

Automation in Automotive Electric System

Malav Bhatt¹, Jinesh Kamdar²

¹U.G Student, Automobile Engineering Department, Indus University, Ahmadabad

²Assistant Professor, Automobile Engineering Department, Indus University, Ahmadabad

Email address: malavbhatt.16.am@iite.indusuni.ac.in

Abstract— This project that I have performed presents a design and prototype implementation of new automotive electrical system for automobile that uses WiFi technology as a network infrastructure connecting its parts. The proposed system consists of two main components; the first part is the server (web server), which presents system core that manages, controls, and monitors users' automotive. Second part is hardware interface module, which provides appropriate interface to sensors, actuator and relays of automotive electronic automation system. Unlike most of available automotive electrical automation system in the market the proposed system is scalable that one server can manage many hardware interface modules as long as it exists on WiFi network coverage. System supports a wide range of automation devices like power management components, warning devices and security components. The proposed system is better from the scalability, flexibility and accessibility point of view than the commercially available automotive automation systems.

Keywords— Automotive Electric System; Relays,Sensors,Actuators; Smartphone; Wi-Fi; Automation.

I. INTRODUCTION

Nowadays smart phones are becoming more powerful with reinforced processors, larger storage abilities, greater entertainment methods and more communication theories. Wifi is mainly used for data exchange; add new features to smart phones. Wifi technology, created by telecom vendor Ericsson in 1994, shows its advantage by integrating with smart phones. A host wifi device is capable of communicating with up to numbers of wifi modules at same time through one link. Thank for wifi technology and other similar techniques, with dramatic increase in Smartphone users, smart phones are rapidly turning into a multipurpose portable and affordable device to provide modernism to people on their daily basis.



Fig. 1. layout of pyrolysis oil production Assembly

The main objectives of this project are:

1. To provide an accessibility to automobile electrical system
2. To provide equivalent and more compact protective functions.
3. Reliable and quick response to automotive electric system in low rate and power consumption.

II. LITERATURE REVIEW

Vineet Sharma Thus, in this project, I have learned that how to designed an Android App in the software Android Studio to control the RC module. The publisher has programmed Arduino and designed the RC car with diagram

in literature review. All in all the car receiving the commands via Bluetooth and move accordingly.[1]

JayeshGeorge's SMART CAR project I understand the theory that they try to control the car with the help of android application in Smartphone. Thus reducing the effort of controlling car in rough terrain and it also helps in reducing the difficulties of parking a car in tight parking conditions. The communication between the car and Smartphone is done with the help of Bluetooth communication. As per the securities point of view, they have provide access code for the Wi-Fi So the system helps user to reduce efforts and making vehicle or organization more intelligent and life luxurious. The commands are sent to the Bluetooth module in microcontroller with the help of Bluetooth in smartphones. To end with the objective of the project has been fulfilled that is to be developed into an integrated system which can sense and control the ignition of the vehicle.[2]

Andrew Whitmore from the recent literature, it's The Internet of Things is a paradigm where nowadays subject can be subjected to identify and sense capabilities that will allow them to communicate with one another and with other devices and services over the Internet to accomplish some objective. All in all, IoT devices will be multifunctional, subject-aware and will enable artificial intelligence. This survey reports on the current stage of inventions on the Internet of Things(iOT) by examining the literature, identifying current scenario, describing challenges that harms IoT diffusion, presenting open research requirements and further enlargement and compiling a comprehensive reference list to guide researchers.[3]

III. WORKING OF THE PROJECT

The idea behind the project is to connect an OLED to the Arduino Board. This OLED must be connected over WiFi i.e. within a local network through a Smart Phone. For this, here im using the ESP8266 WiFi Module and interface it to Arduino through Serial Communication. Arduino will command the ESP8266 module to get connected to a WiFi network. An OLED is connected to the Digital I/O Pin of the

Arduino. Coming to the rest of the connections with respect to the ESP8266, it's pins are connected to 3.3V of the Arduino and is connected to, well the GND pin of the Arduino. A Push Button is connected between RESET of ESP8266.

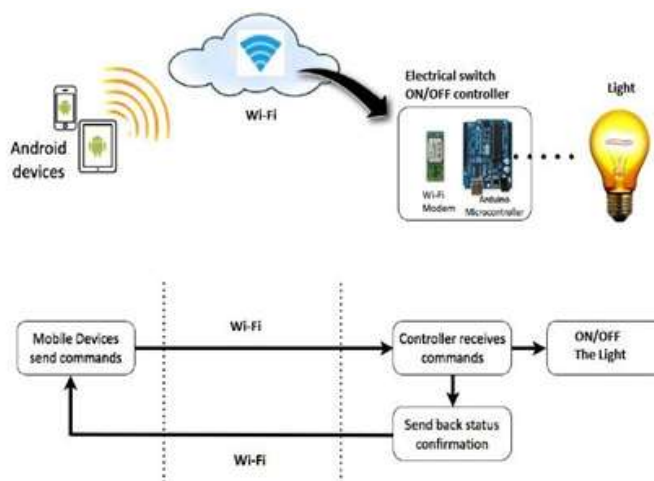


Fig. 2. Pyrolysis oil production Assembly

By uploading the Arduino Code provided above to Arduino Board after making all the necessary connections. Once the code is uploaded, open the Serial Monitor of Arduino. We can see the progress of the setup done on the ESP8266 WiFi Module. Now, open the application that you saved earlier and enter this IP Address in the IP Address field provided. After entering the IP Address, you can click on the Button on the page to operate relay and sensors.

IV. RESULTS AND DISCUSSIONS

Throughout the project was a great learning experience. I am into the field of automobile department from a long time, but at the same time to accomplished this project learning Software and coding is to come up with a complete and useful product. The project added to my knowledge in several areas including hardware components integration, communication, electrical circuits designing, Android software development as well as microcontroller software designing, automobile electronic and electrical design. Although all the basic requirements were met, I plan to continue the development of the project by adding more features that enhance the user experience to make cars smarter. Such as, by using infrared sensor, actuators and hi-tech cameras one can think till autonomous car. But it requires great research and effective design.

So by doing the project, would like to call SMART CAR we try to control the car system with the help of android application in Smartphone. Thus reducing the effort of controlling car in rough terrain and it also helps in reducing the difficulties of parking a car in tight parking conditions. The communication between the car and Smartphone is done with the help of WiFi communication. The commands are sent to the Wifi module in microcontroller with the help of WiFi in Smartphone.

V. COMPONENTS USED

- 1 8266 microcontroller
- 2 Oled display
- 3 WIFI module
- 4 Relays/sensors/actuator
- 5 Wiring
- 6 source of energy(battery)

1. ESP 8266 Microcontroller

It is the heart of the project There are several candidates in the microcontroller section, they include PIC microcontrollers, Arduino boards or even an FPGA chip, which is not considered a microcontroller. The esp8266 microcontrollers are good for their cheap prices and the availability of huge models that vary according to the user needs. They seem like a right choice for final production with large quantities. However, for prototyping, their cost is not so cheap given the need for purchasing a development board or a programming board for programming the chips. Using esp8266 for prototyping has no justification over using an Arduino for example.

FPGAs are very powerful, however using a complete FPGA board for prototyping will be very costly, will take large space and doesn't seem the right choice for final production as well. Additionally, although FPGAs are powerful, they don't fit in this type of application where real time processing is not needed, and FPGA lack the availability of software libraries that will ease the process of development and integration with the system components. Adriano's are the right choice for this type of applications; complete boards for prototyping are available with reasonable prices, also, the AT mega chips that are used with the Arduino are available with low prices for final production.

Main advantages of the Arduino is its simple IDE that will ease the process of development, also the availability of huge range of software libraries that will accelerate developing the system and integrating its components.

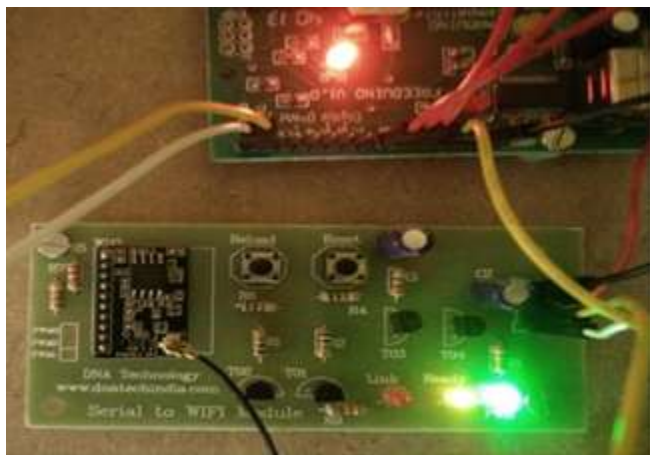


Fig. 3. ESP 8266 Microcontroller

2. WiFi Module

The module is based on the Institute of Electrical and Electronics Engineers 802.11 standards. It supports transparent transmission mode and multiple network

protocols. The Wi-Fi module is embedded based on the universal serial port, Ethernet, wireless network interface between the conversions. It simply connecting sensors and switches to the module I/O pins or UART interface. Though in this project I have used mobile hotspot-wifi connectivity to provide interference.



3. Oled Display

The OLED connects to microcontroller using just four wires – two of them are for power and two for data, making the wiring which makes it even more simple. The general purpose of using this Oled is to obtain an IP address of the system which enhance and provide the safety to the system.



Fig. 5. OLED display

At the very basic level, the microcontroller Wire library is used to communicate with the display. Such Libraries are easily available that make it easy to operate. These libraries are installed in this equipment.

4. Wiring

Wiring makes it easy to create connection for controlling devices attached to the electronics system to create all kinds of

interactive fields. Connect a few electronic equipments to the Wiring and analyse, for example, that a infrared sensor controls a light when an obstacle approaches it, add another sensor, and see how this light changes when the effectiveness level in a system decreases.

5. Relay



Fig. 6. automotive Relay

There are some easily available ready to use relay boards in the market, however, they cannot be used in this application because all of them use relays that are rated for 10A DC or less. To control the ignitions wires of a car electronically, relay that can handle large current ~30-40A should be used. Relays that are marketed as automotive relays can handle such amounts of current. A pack of relays has been purchased for the purpose of controlling the ignition system of the car.

6. Head Light:-

In this project we have set an headlight in the circuit for the explanation purpose at the prototype level. The headlight is a lamp attached to the front of a vehicle to brighten the road visibility to driver. Headlamps are also often called headlamps, but in the most effective usage, headlight is the term for the beam of light produced and distributed by the device and headlamp is for the element itself.

VI. CONCLUSION

This project conduct the better accessibility and effectiveness to automobile electric system using wifi communication through Smartphone. For that we have program microcontroller and an Oled display to simulate with it. Just for the basic idea n project prospective we have set an example of headlight operation using smartphone through wireless communication by managing the operation of relay board in circuit.

To achieve this operation one can use any of microcontroller controller website or applications, as here we have used esp8266 wifi control application to achieve the output from the system. Simple as this, we can implement this technology for any of the relays, sensors and actuators operation for different perspectives.

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