INTERNET OF AUTOMOBILES USING VEHICULARCLOUDS

SAKETH RAVULA[1], SANTOSH KUMAR KULKARNI[2]

[1]Saketh Ravula, M.Tech Student, Dept Of ECE, Malla Reddy Institute of Technology, Maisammaguda ,Dhullapally,Post Via Kompally,Secunderabad , India.

[2] Guide details: Santosh Kumar.K, Associate Professor ,Dept Of ECE, Malla Reddy Institute of Technology, Maisammaguda ,Dhullapally,Post Via Kompally,Secunderabad , India.

Abstract: Traditionally, the vehicle has been the extension of the man's ambulatory system, docile to the driver's commands. Recent advances in communications, controls and embedded systems have changed this model, paving the way to the Intelligent Vehicle Grid. The car is now a formidable sensor platform, absorbing information from the environment (and from other cars) and feeding it to drivers and infrastructure to assist in safe navigation, pollution control and traffic management. The next step in this evolution is just around the corner: the Internet of Autonomous Vehicles. Pioneered by the Google car, the Internet of Vehicles will be a distributed transport fabric capable to make its own decisions about driving customers to their destinations. Like other important instantiations of the Internet of Things (e.g., the smart building), the Internet of Vehicles will have communications, storage, intelligence, and learning capabilities to anticipate the customers' intentions. The concept that will help transition to the Internet of Vehicles is the Vehicular Cloud, the equivalent of Internet cloud for vehicles, providing

all the services required by the autonomous vehicles. In this article, we discuss the evolution from Intelligent Vehicle Grid to Autonomous, Internet-connected Vehicles, and Vehicular Cloud.

I. Introduction

The urban fleet of vehicles is rapidly evolving from a collection of sensor platforms that provide information to drivers and upload filtered sensor data (e.g., GPS location, road conditions, etc.) to the cloud; to a network of autonomous vehicles that exchange their sensor inputs among each other in order to optimize a well defined utility function. This function, in the case of autonomous cars, is prompt delivery of the passengers to destination with maximum safety and comfort and minimum impact on the environment. In other words, one is witnessing in the vehicle fleet the same evolution from Sensor Web (i.e., sensors are accessible from the Internet to get their data) to Internet of Things (the components with embedded sensors are networked with each other and make intelligent use of the sensors). In the intelligent home, the IOT formed by the myriad of sensors and actuators that cover the house internally and externally can manage all the utilities in the most economical way, with maximum comfort to residents, with virtually no human intervention. Similarly, in the modern energy grid, the IOT formed by all components large and small can manage power loads in a safe and efficient manner, with the operators now playing the role of observers. In the vehicular network, like in all the other IOTs, when the human control is removed, the autonomous vehicles must efficiently cooperate to maintain smooth traffic flow in roads and highways. Visionaries predict that the vehicles will behave much better than drivers allowing handling more traffic with lower delays, less pollution and certainly better driver and passenger comfort. However, the complexity of the distributed control of hundreds of thousands of cars cannot be taken lightly. If a natural catastrophe suddenly happens, say an earthquake, the vehicles must be able to coordinate the evacuation of critical areas in a rapid and orderly manner. This requires the ability to efficient communicate with each other and also to discover where the needed resources are Moreover the communications must be secure, to prevent malicious attacks that in the case of autonomous vehicles could be literally deadly since there is no standby control and split second chance of intervention by the driver.

II. Literature Survey

The main aim the project is to give information to the driver when he enters into a specified area thereby he can drive the vehicle according to the parameters of the zone. Existing method is Vehicular communication (VC) systems will enable many exciting applications that will make driving safer, more efficient and more comfortable. But this necessitates the introduction of security and privacy enhancing mechanisms. In this paper we focus on practical aspects associated with the implementation and deployment of such a secure VC system. We also provide an outlook to future research challenges. Proposed method is the objective of the paper is to present a conceptual model of a microcontroller based variable electronic speed governor that can be implemented to control the speed of any vehicle depending on the local speed limit. Every city, town or a village, can be marked and divided into individual zones. The division depends upon the area under which the business, residential, and industrial regions come under.

III. Proposed Scheme

On Road Junctions:

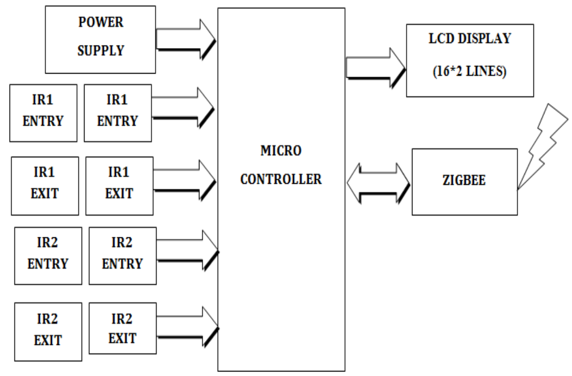

Fig: 1: Block diagram

In-Built Vehicle:

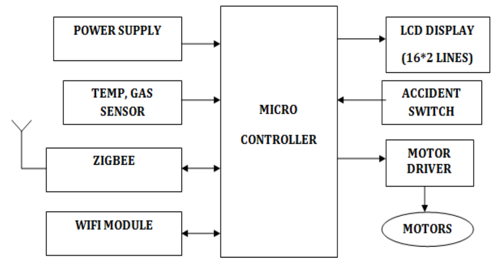

Fig: 2: Block diagram

IV. Methodology

Temperature Sensor:

A thermistor is a type of resistor whose resistance is dependent on temperature. Thermistors are widely used as inrush current limiter, temperature sensors (NTC type typically), self-resetting overcurrent protectors, and self-regulating heating elements. The TMP103 is a digital output temperature sensor in a four-ball wafer chip-scale package (WCSP). The TMP103 is capable of reading temperatures to a resolution of 1°C.

Fig: 3:Temperature sensor

Co2 Sensor:

They are used in gas leakage detecting equipments in family and industry, are suitable for detecting of LPG, i-butane, propane, methane, alcohol, Hydrogen, smoke. The surface resistance of the sensor Rs is obtained through effected voltage signal output of the load resistance RL which series-wound. The relationship between them is described:

Rs\RL = (Vc-VRL) / VRL

Fig: 4:Co2 sensor

IR:

Transmitter and receiver are incorporated in a single housing. The modulated infrared light of the transmitter strikes the object to be detected and is reflected in a diffuse way. Part of the reflected light strikes the receiver and starts the switching operation. The two states – i.e. reflection received or no reflection – are used to determine the presence or absence of an object in the sensing range.This system safely detects all objects that have sufficient reflection. For objects with a very bad degree of reflection (matt black rough surfaces) the use of diffuse reflection sensors for short ranges or with background suppression is recommended.

Zigbee:

Zigbee modules feature a UART interface, which allows any microcontroller or microprocessor to immediately use the services of the Zigbee protocol. All a Zigbee hardware designer has to do in this case is ensure that the host's serial port logic levels are compatible with the XBee's 2.8- to 3.4-V logic levels. The logic level conversion can be performed using either a standard RS-232 IC or logic level translators such as the 74LVTH125 when the host is directly connected to the XBee UART. The below table gives the pin description of transceiver. The X-Bee RF Modules interface to a host device through a logic-level asynchronous Serial port. Through its serial port, the module can communicate with any logic and voltage Compatible UART; or through a level translator to any serial device.

Data is presented to the X-Bee module through its DIN pin, and it must be in the asynchronous serial format, which consists of a start bit, 8 data bits, and a stop bit. Because the input data goes directly into the input of a UART within the X-Bee module, no bit inversions are necessary within the asynchronous serial data stream. All of the required timing and parity checking is automatically taken care of by the X-Bee's UART.

WiFi:

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 phrase that means *IEEE 802.11x*. 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 created that then 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 Wi-Fi is supported by many applications and devices including video game consoles, home networks, PDAs, mobile phones, major operating systems, and other types of consumer electronics. Any products that are tested and approved as "Wi-Fi Certified" (a registered trademark) by the Wi-Fi Alliance are certified as interoperable with each other, even if they are from different manufacturers. with any other brand of client hardware that also is also "Wi-Fi Certified". Products that pass this certification are required to carry an identifying seal on their packaging that states "Wi-Fi Certified" and indicates the radio frequency band used (2.5GHz for 802.11b, 802.11g, or 802.11n, and 5GHz for 802.11a).

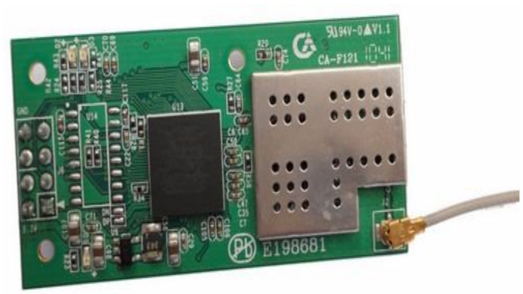

Fig: 5:WiFi Module

VSD03 is the new third-generation embedded Uart-Wifi modules studied by VSD TECH. Uart-Wif is an embedded module based on the Uart serial,according with the WiFi wireless WLAN standards, It accords with IEEE802.11 protocol stack and TCP / IP protocol stack, and it enables the data conversion between the user serial and the wireless network module. through the Uart-Wifi module, the traditional serial devices can easily access to the wireless network. VSD03 does a comprehensive hardware and software upgrades based on the products its main features include:

Interface:

- 2*4 pins of Interface: HDR254M-2X4
- The range of baud rate: 1200~115200bps
- RTS / CTS Hardware flow control
- single 3.3V power supply

Wireless

- support IEEE802.11b / g wireless standards
- support the range of frequency: 2.412~2.484 GHz
- support two types of wireless networks:
    - Ad hoc and Infrastructure
- support multiple security authentication mechanisms:
    - WEP64/WEP128/ TKIP/CCMP(AES)
    - WEP/WPA-PSK/WPA2-PSK
- support quick networking
- support wireless roam

V. Conclusion

The urban fleet of vehicles is evolving from a collection of sensor platforms to the Internet of Autonomous Vehicles. Like other instantiations of the Internet of Things, the Internet of Vehicles will have communications, storage, intelligence and learning capabilities to anticipate the customers' intentions. This article claims that the Vehicular Cloud, the equivalent of Internet Cloud for vehicles, will be the core system environment that makes the evolution possible and that the autonomous driving will be the major beneficiary in the cloud architecture. We showed a vehicular cloud model in detail and discussed potential design perspective with highlights on autonomous vehicle, AUV, for future research.

VI. References

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AUTHOR DETAILS

1st Author:

Saketh Ravula completed B.Tech in 2012 and Pursuing (M.Tech - VLSI & Embedded Systems) Post graduation in Electronics and Communication Engineering in Malla Reddy Institute of Technology, Hyderabad.

2nd Author:

Santosh Kumar Kulkarni completed M.Tech and pursuing Ph.D. Having 6 years of teaching experience.Presently working as Associate Professor in Department of Electronics and Communication Engineering, Malla Reddy Institute of Technology, Hyderabad.