Emergency Vehicle Detection

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Abstract: in this paper we describe a system that is capable of detecting emergency vehicle which helps in clearing the path for the vehicle. We are using gsm, gps and Rfid technology and sensors to implement this system. Gsm is used for sending alert messages while gps for sending real time location so that we can clear the path in required time. Sensors are used for detection of vehicles. Microcontroller is used as an interface for gsm gps and rfid.

1. INTRODUCTION

In metropolitan cities for example Bengaluru traffic has become one of the biggest issue. People get stuck in traffic jams for hours and there have been many instances of ambulances reaching late to the hospital due to the traffic which many times have resulted in death of the patient. We are aware of the fact that in metropolitan cities population is very high which is incrementing day by day on the other hand growth of road networks and other infrastructure occurs at very slow place, thereby causing huge traffic jam in most major parts of cities i.e. office areas, shopping areas etc.

To make the Traffic system more efficient for the emergency vehicle we have to depend on real time location so that In Required time the path can be cleared by concern authorities. These technologies are mainly based on IOT, IoT is a system where computing devices, mechanical devices and digital machine are related to each other, nowadays many companies are using iot to enhance and make their business efficient.

Iot uses processors and sensors to acquire data and act on it after analyzing it.They also act on data collected from other source. IoT mostly work without any human involvement although it people can communicate with device to give them required instructions and access the important data. It uses a combination of connectivity networking and communication protocols to complete the required task. It can also use high level technology such as machine learning and artificial intelligence to make the process more efficient and faster. IoT deals with a real time applications and it is used everywhere from supply chain and logistics operations.

Iot also makes manufacturing less expensive. It also reduces labor cost. IoT improves communication between devices and it also transfer data packets efficiently thereby saving time and money and automates task. RFID is important part of IoT and tracking devices. RFID can monitor and track objects in real time.

2. RELATED WORK

Dynamic traffic control system using rfid and gsm
Ref. [1] proposed an idea where she emphasized on the use of real time location to make the traffic system more efficient with real time data. She used rfid technology for detection of vehicle while gsm technology was used for sending alert messages. It was also used for stolen vehicle detection.
Detecting Traffic congestion using gps.
Ref. [2] refers to the research undertaken on the congestion problems in metropolitan cities where they stated how gps data can be used to know where traffic congestion is most. They took a large set of data from different locations and after analyzing it very thoroughly they were able to mark the locations where most traffic congestion takes place so that public can avoid these routes to reach destination in time.
Implementing intelligent control traffic system.
Ref. [3] introduced a system for making traffic system efficient. The idea mainly consisted of three parts automatic control system, ambulance clearance and stolen vehicle detection. This intelligent control system uses RFID tag.Adruino based traffic congestion control.
Ref.[4] where he emphasized the use of IR sensors which can find density of route. He used RFID technology to build a system known as ambulance clearance system.

3. COMPONENTS

A.) GSM-it stands for global system for communication. Here it will be connected to a microcontroller. GSM modem are

used mainly for providing internet and for sending and receiving messages. GSM describes a digital circuit switched network, gsm enhances data rates, it compresses data and sends it through a streams of user data to a channel. When a call is originated from a mobile device which consists of a gsm network which is routed through the main network to the destination. To be able to connect to a gsm network mobile device first connects to a radio network which in turn handles the communication between devices and main network. Mobile sends a request for radio resource allocation to bss, which it sends to mobile switching center and then then communication is established between mobile device and bss, once the connection is established and confirmed by mobile device bss initiate connection to msc after which the subscriber needs to be authenticated which is done by IMSI number stored in sim card which help us to identify the identity of subscriber after all these steps communication can began

Fig [1]

B.)RFID-it stands for radio frequency indentification.it uses tags which are attached to the object we want to detect. The tags stores the important data and the reader can track the object by reading radio frequency. It also consists of an antenna which completes the circuit. There are two types of tags active and passive one relies on power while other one does not respectively.it works through a microchip which has certain information stored in it.Microchip is generally very small but can hold large amount of data, they don't contain electricity but can some type of stored power or batteries. Microchips are read by scanners. RFID is mostly use in tracking prodcuts.RFID technology is improvement over bar codes because the rfid tags have read and write property. This technology is also used in toll pass cards and subway passes. RFID systems uses a central system known as time division multiple to make sure that there wireless communication is carried out efficiently and properly.
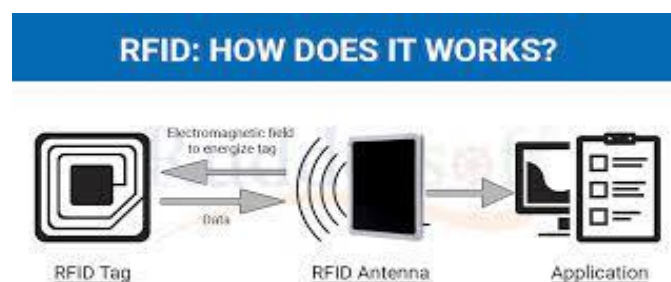

Fig [2]

C.)GPS-it stands for global positioning system. It is a satellite based radio navigation system.it provides real time location to a gps receiver .GPS operates independently. It is used widely.it is a system of navigation satellites circling the earth and through signals send out by them we can know the location. These signals are looked by gps receiver in our phone and then it calculates the distance from more than four gps satellites through these methods it can figure out where we are. GPS works on all weather conditions provided there are no obstacles in the line of sight. A gps system required minimum 3 satellites to calculate our 2d position while it requires minimum four satellites to calculate 3d position. With gps we can easily calculate time of sunrise and sunset, we can also track calculate speed of the object. We can track objects and we can know the distance between source and destination. GPS also faces some challenges like interference with other signals, precise measurement of time of flight and many more. GPS also have enhanced version known as DGPS.It provides us with much more location accuracy.

Fig [3]

D.) Sensors-are devices that detect the changes in the environment and responds to it, inputs can come from variety of sources such as light, heat, pressure, humidity etc. Sensors converts physical parameter into signals which are suitable to be processed. Sensors are known for their accuracy, range, resolution, precision

Sensitivity etc. Sensors are of many types like passive sensor, active sensor, analog and digital sensors. Sensors enables the IoT to make smarter and effective decisions. IoT sensors data is basically used according to the needs every sensor have different objective to perform and complete the task. Here we are using location sensor which communicates with the gps receiver which in turn determines our location. Accuracy of location can vary it depends on multiple factors such as through how many satellites did gps communicated etc. Sensors is one of the most important component of IoT which is used in real time applications.
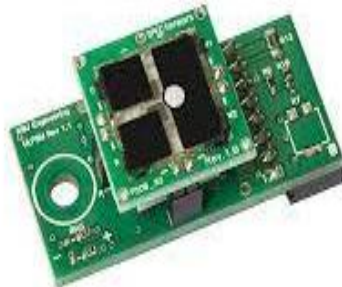

Fig [4]

E.) LPC2148-it is a single 16/32 bit RISC Microcontroller. They are ideal for applications where making smaller applications is a key requirement. It is also suitable for devices which are suitable for making communications gateway, converting protocols, providing both big buffer size and efficient processing paper. Its architecture is made on RISC principles and its instruction set is rather based on decode mechanism which is very simple than those of micro programmed programs. It uses pipeline architecture so that can all parts of memory system can work without any obstacle. It also employs a different type of strategy known as thumb which make it more suited to high volume applications where density of code is problem. The implementation of flash in LPC2148 allows for execution and full speed in ARM mode. Speed increments by over thirty percent. It also increments the efficiency of LPC2148 to a great extent Fig [5] shows memory diagram of LPC2148.
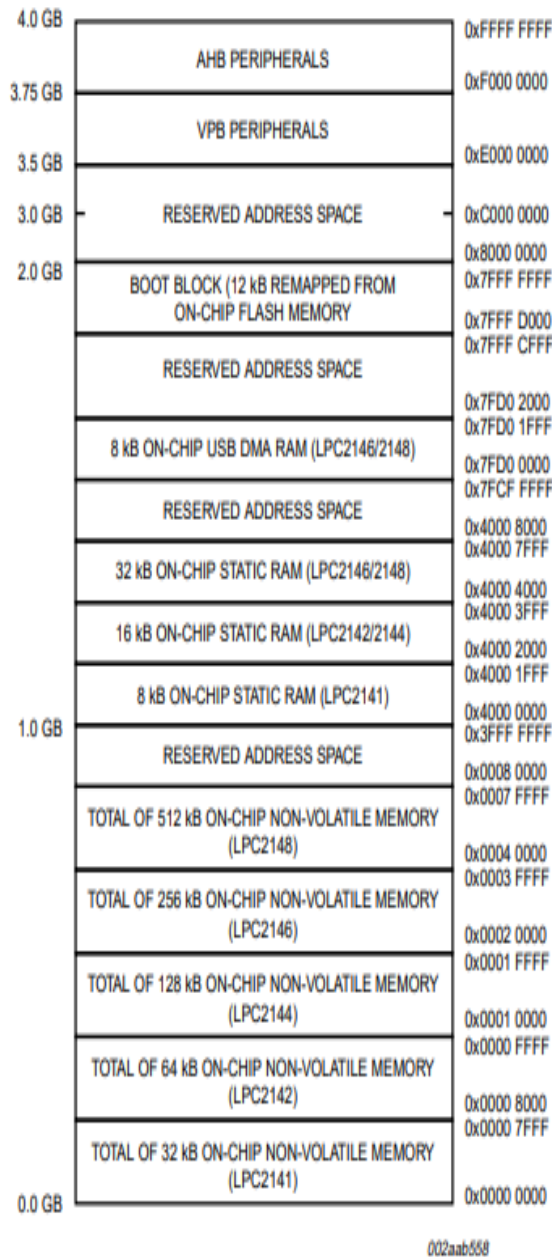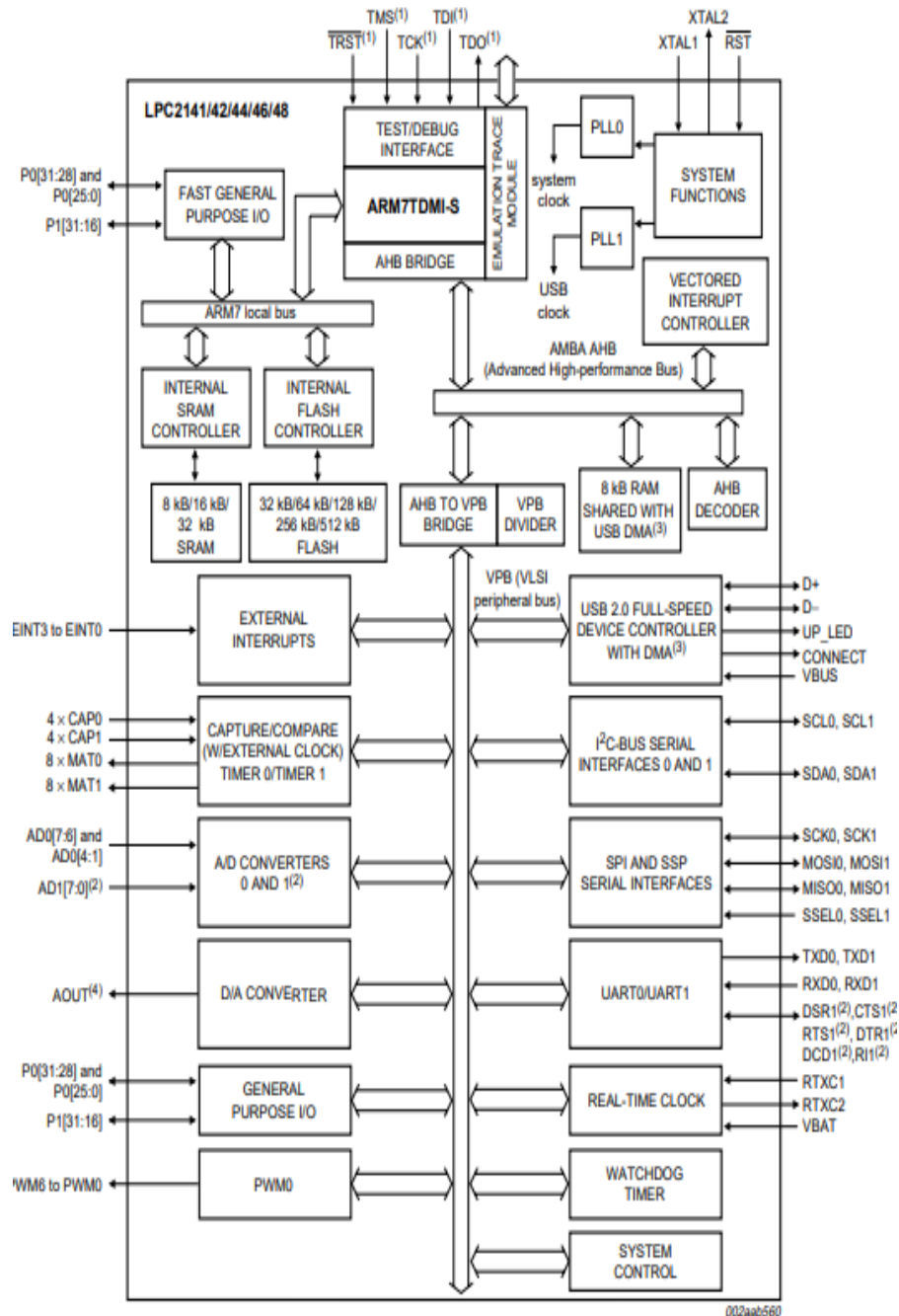
Fig [5]

GPIO registers are very important part of LPC2148.They allow for clearing and settling number of outputs at once.GPIO functions accelerates LPC2148.Fig [6] shows block diagram.

(1) Pins shared with GPIO.

(2) LPC2144/46/48 only.

(3) USB DMA controller with 8 kB of RAM accessible as general purpose RAM and/or DMA is available in LPC2146/48 only.

(4) LPC2142/44/46/48 only.

Fig [6]

F.)LCD-LCD screens comes in different size and colors can display many characters while the most popular is LCD1602 which displays up to 16 characters. Pin description can be seen in Fig [7].

Pin Number	Name	Description
1	VSS (0v)	Ground Potential
2	VDD (5v)	Positive Voltage
3	V0 (Contrast)	Contrast adjustment; 0v: Max contrast; 5v: Min contrast
4	RS	Register Select; 0: Instruction Register 1: Data Register
5	RW	Read Write Select pin 0: Write mode; 1: Read mode;
6	E	A Enable Pin To enable the LCD Module
7	D0-D7	LCD Data Bus line. They are responsible for the parallel data transfer.
15	LED+ (A)	Back Light Source LED Anode
16	LCD- (K)	Back Light Source LED Cathode

Fig [7]
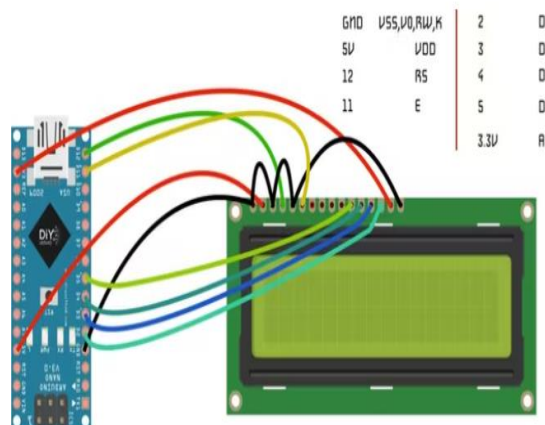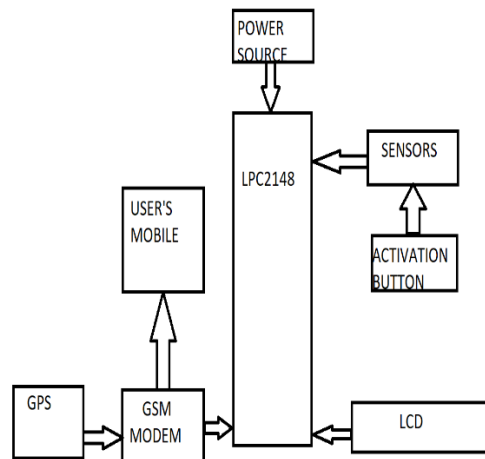
Circuit diagram of LCD is shown in Fig [8]

Fig [8]

5. ARCHITECTURE

6. METHODOLOGY

Here are the certain steps involved in the implementation
- We use kiel which is a debuuging tool in whch we write code and run it in simulation based.
- After that we use flash magic here we dump the code to microcontroller.
- Then we connect gsm and gps and wait for the signal.
- Once the signal is established we can perform next task.
- Contact sensors,gps,gsm,lcd screen are connected to each other.
- Here we are using three sensors named as normalvehicle,ambulance and fire extenguisher vehicle respectively.
- On touching the sensor we can here a buzz sound which confirms the detection of vehicle.
- After which quickly a message is send to the stored number with longitude and latitudes of the place.
- To know the exact location we have to enter this longitude and latitude in the google maps.

7. CONCLUSION

The proposed system can be prove to be useful in solving the problems of traffic jam specially in metropolitan cities where number of cars are increasing day by day, it can be prove useful in providing clear passage to the ambulance and other emergency vehicles. It also give us a way to create a smart traffic control system.

REFRENCES

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