Intelligent Navigation Tracking System Using IoT Technology

J.SHARADHA[1], Dr. S. SATHISH [2]

[1]*PG Scholar, ECE Department, Malla Reddy Engineering College for Women, Secunderabad, Telangana, India*

[2] *Professor, ECE Department, MallaReddy Engineering College for Women, Secunderabad, Telangana, India*

Abstract- Computer Vision and Internet of thing (IOT) is the emerging technologies now a days. To take accident measure and tracking the vehicle for security aspects in this project Intelligent Navigation Tracking system has been implemented using ARM7 Micro-Processor and being given a next layer i.e. IOT in order to track the vehicle from remote areas. Now a days many accidents are occurred in the highway where getting the help is also getting much delayed due to which there is a huge risk for life of the peoples.

In this project Internet of things is used in order to make a server where the location of the vehicle will keep on updating on the web page using GPS module. And if any accident occurs it will be automatically detected using the MEMS sensor, if any problem with vehicle like gas leakage will be used gas sensor to sense that. Also if the engine get heat temperatursensor to detect the temperature of the vehicle engine. As the ARM7 doesn't have the Wi-Fi module we will use external Wi-Fi module i.e. ESP8266 IEEE 802.11 b/g/n.

Key words- GPS, MEMS, IOT

I. INTRODUTION

The more we try to make our lives easy and luxurious the more hazardous it gets. The advancement of technology also plays a significant role. With the improvement of the growth of traffic and thus road accidents count has reached to an enormous scale. This rate of fatalities and serious injuries leads to loss of human lives. The survey of 2015 reveals that about 1,374 accidents and 400 deaths happen every day in India. This scenario can be explained as 57 accidents and loss of 17 lives on an average every hour in India. The main cause of these deaths lack of immediate medical aid provided to the victim. In this project we locate the accident spot with the help of GPS. Once the location is known a message will be sent to some concerned person of the victim. This will help the ambulance to approach the accident spot on time.

There has been a rapid growth in technology and the expansion in urbanization at a massive scale over the past few years. Such heavy automobile usage has increased traffic and thus resulted in rise of road accidents. Road mishaps have increased by 1.4 percent in 2015. This takes a toll on the property as well as causes human life loss because of unavailability of immediate medical facilities. Most of the time, the location of the accident spot cannot be traced in time and as a result ambulance cannot be dispatched, which results in delay. Moreover accurate data cannot be obtained in case of some remote areas. Whenever an accident is being met, the nearby people call the ambulance. The problem associated with this is that the victims depend on the mercy of nearby people. This project aims to locate the accident spot with the help of GPS and update all the values in the remote server from where the person can track the vehicle without any external manpower to help the person.

BLOCK DIAGRAM

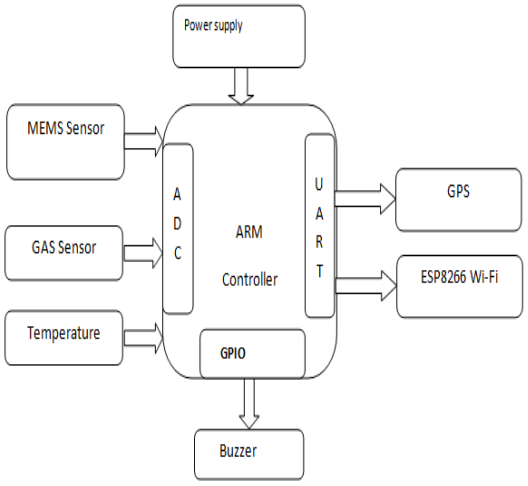


Fig.1: BLOCK DIAGRAM

The above block diagram explains the project where the MEMS Sensor Gas Sensor and Temperature Sensors are used to detect the abnormality in the vehicle and to track the vehicle using GPS and upload all the values in the local server using the ESP8266 Wi-Fi module and buzzer to give alert to the driver.

HARDWARE COMPONENTS

LPC2148 Processor:

LPC2148 Microcontroller Architecture. The ARM7TDMI-S is a general purpose 32-bit microprocessor, which offers high performance and very low power consumption. The ARM architecture is based on Reduced Instruction Set Computer (RISC) principles, and the instruction set and related decode mechanism are much simpler than those of micro programmed Complex Instruction Set Computers (CISC). This simplicity results in a high instruction throughput and impressive real-time interrupt response from a small and cost-effective processor core.

Pipeline techniques are employed so that all parts of the processing and memory systems can operate continuously. Typically, while one instruction is being executed, its successor is being decoded, and a third instruction is being fetched from memory. The ARM7TDMI-S processor also employs a unique architectural strategy known as Thumb, which makes it ideally suited to high-volume applications with memory restrictions, or applications where code density is an issue.

The key idea behind Thumb is that of a super-reduced instruction set. Essentially, the ARM7TDMI-S processor has two instruction sets:

- The standard 32-bit ARM set.
- A 16-bit Thumb set.

The Thumb set's 16-bit instruction length allows it to approach twice the density of standard ARM code while retaining most of the ARM's performance advantage over a traditional 16-bit processor using 16-bit registers. This is possible because Thumb code operates on the same 32-bit register set as ARM code. Thumb code is able to provide up to 65% of the code size of ARM, and 160% of the performance of an equivalent ARM processor connected to a 16-bit memory system

Temperature sensor:

TheLM35 pin diagram is shown in the figure 2 .As a temperature sensor, the circuit will read the temperature of the surrounding environment and relay temperature to us back in degrees celsius. The LM35 is a low voltage IC which uses approximately +5VDC of power. This is ideal because the arduino's power pin gives out 5V of power. The IC has just 3 pins, 2 for the power supply and one for the analog output. The output pin provides an analog voltage output that is linearly proportional to the Celsius (centigrade) temperature. Pin 2 gives an output of 1 millivolt per 0.1°C (10mV per degree). So to get the degree value in celsius, all that must be done is to take the voltage output and divide it by 10- this give out the value degrees in celsius.

Fig.2:Temperatur e sensor LM35

MEMS SENSOR

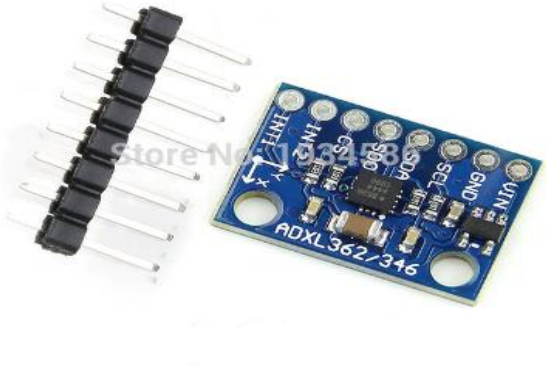


Fig.3: MEMS Sensor

MEMS accelerometers are one of the simplest but also most applicable micro-electromechanical systems. They became indispensable in automobile industry, computer and audio-video technology. This seminar presents MEMS technology as a highly developing industry. Special attention is given to the capacitor accelerometers, how do they work and their applications. The seminar closes with quite extensively described MEMS fabrication.

An accelerometer is an electromechanical device that measures acceleration forces. These forces may be static, like the constant force of gravity pulling at our feet, or they could be dynamic - caused by moving or vibrating the accelerometer. There are many types of accelerometers developed and reported in the literature. The vast majority is based on piezoelectric crystals, but they are too big and to clumsy. People tried to develop something smaller, that could increase applicability and started searching in the field of microelectronics. They developed MEMS (micro electromechanical systems) accelerometers. The first micro machined accelerometer was designed in 1979 at Stanford University, but it took over 15 years before such devices became accepted mainstream products for large volume

applications [1]. In the 1990s MEMS accelerometers revolutionised the automotive-air bag system industry. Since then they have enabled unique features and applications ranging from hard-disk protection on laptops to game controllers. More recently, the same sensor-core technology has become available in fully integrated, full-featured devices suitable for industrial applications [2]. Micro machined accelerometers are a highly enabling technology with a huge commercial potential. They provide lower power, compact and robust sensing. Multiple sensors are often combined to provide multi-axis sensing and more accurate data.

Gas sensor:

Ideal sensor for use to detect the presence of a dangerous LPG leak in your car or in a service station, storage tank environment. This unit can be easily incorporated into an alarm unit, to sound an alarm or give a visual indication of the LPG concentration. The sensor has excellent sensitivity combined with a quick response time. The sensor can also sense iso-butane, propane, LNG and cigarette smoke.

Fig.3: Gas sensor

Wi-Fi:

In this project, an Wi-Fi module based on the universal serial interface network standard, built-in TCP / IP protocol stack, enabling the user serial port, Ethernet, wireless network (wifi) interface between the conversions. Through the device, the traditional serial devices do not need to change any configuration; data can be transmitted through the Internet network. The sensor datas will be transmitted to the cloud network through this module.

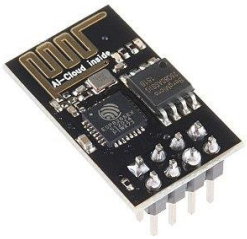


Fig.4: Wi-Fi module

II. RESULT

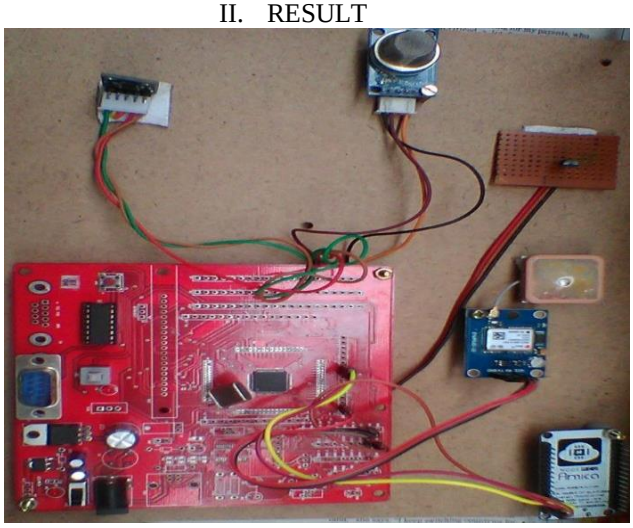


Fig.5:

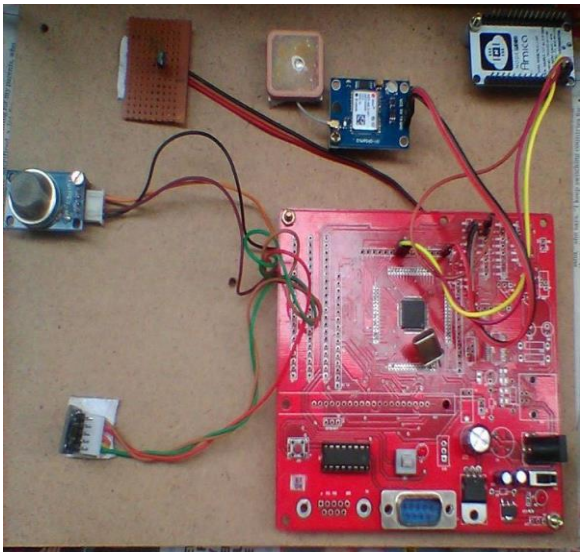
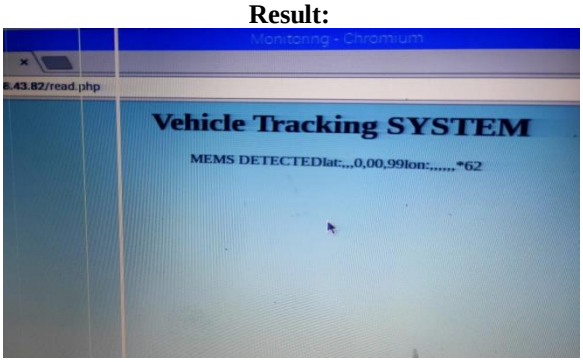


Fig.6:

Result:



III. REFERENCES

[1]. A. Festag, "Standards for Vehicular Communication From IEEE 802.11p to 5G," *e & i Elektrotechnik und Informationstechnik, Springer Verlag*, vol. 132, pp. 409–416, 2015.

[2]. ETSI EN 302 637-2, "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Awareness Basic Service," November 2014.

[3]. A. Vinel, H. Pettersson, L. Lin, O. Altintas, and O. Gusikhin, "Vehicular Networking for Autonomous Driving [Guest Editorial]," *IEEE CommunicationsMagazine*, vol. 53, no. 12, pp. 62–63, Dec 2015.

[4]. 3GPP TR 36.300 Technical Specification Group Radio Access Network,"E-UTRA and E-UTRAN; Overall Description," Release 14 2017.

[5]. A. Bazzi, B. M. Masini, A. Zanella, and I. Thibault, "On the Performance of IEEE 802.11p and LTE-V2V for the Cooperative Awareness of Connected Vehicles," *IEEE Transactions on Vehicular Technology*, vol. PP, no. 99, pp. 1–1, 2017.

[6]. C. H. Yu, K. Doppler, C. B. Ribeiro, and O. Tirkkonen, "Resource Sharing Optimization for Device-to-Device Communication Underlaying Cellular Networks," *IEEE Transactions on Wireless Communications*, vol. 10, no. 8, pp. 2752–2763, August 2011.

[7]. M. Botsov, M. Kl¨ugel, W. Kellerer, and P. Fertl, "Location Dependent Resource Allocation for Mobile Device-to-Device Communications," in *Proc. IEEE WCNC*, 2014.