejabat, kereta api atau sesuatu tempat yang jauh daripada mereka. Masalah timbul bila seseorang pergi kepada kereta mereka hanya untuk menentukan kereta mereka dalam keadaan selamat atau tidak. Projek ini mengambil berat tentang masalah ini, di mana sistem ini direka pada kereta, dan memberitahu mereka tentang status kereta di mana sahaja mereka berada. Periksa keadaan kereta dengan menggunakan telefon bimbit, tenaga dan masa dapat diijimat sepenuhnya. Tambahan pula, bateri kereta tidak akan terbazir apabila alat elektronik hidup dan seseorang itu tahu keadaan itu. Dengan cara ini, masalah kerosakan kereta di tengah jalan atau kereta tidak dapat dihidupkan dapat dielakkan.



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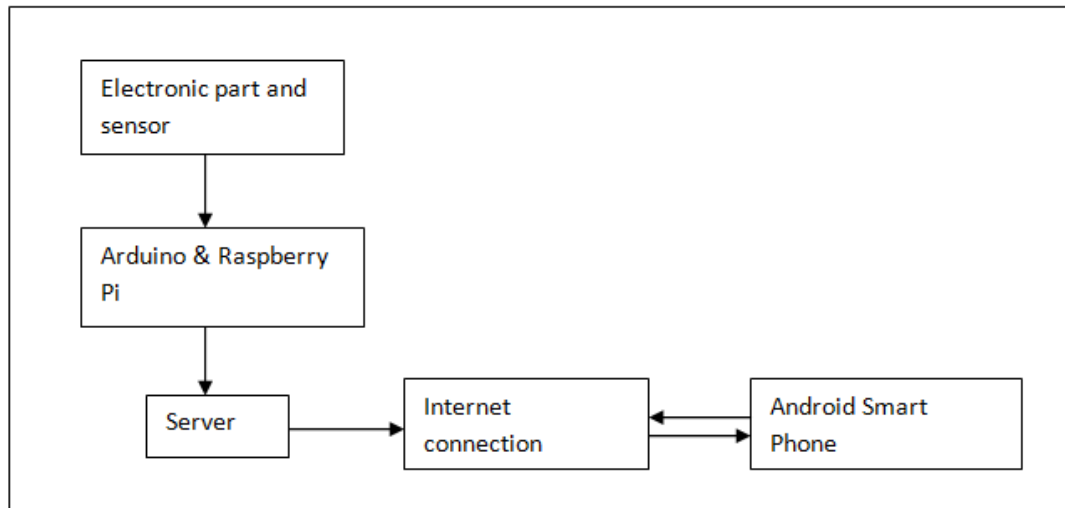
## **CHAPTER 1**

### **INTRODUCTION**

Car is important nowadays. It is one of needs of life to go from one destination to other destination. Even though, if the car not well care, it will have a problems in anytime and bring problems to driver. Problems like temperature rising, engine broken and running out of battery can bring a dangerous situation to other road user.

This project is developed in purpose to avoid one of the problem that always been done by drivers while leaving cars. Forgot to switch off the head lamp and roof lamp could run out the battery while the engine is off. This application can help drivers by telling them which part that not switch off yet while leave a car. Figure 1 shows the basic system diagram flow chart. The sensors detect the part in the car, and send the information to Arduino. It connects to the Raspberry Pi which is a micro processor that provides wifi. Raspberry Pi process the data received from Arduino, connects to the internet and then upload the result to the server. The car sends the information to drivers through the server that there is a part that not switches off yet. By this way, running out of battery can be avoided. This application develops for Android operating system and tests on Android smart phone.

This project is expected valuable and to be develop because it can help the drivers avoid from such problem.



**Figure 1.1.1 Basic System Diagram**

## 1.1 Problem Statement

Car depends on the battery in order to start the ignition. Battery will out of power if part of electronic device in car is left open without the engine running especially when the car is left at the parking lot. Distances is also a factor just to check the status of the car.

## 1.2 Objectives

The objectives of this project are as follows:

- i. To develop an Internet-based car status warning system based on Android smart phone.
- ii. To alert the driver when they forget to turn off lights, shut the window and lock the door while parking their car.
- iii. To check the status of the car by using internet.



### **1.3 Project Scope**

There are two parts in this scope that is hardware and software. For hardware, design circuit that detect electronic which are still open and the connection of the device to the internet by using Arduino and Raspberry Pi board respectively. For software part, Eclipse application is used including the design of Internet-based car status warning application.

### **1.4 Project Significant**

The project brings benefits such as follows:

1. To reduce the possibility of having problem in the future use.
2. Can be used anywhere as long the location of the user and car has an internet connection.

### **1.5 Thesis Organization**

This thesis comprises five chapters: Introduction, Literature Review, Project Methodology, Result and Discussion, and Conclusion and Future Work. The introduction of the project has been given in this chapter where it specifically explains the background of the project for further understanding of the thesis. Chapter 2, the Literature review, reviews the theory on operational amplifier, low noise amplifier also several other topics related to the project. Chapter 3 discusses the methodology of the overall project which is divided into two stages which is PSM I and PSM II. PSM I will cover on the literature review and research. Whereas in PSM II continue with design schematic circuit and layout using CADENCE. Experimental results and discussion are explained in further details in Chapter 4. Finally, the thesis ends with Chapter 5 which concludes the overall project followed by a number of recommendations for future work and research.

## CHAPTER 2

### LITERATUR REVIEW

In this chapter, literature review or background research is one method to explain the perspective and theory which were used in this project. To develop an Internet-based car warning system, literature review is done by collecting information from journals, blogs, tutorials and projects.

#### 2.1 Project Existed

There are some projects held by writers in the journal and internet. Most of the project used the board as same as this project that is Arduino board and Raspberry Pi board.

##### 2.1.1 Home Automation System using Raspberry Pi and Arduino

Home automation system is done by using Raspberry Pi and Arduino board in order to get the best result. This homemade home automation system is done to avoid from high price to buy a system. For this system, the Raspberry Pi will act as the brains and the gateway of operations. It will run a Node app, tied to Mongo database, and serve the front-end interface to any web browser. An Arduino,

powered from the Raspberry Pi, will interface between the electronics such as radio control power switches.

First step of this project is make the Raspberry Pi ready and enable the SSH. Ready means it has a Raspian image inside SD card in order to make the Raspberry Pi work. After everything is ready, the operating system is updated to get the latest information

```
Sudo apt-get update
Sudo apt-get upgrade
Sudo apt-get install git-cor git scons build-essential scons libpcr++-dev xulrunner-
dev libboost-dev libboost-program-options-dev libboost-thread-dev libboost-
filesystem-dev
```

When update is finished, the next step is installing Node. Node is an interface to the V8 Javascript runtime. Node is used for web server in this project.

```
sudo mkdir /opt/node
wget http://nodejs.org/dist/v0.10.2-linux-arm-pi.tar.gz
tar xvzf node-v0.10.2-linux-arm-pi.tar.gz
sudo cp -r node-v0.10.2-linux-arm-pi/* /opt/node
sudo ln -s /opt/node/bin/node/usr/local/bin/node
sudp ln -s /opt/node/bin/npm/usr/local/bin/npm
```

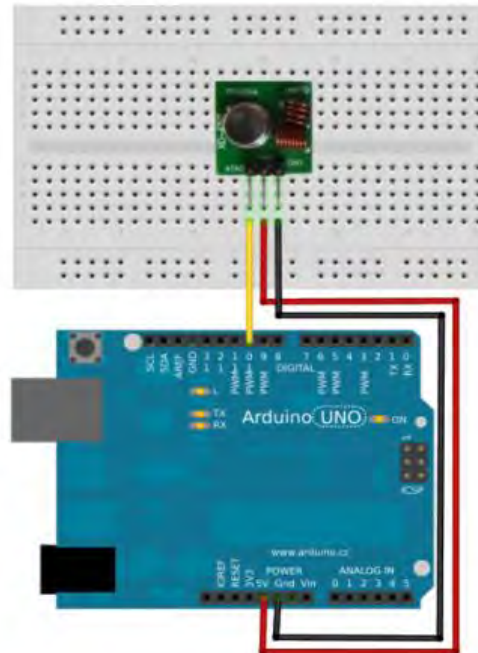
The next step is installing Mongo. Mongo is a document –based No SQL database increasingly used by web apps. Run this command to install mongo.

```
git clone git://github.com/RickP/mongopo.git
cd mongopi
scons
sudo scons --prefix=/opt/mongo install
scons -c
```

When installation is finished, fix permission issues and make it running on startup.

```
Sudo useradd mongodb
Sudo mkdir /data/dbb
Sudo chown $USER /data/db
cd /etc/init.d
sudo wget -O mongodb https://gist.github.com/ni-c/fd4df4-4bda6e87fb718/raw/36d45897cd943fbd6d071c096eb4b71b37d0fcbb.mongodb.
sh
sudo chmod +x mongodb
sudo update-rc.d mongodb defaults
mongod
```

For the hardware part, transmitter 433 Mhz is used and connected to Arduino as shown in figure 2.



**Figure 2.1.1: Connection between Arduino and transmitter**

### 2.1.2 DHT Humidity Sensing on Raspberry Pi with GDocs Logging

This project is done to check the humidity and temperature using low-cost humidity and temperature sensors. Python update a Google spreadsheet live with the temperature/humidity data.

For this project, GPIO4 is used in the diagram and code. Any GPIO can be used as long the changes in the code are made. The sensors that been used is DHT11 and DHT22. 4.7k-10k Ohm resistor is connected from data pin to VCC. The connection is shown in the figure 3 and 4.

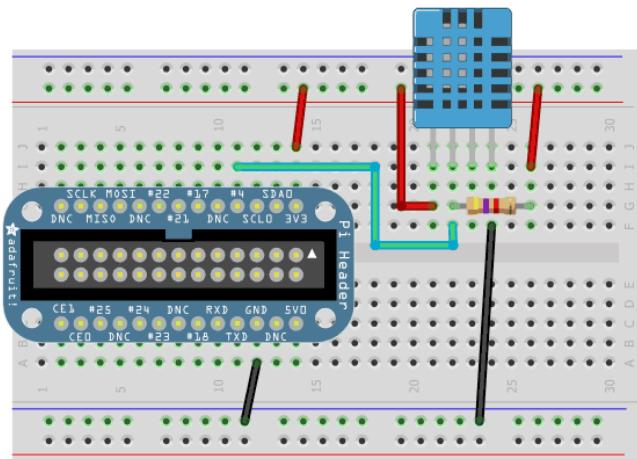


Figure 2.1.2: DHT11 connected to GPIO4

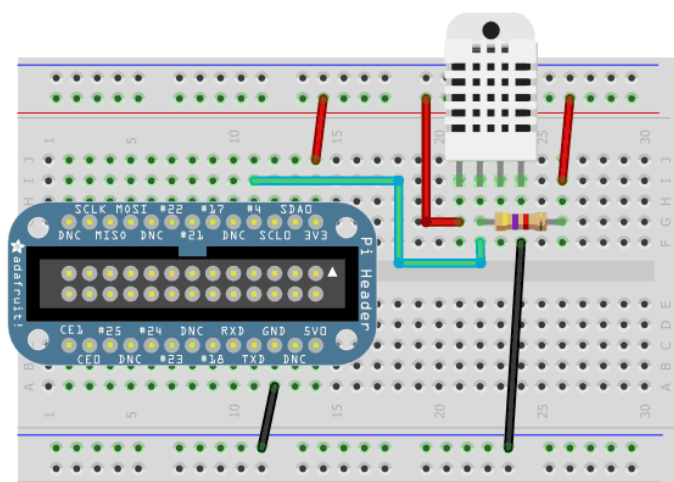


Figure 2.1.3: DHT22 connected to GPIO4

The next step is downloading the code by connecting the Raspberry Pi to internet through Ethernet cable and run the following commands from an appropriate

```
$ git clone git://github.com/adafruit/Adafruit-Raspberry-Pi-Python_code.git
$ cd Adafruit-Raspberry-Pi-Python-Code
$ cd Adafruit_DHT_Driver
```

The code is tested with the sensor attached to the data line GPIO4 and run the following code.

```
sudo ./Adafruit_DHT2302 4
```

Wait for a few second for the sensor to boot up and try a few times before it will respond with a temperature and humidity.

The pin connected need to be read at very high speed, since the DHT sensors use a low-level timing protocol to send data. Low level C libraries are used instead of Python libraries because Python libraries are slow. Run this commands to grab and install low-level BCM2835 C Library.

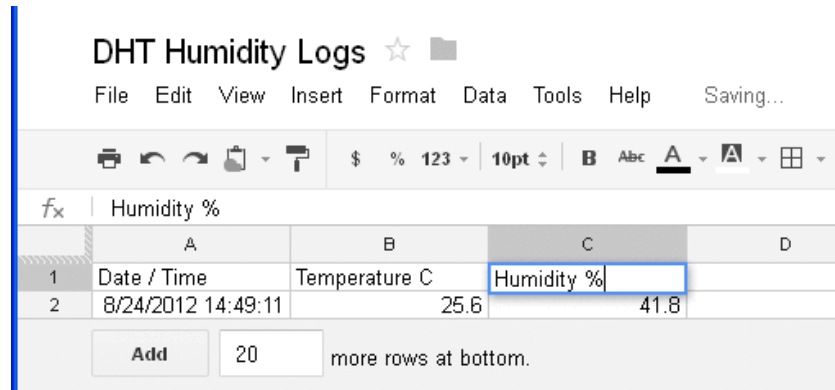
```
$ wget http://www.open.com.au/mikem/bcm2835/bcm2835-1.8.tar.gz
$ tar -zxvf bcm2835-1.8.tar.gz
$ cd bcm2835-1.8
$ ./configure
$ make
$ sudo make install
```

Then compile the Adafruit\_DHT program with the following command

```
gcc Adafruit_DHT.c -I bcm2835 -std=gnu99 -o
```



Next step is creating and prepare spreadsheet by login or signup for Google Docs. Create spreadsheet and the name is DHT Humidity Logs. Delete row until one is left and make it as a header with row names as shown in the figure 2.4.



**Figure 2.1.4: Header with row name**

In order to update the logs from Raspberry Pi to GDocs, gspread python library needs to be installed. Run the following commands.

```
wget http://pypi.python.org/packages/source/g/gspread/gspread-0.1.0.tar.gz
tar -zxvf gspread-0.1.0.tar.gz
cd gspread-0.1.0
sudo python setup.py install
```

In Adafruit-Raspberry-Pi-python-code/Adafruit\_DHT\_Driver directory, Adafruit\_DHT\_googledocs.ex.py is edited.

```
# Account details for google docs
email      = 'you@somewhere.com'
password   = '$hhh!'
spreadsheet = 'SpreadsheetName'
```

This file needs to put Google account Id and password so that the system can automatically upload result to Google spreadsheet.

### 2.1.3 Car PC Project

Car Pc project is cheap project, install in old car compare to new technology pc installed in car. This project also used Raspberry Pi as a main board to connect the entire component that involves in this project. The Raspberry Pi powers a media centre for music, a touch screen display for navigating the library, a backup camera, and a GPS system.

Hardware that involves is:

- Raspberry Pi model B
- 7 inch display with touch screen for car rear view camera
- HDMI male to HDMI male
- 8GB SDHC class 6 card
- 12V(500mA) AC to DC adapter for powering the display
- 5V(1A) for powering the Pi
- ST22 Skytraq GPS Receiver Module
- Reverse Camera

Software that has been used is:

[Operating System]

- Raspbian Wheezy
- Custom Kernel 3.6.11
  - eGalax touchscreen module
  - si470x usb radio module
  - snd-usb –audio module

[Media Center]

- omxplayer
- XBMC 12.2 Frodo [Navigation]
- Navit built from source
- Zoom in, Zoom out button
- Click sent from XBMC to X11

GPS is setup by connecting GPS module to UART TX , UART RX, GND and 3.3V or on usb port. Then GPS is connected to gpsd by this command:

```
Sudo apt-get install gpsd  
Gpsd /dev/ttyAMA0
```

New map is added to Navit by go to Navit Planet Extractor. Desired area is downloaded and transferred to Raspberry Pi in the folder `/home/pi/navit_export/build/navit/maps/`.



**Figure 2.1.5: Front without OEM Radio/CD player**



**Figure 2.1.6: Trunk with relocated OEM Radio/CD player**



**Figure 2.1.7: Mounted Raspberry PI in the armrest**

From figure 8, Raspberry pi is placed temporary for ease the user to monitor the board. Radio/CD player is removed to place the touch screen based on figure 6 and figure 7.

## **2.2 Project Relationship**

Internet-Based Car Warning System project using both Arduino and Raspberry Pi board. As the project stated above, Home Automation project [1] also using both Arduino and Raspberry Pi board. The concept is same that is using Arduino board for components connection but Raspberry Pi in Home Automation project becomes a web server where the user access from the smart phone to Raspberry Pi via Node web server installed in Raspberry Pi and control the components by phone. The server used in this project is Google Spreadsheet, not Node and Mongo. The result is shown at the phone but the user cannot control the component.

DHT humidity Sensing project use temperature/humidity sensor [2] that are connected to Raspberry Pi, upload the results to the Google Spreadsheet. Compare to Internet-based car warning system project, the concept being used is same where this project also uses Google Spreadsheet as a server and use different type of sensors. Raspberry Pi uploads the results to Google Spreadsheet, automatically alerts and shows the result with GUI interface on the smart phone.