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ACCIDENT DETECTION AND PREVENTION IN HILLY AREAS

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Abstract : Generally the usage of vehicle tracking system has been increased rapidly. The major concern of the proposed Vehicle tracking system is beneficial in many ways such as providing security to the personal vehicles, taxis, cabs, school buses/cars and others. Vehicle tracking system is designed to know the position of the vehicle. Tracking system is developed by using GPS and GSM modules to locate the user's vehicle easily. GPS module is used to track the location of the vehicle in the form of values such as latitude and longitude. These values are transmitted to the user using GSM modem through mobile network. Different sensors are used to detect alcohol consumption and to identify the accident. The Sensor values can be monitored by anyone from anywhere in the world.

IndexTerms - Vehicle Tracking, Arduino Microcontroller, Sensors, GSM, GPS

I. INTRODUCTION

One of the most usable technologies in this trending world is IOT. IOT describes about the embedded devices which are interlinked with the internet. IOT Internet of Things encompasses devices like sensors, actuators; motors etc. Nowadays the major concern of the people is securing the valuable objects like vehicles. Security is enhanced by using. The proposed system is used for tracking vehicles by using GPS and GSM. GPS uses satellite technology to determine the location of the object. It finds the values in the form of latitude and longitude. Different sensors are used to detect accident and alcohol percentage. It allows visualizing and analyzing the live data of the sensors. By using this data, automobile owner can monitor the sensors data graphically from anywhere in the world. Vehicle Tracking System (VTS) is a technology that is used to certain the whereabouts of a vehicle using technologies like Global Positioning Systems (GPS) and Various parameters like geographical coordinates, speed, distance, etc. can be obtained and then viewed on a digital map using software. It uses a smartphone to communicate with the system, which uses GPS technologies to provide the desired services. The work also aimed to develop an interactive Graphical User Interface (GUI) for the smartphone application.

II. EXISTING SYSTEM

There are many existing plans towards the accident detection and this approach was made by accident control system using ultrasonic sensor. Ultrasonic sensors were used along with controller and Arduino to prevent the accident from occurring. Buzzers and lamps are placed on both the side of the roads along with controller and ultrasonic sensors. The ultrasonic sensors senses from where the vehicles are coming and accordingly the controller sends signals and accordingly buzzers will ring and the lamps will glow to indicate that vehicles are coming from the other sides and thus saving the vehicles from meeting with an accident Various measures were also taken by the government to reduce the chances of accidents on the turnings by providing glasses so that vehicles coming from the other sides are aware of coming vehicles.

III. PROPOSED SYSTEM AND IMPLEMENTATION

Next approach is mainly based on developing the online tracking of device using GPRS TCP/IP technology by Arduino microcontroller. By using GSM modem and MCU establishing the TCP/IP connection between tracking unit and tracking server using AT protocol. Tracking unit get the location information from GPS receiver and same information keep sending to tracking server using TCP/IP stack. Sending the location information from tracking unit to tracking server will be on request or timer based. Google Earth application will be used at tracking server to display the location position of the device being tracked after the entire system is implemented.

3.1 System Design

The complete system model of our proposed system is divided as two main modules as:

1. Collision Avoidance System (CAS)
2. Automated Accident Detection and Information system (AADIS).

- 1. COLLISION AVOIDANCE SYSTEM:** The main objective of the CAS is to avoid the early accidents due to adverse weather conditions. Below figure shows the block diagram for proposed method. Collision Avoidance System consists of several sensors to predict the weather conditions such that humidity sensor, temperature sensor etc. In our proposed system adverse weather conditions are considered as heavy rain cases and huge snow fall conditions. We use humidity sensor to predict the rain conditions i.e. using humidity sensor we calibrate the level of humidity in the surrounding environments. If the estimated humidity level is below the already pre fixed threshold sensor alerts the system for heavy rain condition. Similarly temperature sensor is used to predict the snow conditions. Generally whenever snow falls then automatically the temperature is low. Therefore whenever the temperature sensor senses very low temperature than threshold level then it alerts the system for high snowfall condition. However after detecting the adverse weather conditions, the next step is to avoid collisions. To avoid early accidents we use small sensors around the vehicle to detect opposite vehicles and their relative speeds and distances. Generally these sensors are IR sensors and Ultrasonic sensors. In our proposed method we use IR sensors to detect the in front vehicles and ultrasonic sensors to detect adjacent vehicles.
- 2. AUTOMATED ACCIDENT DETECTION AND INFORMATION SYSTEM.**

This IOT Based Online Vehicle Tracking and Monitoring System Using GPS is an example of interaction between machines and humans. It helps in minimizing the gap between human and machine capabilities. This technology uses application, protocols and IOT. In this project we will display the latitude and longitude values on LCD Display so that it can be monitored from anywhere in the world.

GPS stands for Global Positioning System, which is a worldwide radio-navigation system. To track the location of the device, the GPS tracking system uses the Global Navigation Satellite System (GNSS) Network. This network consists of a range of satellites that uses microwave signals to transmit the data which will be received by the GPS receiver module. GPS uses a tracking method to find the position of the vehicle in terms of latitude and longitude values and it transfers that information to the specified user. using GPS technology, one can determine location, velocity, time, 24 hours a day, in any environmental conditions any time in the world for free GPS was formally known as NAVSTAR (navigation satellite timing and ranging). GPS was originally developed for military purpose.

GSM stands for global system for mobile communication, it is a standard developed by European Telecommunications Standards institute (ETSI) to describe protocol for second generation digital cellular network. GSM is an open, digital cellular radio network operating in over two hundred countries worldwide. it uses narrow band time division multiple access (TDMA) technology. it can also be used for data computing and sending information. a user can connect his GSM enabled phone with his laptop to send or receive any kind of information.

3.2 Methodology

The system design includes two parts; Hardware Design and Software Design. Hardware Design includes sensors like Ultrasonic Sensor, temperature Sensor, Alcohol Sensor. Ultrasonic sensor uses +5V DC supply. Its range is from 2 cm to 100 cm. Micro controller Software design is utilized for detecting the vehicle or obstruction. And to manage the LED by using Arduino IDE device that is open source software. Programming are often done by using embedded C. Package (OS) that we used is windows 8. **HARDWARE DESIGN** We have adopted Microcontroller (Arduino UNO), and all the sensors are demonstrate in the block diagram. The sending and gathering function of ultrasonic sensor is same as that of bat. Ultrasonic Sensor have 4 pins. They're +5V VCC, GND, echo pin and output pin. Here echo pin is input pin and trigger pin is output. Ultrasonic sends the signal within the type of pulses from signal pin. When the signal hit the thing it'll get reflected back and it's received by echo pin. From echo the signal is shipped to microcontroller Arduino UNO. The temperature Sensor i.e DHT11 is connected to the Arduino Uno which is used to measure the temperature and humidity present in the surrounding area and is displayed on the LCD Screen. The alcohol Sensor connected to the Arduino Uno is used whether the person has consumed alcohol or not and the indication is provided to the respective person by using GSM and GPS. **SOFTWARE DESIGN** The below figure shows the flowchart of software design of microcontroller which is programmed by using Arduino IDE tool which is open source software. Programming are often done by using embedded C.

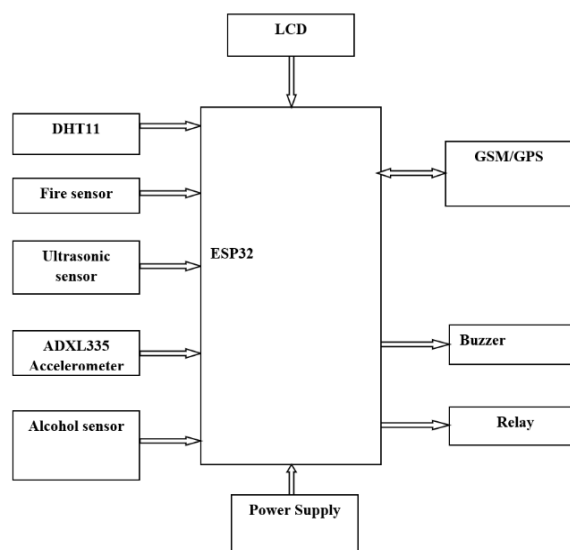


Figure1: Block diagram

3.3 Algorithm for the system design:

Step 1: In the first step configure the I/O ports which are needed to be connected to the Arduino uno.

Step 2: Next configure the serial communication 9600 bps.

Step 3: Check the Wifi or internet connectivity for transporting information.

Step 4: If Wifi connected is then configure the SSID.

Step 5: if Wifi is not connected the go back and check the serial connectivity.

Step 6: Check the GPS connectivity, if it is verified then read the longitude and latitude values which are to be displayed on LCD Screen.

Step 7: If GPS is not connected then verify the configuration of the SSID.

Step 8: If any accident occurs then by using the GPS technology, we are able to send the latitude and longitude values to the registered SSID.

Step 9: Read the distance measured by ultrasonic sensor displayed on the LCD screen.

Step 10: The temperature and humidity sensor (DHT11) connected to the Arduino uno will measure the temperature, humidity in the surroundings.

Step 11: The temperature and humidity values can be read on the LCD screen.

Step 12: If the temperature less than 20c, the buzzer will switch on automatically.

Step 13: If the distance is less than 10m buzzer will start producing the sound.

Step 14: The alcohol sensor connected to the vehicle i.e Arduino uno will measure the alcohol content.

Step 15: If alcohol is sensed then automatically message will be sent to the registered SSID by using GSM technology.

Step 16: The temperature, humidity as well as both latitude, longitude values, distance measured by ultrasonic sensor, percentage of alcohol will be displayed on the LCD Screen connected.

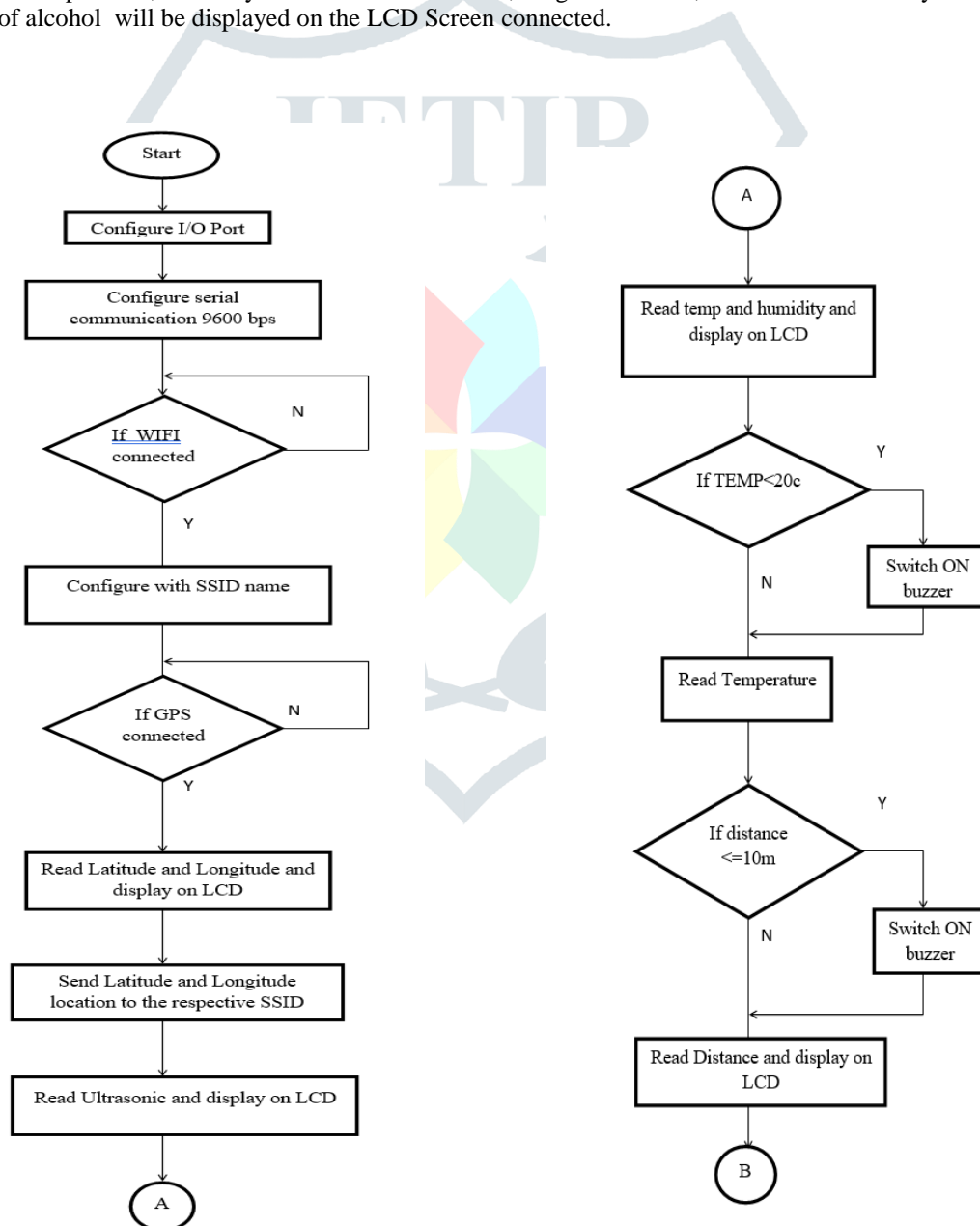


Figure2: Flow chart

IV. RESULTS AND ANALYSIS

By using this project we can automatically detect the vehicle coming in the opposite direction and provides the information about indication to the person driving the vehicle with the help of LCD and if accident occurred it also provides the latitude and longitudinal values to the registered person by making use GSM and GPS technologies. By using this project we can also detect the accident but also help us to prevent the occurrence of accident in hilly areas with the help of different sensors connected to the Arduino Uno present in the vehicle.



Figure3: Demonstration outcome

V. FUTURE SCOPE

The future work can be extended to implement in the prevention of accident and occurrence of accidents in the hilly areas and can also determine the speed of the vehicle and much more.

VI. CONCLUSION

This proposed work can automatically detect the vehicle coming in the opposite direction and provides indication to the person driving the vehicle with the help of LCD and provides the distance of the vehicle coming in the opposite direction. This also provide us the information about the area where the accident occurred with the help of GSM and GPS technologies to the registered SSID. By using this we can not only to detect the accident but also help us to prevent the occurrence of accident in hilly areas.

VII. REFERENCES

- [1] Accident Prevention and Road Safety in Hilly Region using IOT Module by Bhumika R, Harshitha S A, Meena D, Asha M Volume 09- 2021.
- [2] Sensor Based Accidents Prevention System for Hilly Region by Prof. Amar Shitole ,Tanmay Dharkar, DOI:10.48175/IJARSCT-1398 : 2021.
- [3] Smart Safety and Accident Prevention System for Mountain Roads Dwaipayan Saha1 , Indrani Mukherjee , Jesmin Roy , Sumanta Chatterjee , Vol.-8, Special Issue-1, Feb 2020 E-ISSN: 2347-2693(JCSE).
- [4] Published in: 2018 1st International Conference on Computer Applications & Information Security (ICCAIS)INSPEC Accession Number: 18043292,DOI: 10.1109/CAIS.2018.8441951Publisher: I EEE.
- [5] Wang Wei and Fan Hanbo, Traffic accident automatic detection and remote alarm device, IEEE proc. ICEICE pp910-913, April 2011.
- [6] Yao Jin. The discussion of Road Traffic Safety Countermeasures System [J]. Private Science and Technology, 2010.
- [7] Wang Wei. Embedded Microcontroller MC9S08AW60 Principles and Application [M]. Beijing: Beijing Aerospace University Press, 2008.
- [8] Zhu Yi, Yang Shubo. MMA series of acceleration sensor principles and application [J]. Medical equipment, 2008