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Car Functions Control Using Wi-Fi

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Abstract: *This paper presents a design and prototype implementation of new car feature control system that uses Wi-Fi technology as a network infrastructure connecting its parts. The proposed system consists of two main components; the first part is the browsers (web browsers), which presents system core that manages, controls, and monitors users car. Users and system administrator can locally (LAN) or remotely (internet) manages and control system code. Second part is hardware interface module, which provides appropriate interface to motor and actuator of car system. System supports a wide range of car feature control like wiper movement, door lock and unlocks window glass open and close. The proposed system is better from the scalability and flexibility point of view than the commercially available car control system.*

I. INTRODUCTION

We carry almost everything in smart phones like, calculator, music system, video player, video games, and FM radio. Then why not, car keys! We know the main application of IOT i.e. home automation in which we control home appliances such as refrigerator, AC, fan, TV, printer etc. The system is composed of Android web browser, Wi-Fi module, microcontroller unit and relay unit for controlling car equipment's. Wi-Fi module accepts control signals from android mobile application and sends data to the microcontroller unit. Microcontroller unit processes the received data and generates control signal for opening and closing of glass and door, wiper movement

A. What Is Wi-Fi

Wi-Fi is the name of a popular wireless networking technology that uses radio waves to provide wireless high-speed Internet and network connections. A common misconception is that the term Wi-Fi is short for "wireless fidelity," however this is not the case. Wi-Fi is simply a trademarked term meaning IEEE 802.11x.

The Wi-Fi Alliance, the organization that owns the Wi-Fi (registered trademark) term specifically defines Wi-Fi as any "wireless local area network (WLAN) products that are based on the Institute of Electrical and Electronics Engineers' (IEEE) 802.11 standards."

Initially, Wi-Fi was used in place of only the 2.4GHz 802.11b standard, however the Wi-Fi Alliance has expanded the generic use of the Wi-Fi term to include any type of network or WLAN product based on any of the 802.11 standards, including 802.11b, 802.11a, dual-band, and so on, in an attempt to stop confusion about wireless LAN interoperability.

II. LITERATURE REVIEW

Siddharth Tripathi, R.Ramaswamy, [Http://dx.doi.org/journal/jcc](http://dx.doi.org/journal/jcc): The Internet of Things was initially inspired by members of the RFID community, who referred to the possibility of discovering information about a tagged object by browsing an internet address or database entry that corresponds to a particular RFID or Near Field Communication technologies.

In the research paper "Research and application on the smart home based on component technologies and Internet of Things", the included key technologies of IoT are RFID, the sensor technology, nano technology and intelligence embedded technology.

The Internet of Things (IoT) enabled users to bring physical objects into the sphere of cyber world.

III. PROBLEM DEFINITION

Car feature control systems face following main challenges these are high cost of ownership, poor manageability, and difficulty achieving security. The main objectives of that research is to design and to implement a cheap and Car feature that is capable of controlling and automating most of the car feature through an easy manageable web interface to run and maintain the home automation system. The proposed system has a great flexibility by using WiFi technology to interconnect its distributed modules to home automation server. That will decrease deployment cost and will increase the ability of upgrading, and system reconfiguration.

System will make use of secure wireless LAN connections between distributed hardware modules and server, and secure communication protocols between users and server.

IV. PROPOSED SYSTEM FEATURE

In this project, we are controlling the various car features such as window glass movement, wiper movement, Door lock and unlock etc. These features are controlled via Smartphone browser and the Wi-Fi module which is placed within the car.

V. HOW THE SYSTEM WORKS

When driver or the owner of the car is willing to access any feature of the car such as door lock or unlock, window glass open or close and wiper movement on or off etc.,

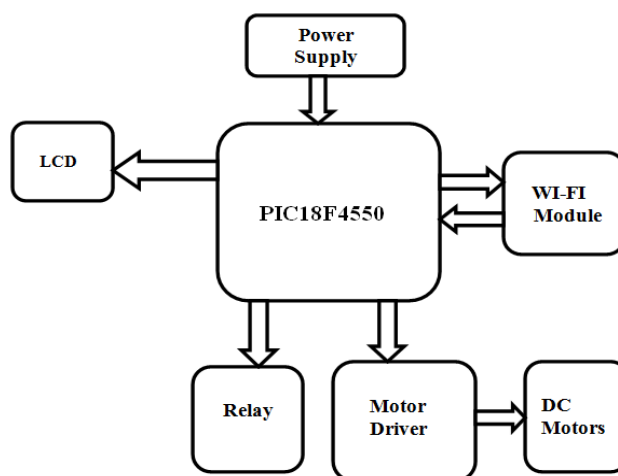
Then the unique IP address of the Wi-Fi module which is placed within the car is to be entered in the browser.

After entering the IP address, the page containing various options for controlling the car functions as mentioned above will appear, and then as per the requirement driver can choose the option from that page.

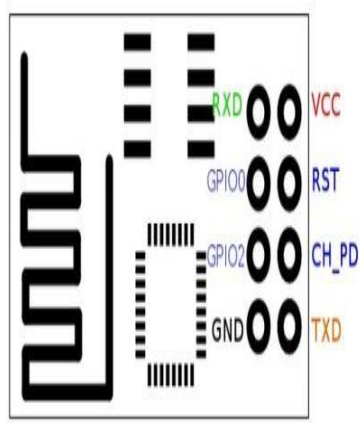
For example, if driver chooses door unlock option from the browser page then the request will be transmitted to the Wi-Fi module within the car and then Wi-Fi module will create signals towards the PIC microcontroller and PIC microcontroller will create signal for the relay driver which in turns control the door lock/unlock etc.

For the window glass movement and wiper movement controlling DC motor is used.

VI. SYSTEM DESIGN AND IMPLEMENTATION



A. Wi-Fi Module



Label	Signal
VCC	3.3V (3.6V max) supply voltage
GND	Ground
TXD	Transmit Data (3.3V level)
RXD	Receive Data (3.3V level)
CH_PD	Chip Power down: (LOW = power down active)
GPIO0	General Purpose I / O 0
GPIO2	General Purpose I / O 2
RST	Reset (reset = LOW active)

Wi-Fi module used in this project is ESP8266. Wi-Fi works with no physical wired connection between sender and receiver by using radio frequency (RF) technology, a frequency within the electromagnetic spectrum associated with radio wave propagation. When an RF current is supplied to an antenna, an electromagnetic field is generated then it is able to propagate through space. The cornerstone of any wireless network is an access point (AP). The primary job of an access point is to broadcast a wireless signal that computers can detect and "tune" into. In order to connect to an access point and join a wireless network, computers and devices must be equipped with wireless network adapters

B. Motor Driver (L298) and Relays

Here, we are using L298 for driving DC motor as well as relays to control the glass movement, wiper movement and the door lock/unlock.

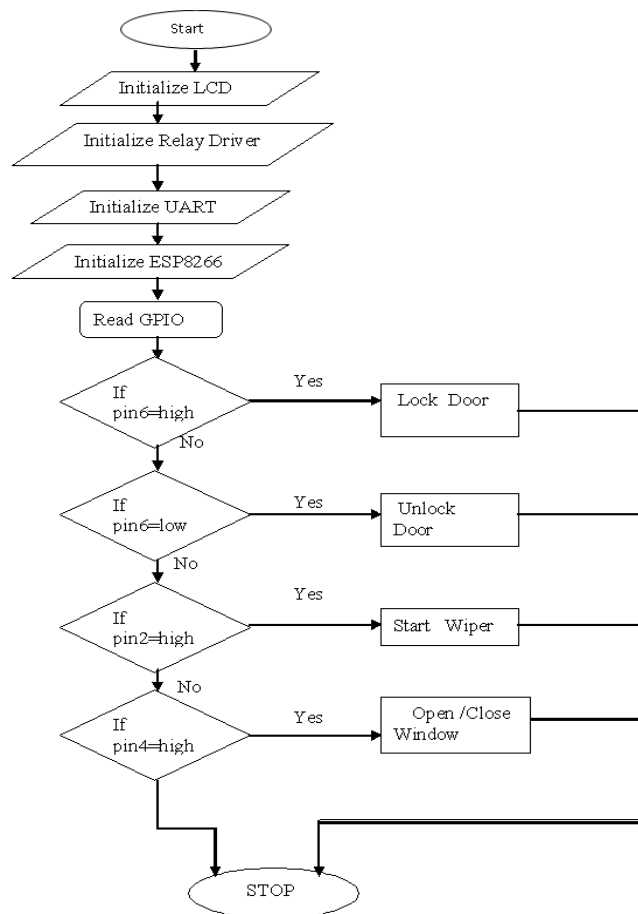
C. Microcontroller (PIC18F4550)

We have used PIC18F4550 microcontroller. The signals to the relay driver and DC motor are controlled through the microcontroller unit.

D. LCD Display

The LCD used is 16x2 alphanumeric display. It used to display the data.

VII. FLOWCHART



VIII. RESULT

Smartphone activated door lock and unlock wiper movement and window glass open and close using Wi-Fi has been designed, implemented and tested successfully. This design used a smart phone to lock and unlock door wirelessly using Wi-Fi technology. In future. Furthermore, security features can be added to increase the efficiency of the design. This could be done



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