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Design and Implementation of Vehicle Tracking System with GPS

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Abstract: ***An efficient vehicle tracking system is designed and implemented for tracking the movement of any equipped vehicle from any location at any time. The proposed system made good use of a popular technology that combines a Smartphone application with a microcontroller. This will be easy to make and inexpensive compared to others. The designed in-vehicle device works using Global Positioning System (GPS) and Global system for mobile communication / General Packet Radio Service (GSM/GPRS) technology that is one of the most common ways for vehicle tracking. The device is embedded inside a vehicle whose position is to be determined and tracked in real-time. A microcontroller is used to control the GPS and GSM/GPRS modules. The vehicle tracking system uses the GPS module to get geographic coordinates at regular time intervals. The GSM/GPRS module is used to transmit and update the vehicle location to a database. A Smartphone application is also developed for continuously monitoring the vehicle location. The Google Maps API is used to display the vehicle on the map in the Smartphone application. Thus, users will be able to continuously monitor a moving vehicle on demand using the Smartphone application and determine the estimated distance and time for the vehicle to arrive at a given destination***

Keywords: Problem Statement introduction, literature survey,General Project Descripation,Advantages & Applications, Conclusion And Future Scop , Refrences

I. INTRODUCTION

A. Background

Traffic is on the rise as the demand for vehicles is getting higher day by day. So, transportation needs improvement as, since demands are increasing, there will be more possibility of vehicle accidents. Vehicle accidents are one of the leading causes of the fatalities. It will be a serious consequence if people can't get help on right time. Poor emergency incident is a major cause of death rate in our country. Crash analysis studies have shown, traffic accidents could have been prevented with the use of this advanced life saving measure. This design focuses on providing basic information on the accident site to the hospital or police station. As a result of this sudden help, precious life may get saved. In this work, a three-axis accelerometer and GPS tracking system work for accidental monitoring. This design detects accidents in less time and sends this information to the required authorities. In this case GSM will send short message to the hospital or police station. This message will read the geographical co-ordinates of accident spot with the help of GPS. And, as now the location has been traced by the GPS, emergency medical service can be given to the accident victims as soon as possible. A key will be provided for the driver. If the accident is very normal, or driver has hit the wall in some situations like parking then driver will press the key. This will inform the microcontroller that this is a very normal accident. But if driver is not in situation to press the switch or if the accident is really a major accident, then driver will not press the key. Then microcontroller will get the coordinates from the GPS modem then it will send this information to the GSM modem, GSM modem is used to send this information via SMS. SMS will be sent to the family member of the driver, so that they can take immediate action to help the persons suffering due to this accident. This project is fully equipped by IR sensors circuit and Pneumatic bumper activation circuit. It is a genuine project which is fully equipped and designed for Automobile vehicles. This forms an integral part of best quality. This product 2 underwent strenuous test in our Automobile vehicles and it is good. Many years ago, wheels were the part of a log and it slowly utilized for carts and wagons. The wooden wheel utilized was hard wood stakes. Trucks have become the backbone of the workforce in the world. They are large, strong and could be move on roughest of terrains. Truck rims should be placed if they are cracked. The project of truck rims is manufactured in the similar manner. It begins with tough hub and 4 to 6 holes for the bolts. Truck wheels require durable which carry some weight. Lighter wheels are developed by decreasing unsprang mass and permit suspension to follow the terrain and develop grip. Better heat conduction spends heat from the brakes that develops braking function in driving situations and decreases the brake failure because of overheating. The spun steel rim is saved with welds series. The rim is balanced and provided the smooth finishing. The main advantages of all pneumatic systems are economy and simplicity. Automation plays an important role in mass production.

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For mass production of the product, the machining operations decide the sequence of machining. The machines designed for producing a particular product are called transfer machines. The components must be moved automatically from the bins to various machines sequentially and the final component can be placed separately for packaging. Materials can also be repeatedly transferred from the moving conveyors to the work place and vice versa. Nowadays almost all the manufacturing process is being atomized in order to deliver the products at a faster rate. The manufacturing operation is being atomized for the following reasons.

B. Motivation

Security in travelling is a primary concern for everyone. Rising demand for automobile has increased the traffic, thereby causing more world for mobile communication. This GSM device consists of sim slot in which a sim can be inserted which has a unique number, this unique number is used for contact. This GSM device consists a unique number called Imai number and this is different for each and every hardware kit. In our project the device is used for transmitting data.



1) GPS Module

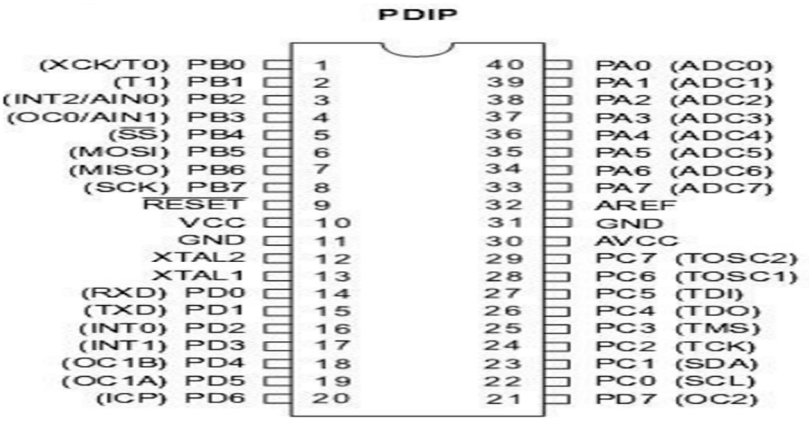
GPS abbreviates global positioning system, and this is used to detect the latitude and longitude of the particular position and it also shows the exact time. It detects these values anywhere on the earth. In our project it plays main role and it is the main source of the latitude and longitude of the vehicle to know the accident occurred location, or even for theft tracking of the vehicle



2) ATMEGA 16 Microcontroller

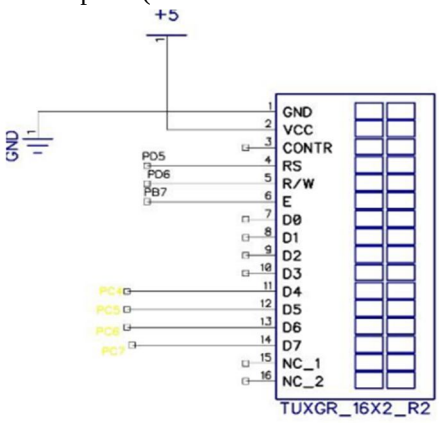
ATmega16 is an 8-bit high performance microcontroller of Atmel's Mega AVR family with low power consumption. Atmega16 is based on enhanced RISC (Reduced Instruction Set Computing, Know more about RISC and CISC Architecture) architecture with 131 powerful instructions. Most of the instructions execute in one machine cycle. Atmega16 can work on a maximum frequency of 16MHz.ATmega16 has 16 KB programmable flash memory, static RAM of 1 KB and EEPROM of 512 Bytes.

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3) LCD Power Sources

LCD has 2 Power Sources VCC and GND are at 1 and 2 NO. Pins of LCD. Used to drive the LCD 3mA current consumption. VCC and GND is at 15 and 16 NO. pins of LCD used to drive the backlight of LCD 100 mA current • Total current consumption = 3mA + 100mA = 103 Ma So, in order to reduce the current requirement, we are connecting a 330-ohm resistance in series with the backlight pin VCC. This reduces the current consumption (100mA / 330ohm =0.303 mA*ADXL335 module*



4) Power Supply

The basic step in the designing of any system is to design the power supply required for that system. The steps involved in the designing of the power supply are as follows, 1) Determine the total current that the system sinks from the supply. 2) Determine the voltage rating required for the different components. • The bridge rectifier and capacitor I/p filter produce an unregulated DC voltage which is applied at the I/P of 7805. • The minimum dropout voltage is 2v for IC 7805, the voltage applied at the input terminal should be at least 7 volts. • C1 (1000 µf / 65v) is the filter capacitor. • C2, C4 (0.1uF ceramic), C3 (220uF/25V accidents on the road.

People often lose their lives because of poor emergency facilities in the case of unattended accidents. Pre-emption of the accidents taking place on the roads is not possible but at least the after effects can be minimized. The proposed system ensures making emergency facilities available to accident victims as early as possible by letting relatives, hospital or a rescue team know the accident spot 3 with the help of this module embedded in the vehicle. Sensors are attached to the microcontroller. In case there is an accident, the sensor gets activated and the GSM system will send notifications to the nearest hospital, police station or kind of the victim with the location coordinates where the accident has occurred. With the help of space navigation system GPS locates the position of the vehicle where accident has occurred. The aim is to design and develop a control system based an intelligent electronically controlled automotive bumper activation system is called “AUTOMATIC ELECTROMAGNETIC BUMPER”. This system is consisting of Ultrasonic transmitter and Receiver circuit, Control Unit, Pneumatic bumper system. The Ultrasonic sensor is used to detect the obstacle. There is any obstacle closer to the vehicle (within 4 feet), the control signal is given to the bumper activation system.

II. LITERATURE SURVEY

A. *Global Positioning System (GPS)*

GPS is a system composed of a network of 24 satellites of the US. The satellites periodically emit radio signal to GPS receivers. The GPS receiver receives the signal from at least three satellites using triangular technique to compute two-dimensions, or four satellites to compute three dimensions (latitude, longitude and altitude).

B. *Google Map*

Is a version of Google Earth it's free software to provide map by satellite image, the programming language of Google Map is KML (keyhole markup language). It used to show lines and pins objects.

C. *Global System for Mobile Communication (GSM):*

GSM is a standard developed by the European telecommunication standards institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile phones, first deployed in Finland in July 1991. As of 2014 it has become the default global standard for mobile communications - with over (90%) market share, operating in over 219 countries and territories.

D. *Subscriber Identity Module (SIM)*

SIM is a detachable smart card considered one of the key features of GSM, SIM card containing the user's subscription information and phone book. This allows the user to retain information after switching handsets. Alternatively, the user can also change operators while retaining the handset simply by changing the SIM, Figure (2.1): the structure of GSM network:

III. GENERAL PROJECT DESCRIPTION

The proposed system ensures making emergency facilities available to accident victims as early as possible by letting relatives, hospital or a rescue team know the accident spot with the help of this module embedded in the vehicle. Sensors are attached to the microcontroller. In case there is an accident, the sensor gets activated and the GSM system will send notifications to the nearest hospital, police station or kind of the victim with the location coordinates where the accident has occurred. With the help of space navigation system GPS locates the position of the vehicle where accident has occurred. Also, to develop a control system based an intelligent electronically controlled automotive bumper activation system is called AUTOMATIC ELECTROMAGNETIC BUMPER. This system is consisting of Ultrasonic transmitter and Receiver circuit, Control Unit, Pneumatic bumper system. The Ultrasonic sensor is used to detect the obstacle. There is any obstacle closer to the vehicle (within 4 feet), the control signal is given to the bumper activation system.

1) *Basic Block Diagram*

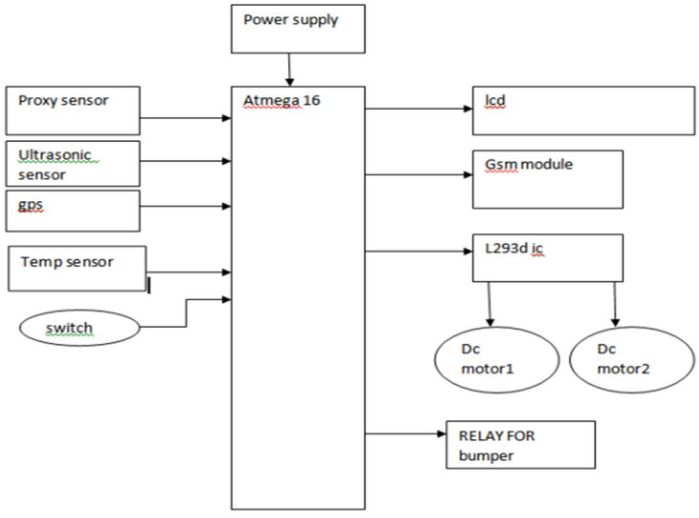


Fig Block Diagram of Black Box System With GPS

2) Fig.

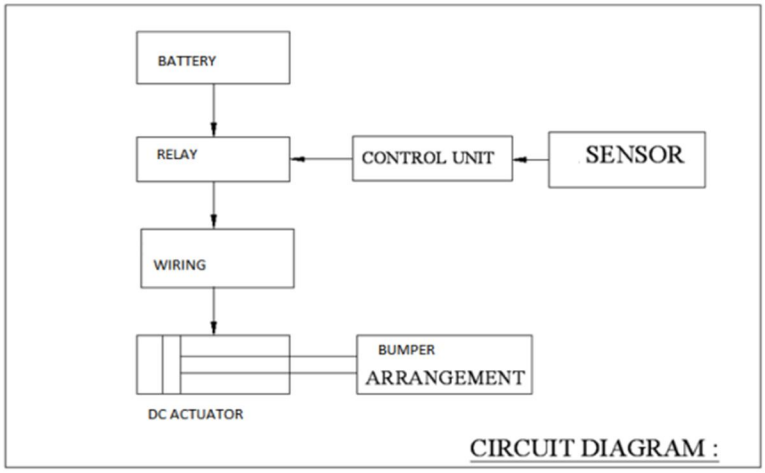


Fig. Circuit Diagram of Black Box System with GPS

3) Fig

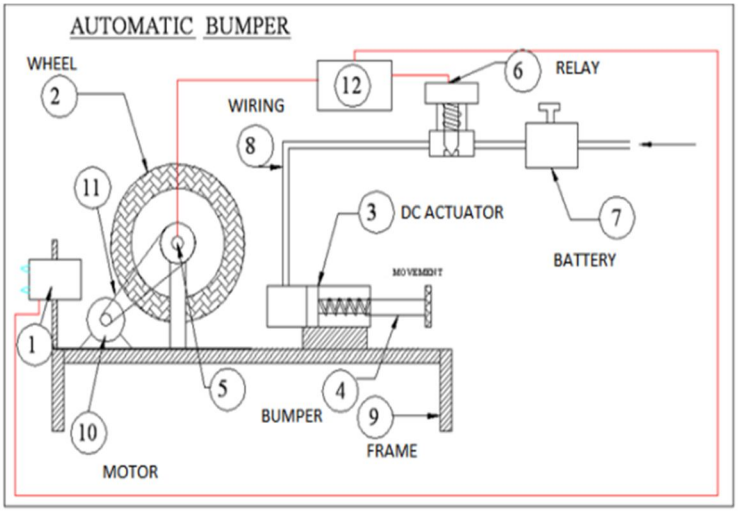
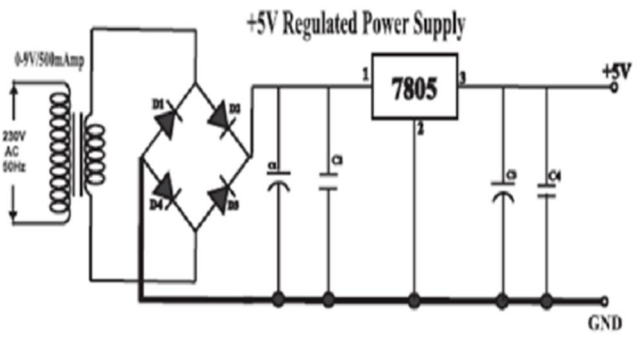


Fig Automatic Bumper for Reduction of Accident Impact

4) GSM Module

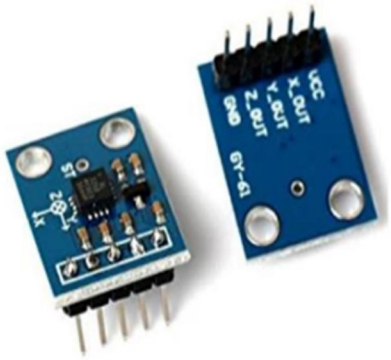
abbreviates global system for mobile communication, this isa second generation (2G) mobile network. This is widely used in all over the electrolyte capacitor) is to be connected across the regulator to improve the transient response of the regulator. • Assuming the drop out voltage to be 2 volts, the minimum DV voltage across the capacitor C1 should be equal to 7volts (at least)



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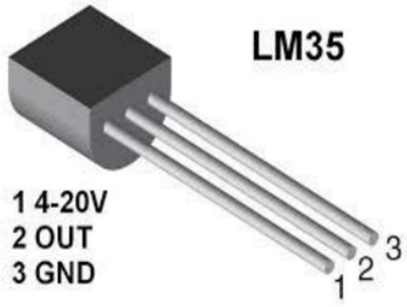
5) Vibration Sensor

The ADXL335 is a small, thin, low power, a complete 3-axis accelerometer with signal conditioned voltage outputs. The ADXL335 Module 3-axis Analog Output Accelerometer measures acceleration with a minimum full-scale range of ±3 g. It can measure the static acceleration of gravity in tilt-sensing applications, as well as dynamic acceleration resulting from motion, shock, or vibration. This breakout board comes with an onboard voltage regulator and works at both 3.3V & 5V (3-5V). An accelerometer is an electro-mechanical device that will measure acceleration forces. These forces may be static, like the constant force of gravity pulling at your feet, or they could be dynamic – caused by moving or vibrating the accelerometer.



6) Temperature Sensor

In general, a temperature sensor is a device which is designed specifically to measure the hotness or coldness of an object. LM35 is a precision IC temperature sensor with its output proportional to the temperature (in °C). With LM35, the temperature can be measured more accurately than with a thermistor. It also possesses low self-heating and does not cause more than 0.1 °C temperature rise in still air. The operating temperature range is from -55°C to 150°C.The LM35's low output impedance, linear output, and 27 precise inherent calibration make interfacing to readout or control circuitry especially easy. It has found its applications on power supplies, battery management, appliances



IV. ADVANTAGES AND APPLICATIONS

A. Advantages

1) High effectiveness.
2) High durability and reliability.
3) Simple design.
4) High adaptability to harsh environment
5) Safety Easy selection of speed and pressure.
6) Environmentally friendly.
7) Free from wear adjustment.
8) Less power consumption
9) It gives simplified very operation.
10) Installation is simplified very much

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B. Applications

Commercial fleet operators are by far the largest users of vehicle tracking systems. These systems are used for operational functions such as routing, security, dispatch and collecting on-board information. These are also used for fire detector in large vehicles like train, bus etc. because the vehicle like train contains large number of people and the sending alert of fire accident can save many lives. The applications for this project are in military, navigation, automobiles, aircrafts, fleet management, remote monitoring, remote control, security systems, teleservices, etc.

1) Fleet monitoring
2) Vehicle scheduling
3) Route monitoring
4) Driver monitoring
5) Accident analysis

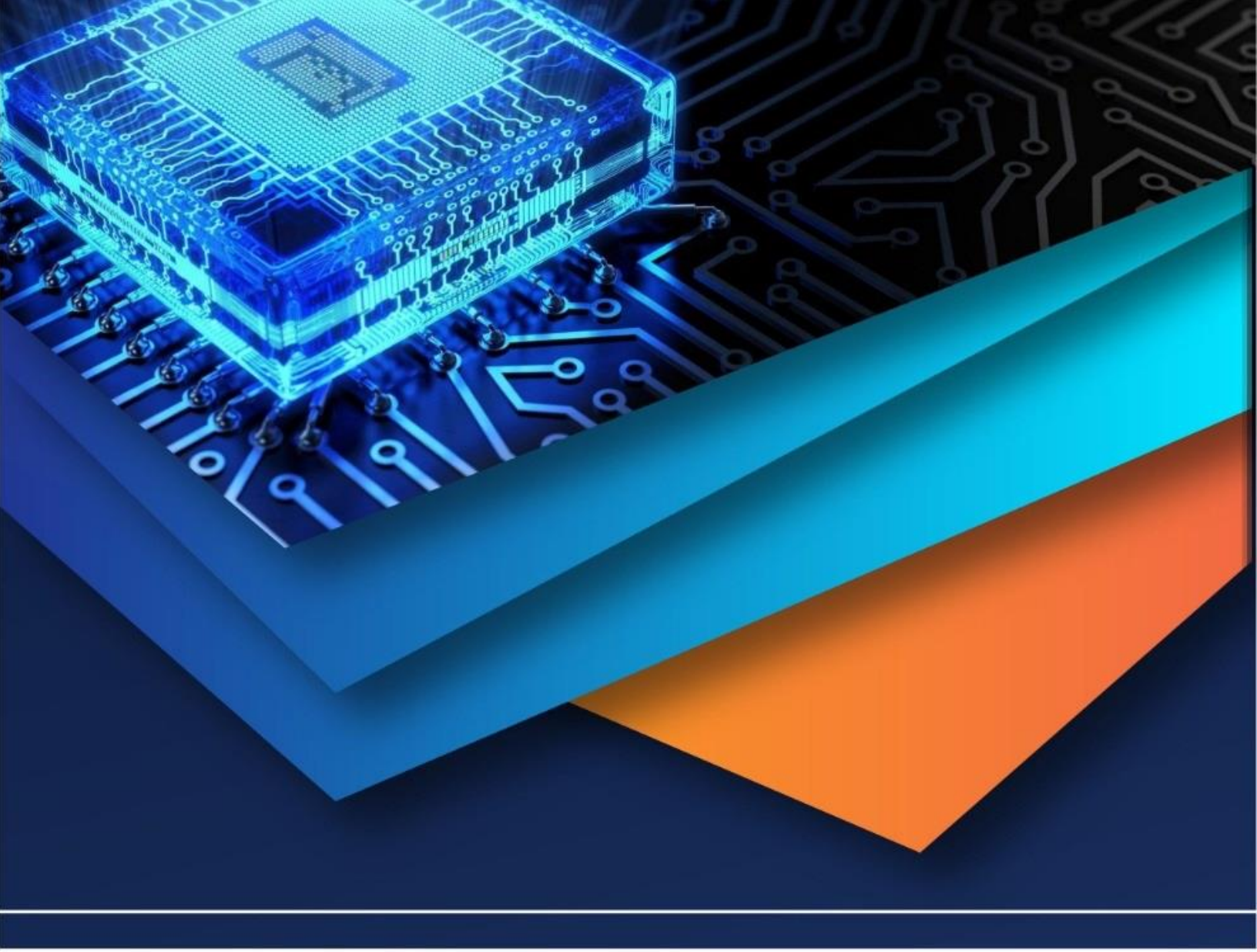
V. CONCLUSION AND FUTURE SCOPE

This project provides the design which has the advantages of low cost, portability and small size. The platform of the system is AVR along with; GPS and GSM, interfacing which reduces the alarm time to a large extent and locates the site of accident accurately. This system can overcome the problems of lack of automated system for accident location detection. Consequently, the time for searching the location is reduced and the person can be treated as soon as possible which will save many lives. Main motto of the accident alert system project is to decrease the chances of casualties in such accident. Whenever accident occurs, paramedics are alerted and they reach the particular location to increase the chances of saving life. This device invention is much more useful for the accidents occurred in deserted places and those occurring at night time which usually go unattended. This system will have broad application prospects and it will play an important role in day-to-day life in future

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