



Arduino Based Human Safety While Driving using GSM and GPS

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ABSTRACT: This project is inspired from the maximum accident case in our country. This Project presents an automotive localization system using GPS and GSM-SMS services, Anti alcoholic system, Smoke detection system, Low/High beam controlling system, parking system. This project is detected the alcoholic driver, smoke and low/high beam, safely reverse parking system. And operating this system whiles this type problem. The GSM & GPS system permits localization of the automobile and transmitting the position to the owner on his mobile phone as a short message (SMS) at his request. Also, this system automatically sends alert messages to predefined numbers when accident takes place. This tracking system is composed of a GPS receiver, Microcontroller and a GSM Modem. GPS Receiver gets the location information from satellites in the form of latitude and longitude. The Microcontroller processes this information and this processed information is sent to the user/owner using GSM modem. The presented application is a low cost solution for automobile position and status, very useful in case of car theft situations, for monitoring adolescent drivers by their parents as well as in car tracking system application.

KEYWORDS: Arduino controller, GSM, GPS module, Human safety.

I.INTRODUCTION

The development of a transportation system has been the generative power for human beings to have the highest civilization above creatures in the earth. Automobile has a great importance in our daily life [1] [2]. We utilize it to go to our work place, keep in touch with our friends and family, and deliver our goods. But it can also bring disaster to us and even can kill us through accidents. Speed is one of the most important and basic risk factors in driving. It not only affects the severity of a crash, but also increases risk of being involved in a crash [3] [4]. Despite many efforts taken by different governmental and non-governmental organizations all around the world by various programs to aware against careless driving, yet accidents are taking place every now and then. However, many lives could have been saved if the emergency service could get the crash information in time [5]. As such, efficient automatic accident detection with an automatic notification to the emergency service with the accident location is a prime need to save the precious human life. This seminar proposes to utilize the capability of a GPS receiver to monitor the speed of a vehicle and detect an accident basing on the monitored speed and send the location and time of the accident from the GPS data processed by a microcontroller by using the GSM network to the Alert Service Centre [6] [7] [8].

II.WORKING OF COMPONENT

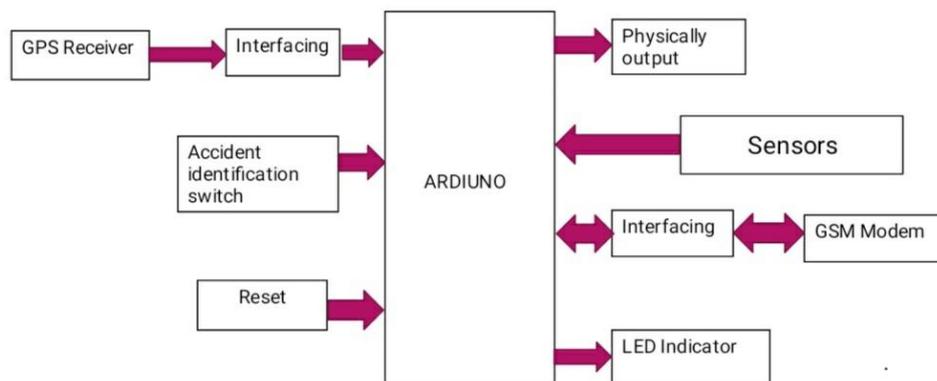


Fig. 1 Block diagram



In our project from the beginning, if a driver or a person is drunk, the vehicle will not start or even if the seat belt is not fastened inside the vehicle, the vehicle will not start. Now suppose this condition is resolved, then the vehicle will start. We all know that the transportation system has increased in this time. So the causes of accidents are also increasing.

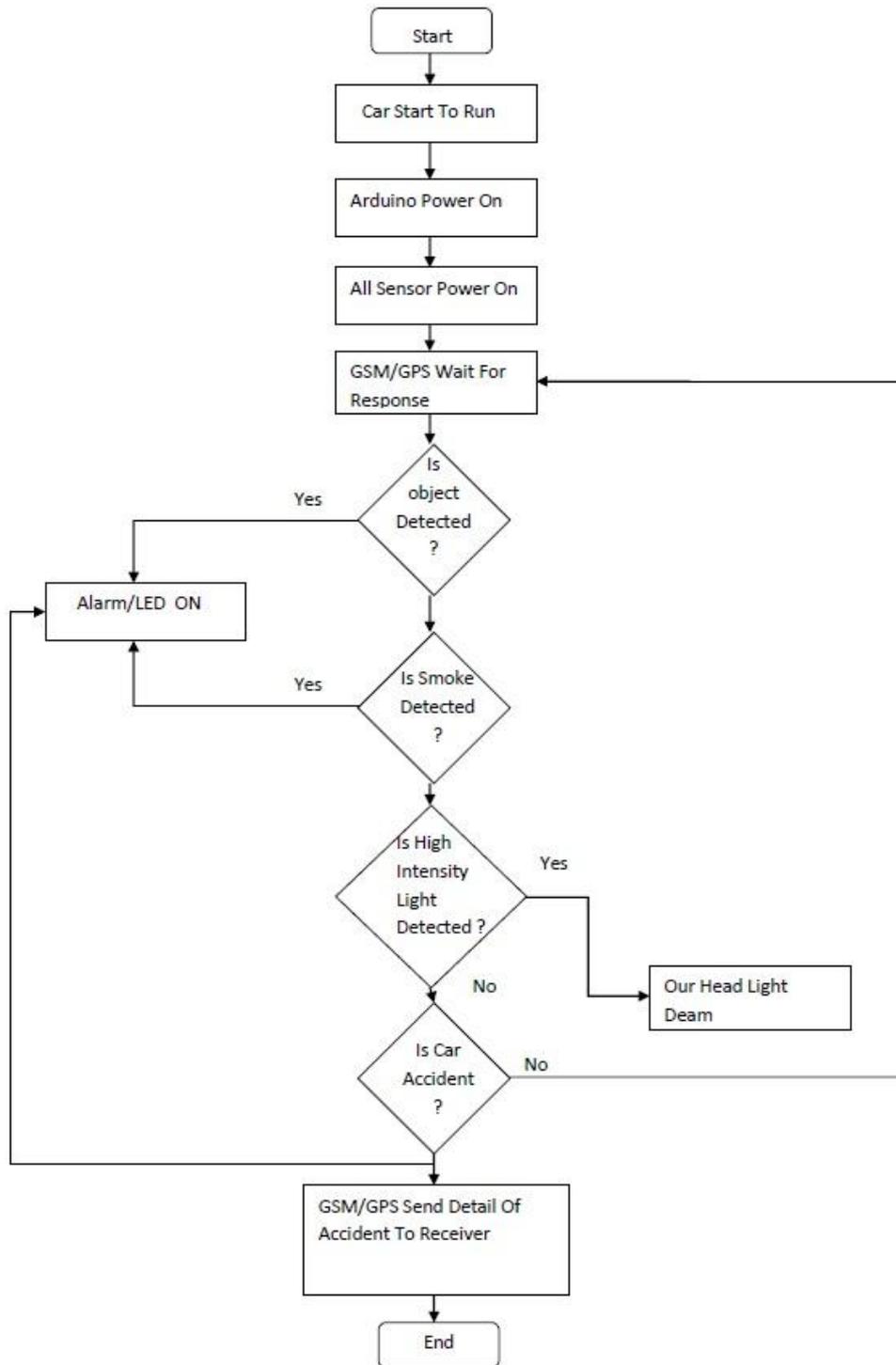


Fig. 2 Flow chart for Operation

One of the reasons is that an accident can happen even if an object comes in front of the vehicle. So, to solve that, we have put such sensors in our project. And its job to alert you if an object or vehicle comes at a particular distance and this can also work in your parking system. Now even at night when we are driving, there is no possibility of an



accident. Accidents can also be caused by a high beam vehicle coming from the front while driving at night. So at that time our project has a system that will automatically dim the high beam light. Accidents can happen for all these reasons. Now considering all these reasons, accidents, also happen. In this project we present an automatic localization system using GPS & GSM-SMS services with micro processor where GPS receiver gets the location information from satellites in the forms of latitude and longitude, GSM-SMS service sends a short message predefined numbers [7]. This system also automatically sends alert message, when accident takes place. This system is interconnected with car alarm system, and alerts to the owner on his mobile phone. The microprocessor processed this information and sends to it on predefined numbers [9].

III.CIRCUIT DIAGRAM AND HARDWARE

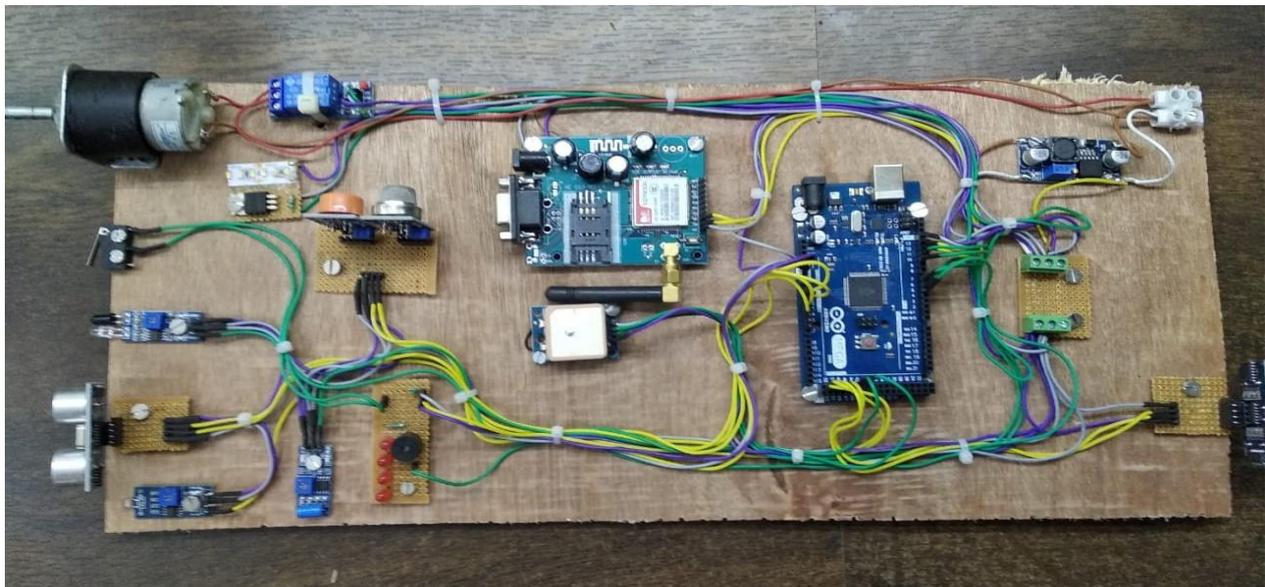


Fig. 3 Hardware of project

For our project we decide to make it cost effective and reliable we use Arduino controller and interface it with sensors. The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The NEO-6M GPS module is comes with an external antenna and does not come with header pins. So you will need to solder it. SIM900A Modem is built with Dual Band GSM/GPRS based SIM900A modem from SIMCOM. It works on frequencies 900/ 1800 MHz SIM900A can search these two bands automatically. The frequency bands can also be set by AT Commands. The baud rate is configurable from 1200-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. SIM900A is an ultra compact and reliable wireless module. This is a complete GSM/GPRS module in a SMT type and designed with a very powerful single-chip processor integrating AMR926EJ-S core, allowing you to benefit from small dimensions and cost-effective solutions. The Vibration module based on the vibration sensor SW-420 and Comparator LM393 to detect if there is any vibration that beyond the threshold. The Grove - Gas Sensor (MQ2) module is useful for gas leakage detection (home and industry). It is suitable for detecting H₂, LPG, CH₄, CO, Alcohol, Smoke or Propane. Due to its high sensitivity and fast response time, measurement can be taken as soon as possible. The sensitivity of the sensor can be adjusted by potentiometer. The HC-SR04 ultrasonic sensor uses sonar to determine distance to an object like bats do. It offers excellent non-contact range detection with high accuracy and stable readings in an easy-to-use package. It comes complete with ultrasonic transmitter and receiver modules. This module is made using Alcohol Gas Sensor MQ3. It is a low cost semiconductor sensor which can detect the presence of alcohol gases at concentrations from 0.05 mg/L to 10 mg/L. The sensitive material used for this sensor is SnO₂, whose conductivity is lower in clean air. Its conductivity increases as the concentration of alcohol gases increases. It has high sensitivity to alcohol and has a good resistance to disturbances due to smoke, vapour and gasoline.



IV.CONCLUSION

In this project we present an automatic localization system using GPS & GSM –SMS services with micro processor where GPS receiver gets the location information from satellites in the forms of latitude and longitude, GSM-SMS service sends a short message predefined numbers. This system also automatically sends alert message, when accident takes place. This system is interconnected with car alarm system, and alerts to the owner on his mobile phone. The microprocessor, processed this information and sends to it on predefined numbers. This project is low cost solution for automobile position and states for accident detection it also useful in case of car theft situation, this system also used where information needed is required rarely and at irregular period of time(when requested). After the observation ultrasonic sensor, alcohol sensor, smoke sensor, LDR sensor is use for car and human safety.

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