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# Alcohol Sensing and Accident Alert System for Car Based on Internet of Things (IoT)

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***Abstract:*** ***Nowadays major accidents occur on road because of increase in traffic and rash or asleep driving of the drivers. Several accidents occur attributable to consumption of licker. So licker drunk driving is additionally vital reason for accident happens. The alcohol detection in-car system is supposed for the cover of humans seating within the car and in several things, would like the auto and police authority isn't hip in time. Therefore causes of delaying facilitate reached to the person suffered as a result of an accident. Theses proposed design consist is regarding alcohol detection and in addition an accidental location detection. Once an accident happens, therefore immediately emergency message is sent to nearest emergency service center with accidental location. This proposed design have to be compelled to be fitted with the car. Similarly also detect correct seat belt detection. Correct car seatbelt is most necessary to avoid wasting human life.***
***Keywords: Car Safety system, Sensors, Actuators, IoT, cost, Microcontroller, Communication Medium.***

## I. MOTIVATION

There is such a large amount of car users who drove a car with Consumption of licker, which is the reason for a most of car accidents. [1] [3] [4] [5]

Also once Associate in an accident occurs at non-residential place or highways, in this condition most important is to offer primary aid (healing) service to injured human by the support of ambulance. [1] [3] [4] [5]

So it was also necessary to include accident detection as well as location detection and this info given to the nearest police/ ambulance emergency service center (e.g. 108 in INDIA) help of wireless media like SMS (Short Message Service). This can help to reduce the number of accidents occur due to licker drunk consumption. [2] [7] [8]

In several car accidents there is a possibility of fire.

Therefore during this dangerous situation to save individuals people life with the help of fire fighting blower to stop fire yet as data given to the nearest, police station, fire brigade and ambulance emergency service center. [2] [7] [8]

Proper seat belt detection is better than traditional seat belt detection. Sometimes there is a possibility of misuses safety harness lock using directly attach of extra safety harness buckle without pull of safety harness by a driver. Therefore car system detects attach the safety belt. By reducing this sort of misuse of safety harness detection within the vehicle, therefore necessary to detect correct seat belt. [1] [5]

## II. PROBLEM STATEMENT

Nowadays major accidents occur on road because of increase in traffic and rash or asleep driving of the drivers. Several accidents occur attributable to consumption of licker.

So licker dinked driving is additionally vital reason for accident happens [1] [2]. The alcohol detection in-car system is supposed for the cover of humans seating within the car and in several things, would like the auto and police authority isn't hip in time. Because of this kind of accident, the help given to the sufferer is delayed.

In accident detection construct to assume regarding one full proof system that can't be plagued by accident, associate additionally detects accidental condition by analysing car position and use location instrument to provide data regarding the location where an accident has occurred.

For sending that data to health aid centre or emergency service supplier, van needed communicating media. [2]

## III.SYSTEM METHODOLOGY

According to problem statement, create equivalent block diagram as shown below in fig 1.

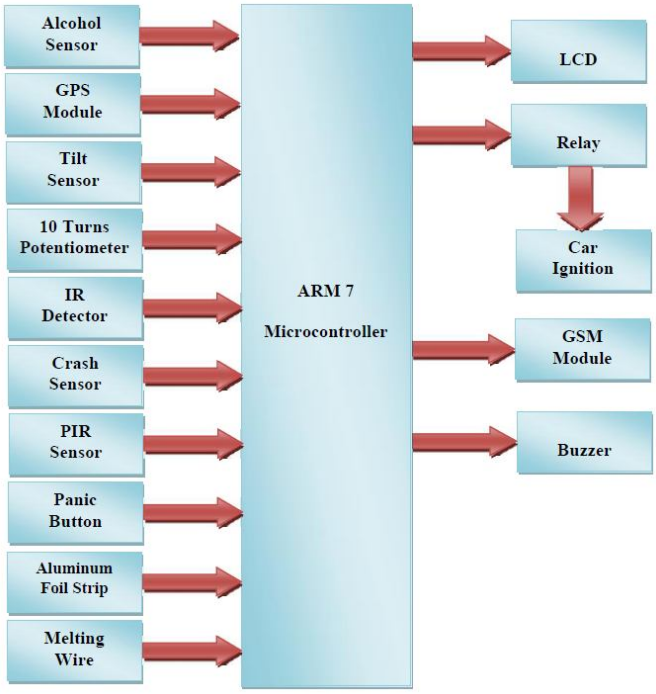


Fig. 1: Block Diagram of Proposed System

### *A. Alcohol Detection with Car Ignition System*

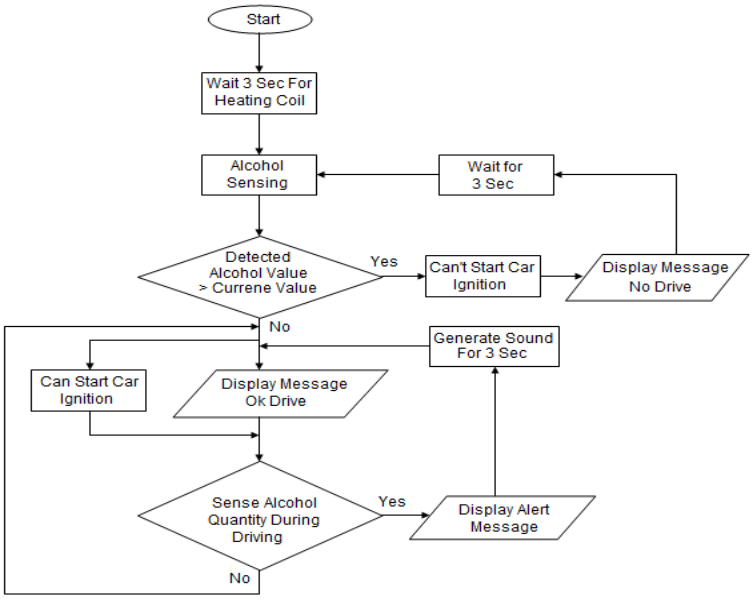


Fig. 2: Alcohol Detection with Car Ignition System [[]]

Here MQ-135 sensor is used which detects alcohol content in the air. If the person on driving seat inside the car has consumed alcohol then it is detected by the sensor. Sensor gives this signal to the ARM-7. If the driver is drunk then the vehicle ignition will not start (relay is off) and wait till the exchange of driver. If driver is not drunk, then the system will allow to start the vehicle ignition (relay is on). During on road driving condition if the driver is drunk then the system will show alerting message on display and buzzer will be on. [1]

*B. Car Tilting Detection*

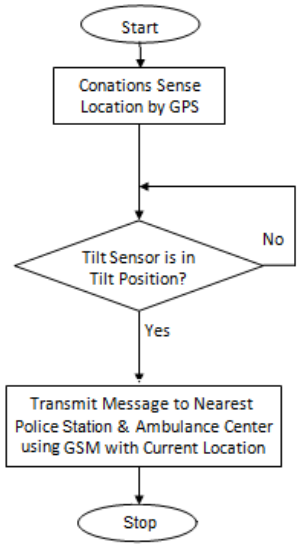


Fig. 3: Car Tilting Detection [1]

Here use Tilt sensor for detection of an accident, an output of this sensor is given to the ARM-7. Microcontroller decides its accident when car is tilting. If an accidental situation is detected then it fetches data from the GPS about recent location. Then it gives the command to GSM module to send SMS to nearest Ambulance and Police station. [1]

*C. Car Crash or Collision Detection*

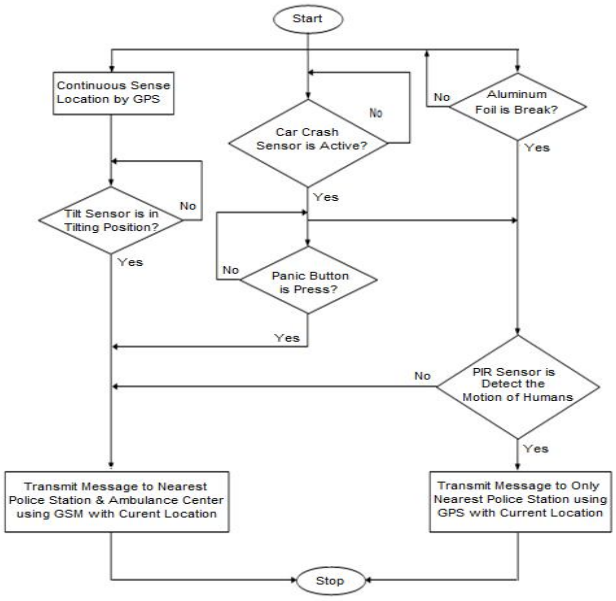


Fig. 4: Car Crash or Collision Detection [2]

For other accident situation, car crash sensor as well as aluminium foil is used to detect accident happened in any direction. The car crash sensor is installed in all corner regions in the car to sense any car body part crash or not. Also aluminium foil is used to detect any outer side of car body part is crashed or not, this foil is properly attached within the car body. This foil is attached in zigzag form to cover whole car body. Aluminium foil provides continuity path of its foil. If collision detects at any side of the car then this foil is break and this broken foil is sensed by the microcontroller to understand that an accident has occurred. So it immediately

sends the emergency message with accidental location to nearest police station. PIR sensor detects the human body movement and checks whether the human inside the car is alive or not. And if human is alive, it will not send information to nearest medical emergency centre. And if there is no movement found, then it will send information nearest medical emergency centre. [2]

*D. Fire Detection*

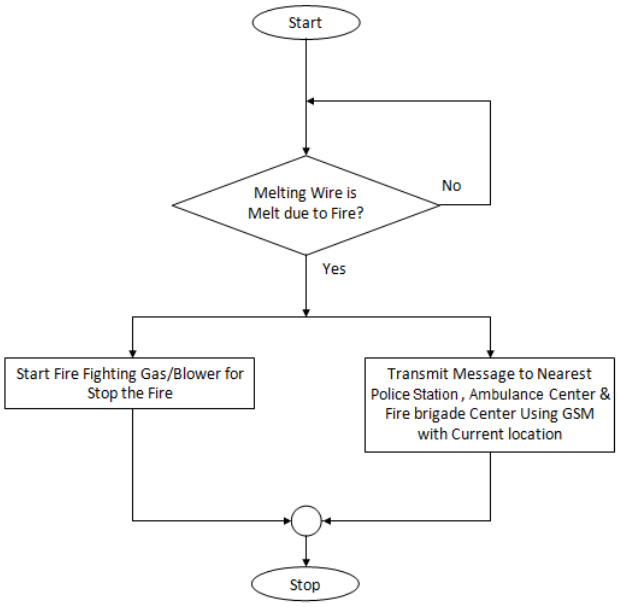


Fig. 5: Fire Detection

Some accident situations, the burning of a car remains for a long time. So for aborting this situation, used fire melting wire strip for fire detection and stop fire using fire fighting gas/blower. This fire melting wire is installed on car engine side and car back side. This wire provide continuity path. In case of fire, this wire will melt due to fire temperature. So controller will activate the fire stopping gas cylinder system and also send immediate emergency message to nearest police station, ambulance and fire brigade centre with accidental location.

*E. Emergency Panic Button Detection*

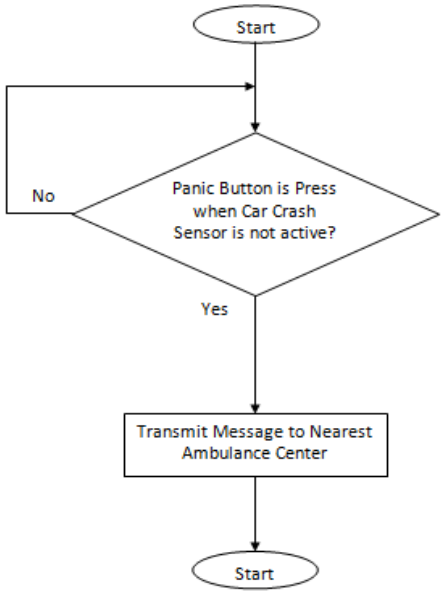


Fig. 6: Emergency Panic Button Detection

In any other medical emergency situation, there is a need of ambulance services. So, the panic button function is used. Use of this button immediate sends emergency medical help message to nearest ambulance or health care centre with current location.

*F. Correct Seat Belt Detection*

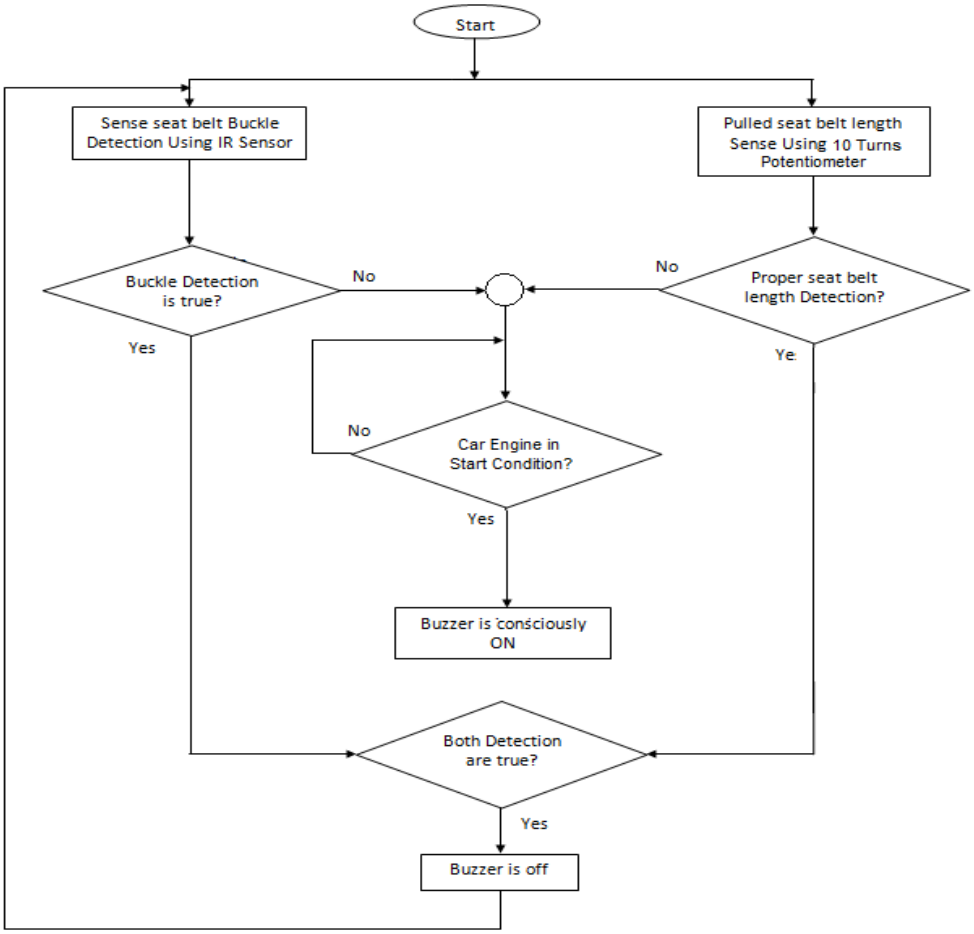


Fig. 7: Correct Seat Belt Detection [1]

For detection of correct seat belt is put on or not, IR sensor is used (for seat belt buckle detection) and 10 turns potentiometer for sensing how much length is pulling of seat belt. An output of these both sensors is given to the ARM-7. Microcontroller decides the seat belt is properly attached or not. If both sensor outputs are proper then microcontroller decides that the seat belt is properly attached otherwise seat belt alert sound continuously ringing. [1]

## IV. IMPLEMENTATION

*A. Alcohol Detection with Car Ignition System*

*1) When Alcohol Content is not Available*


Fig. 8: Alcohol is not Detect

When alcohol content is not available at near of MQ-135 sensor, so Display OK Drive and can start car ignition system using relay.

*2) When Alcohol Contain is Available*


Fig. 9: Alcohol is Detect

When alcohol content is available at near of MQ-135 sensor, so Display OK Drive and can start car ignition system using relay.

*B. Sensor Implementation in the Car*

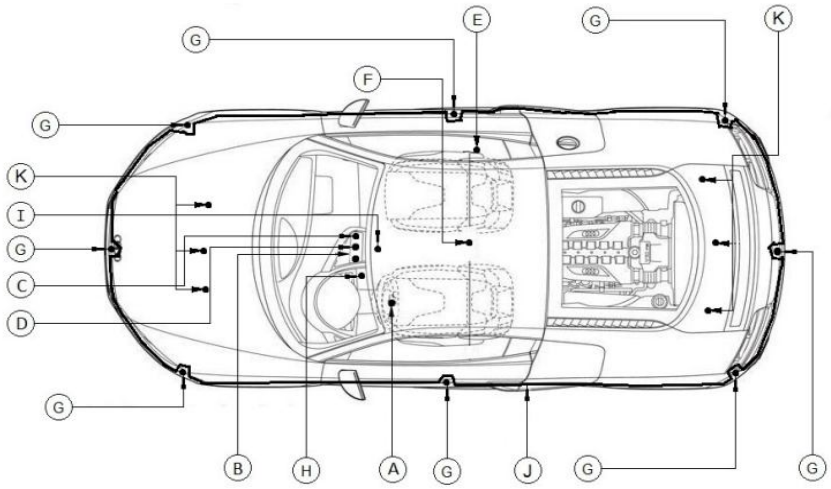


Fig. 10: Sensor Implementation in the Car

| | |
|---|---|
| A | Alcohol Sensor |
| B | Tilt Sensor |
| C | GSM Module (SIM 900A) |
| D | GPS Module |
| E | 10 Turns Potentiometer |
| F | IR Sensor Detection |
| G | Car Crash Sensor |
| H | Panic Button |
| I | PIR Sensor |
| J | Aluminium Foil Strip |
| K | Melting Wire |

Table 1: List of Sensor Used in System

*C. Get Value from GPS with Different Sentences*

GPS unit is connecting to the system; this device to give global poisoning value with the different sentences. Received different Sentences from GPS are shown below figure 11.

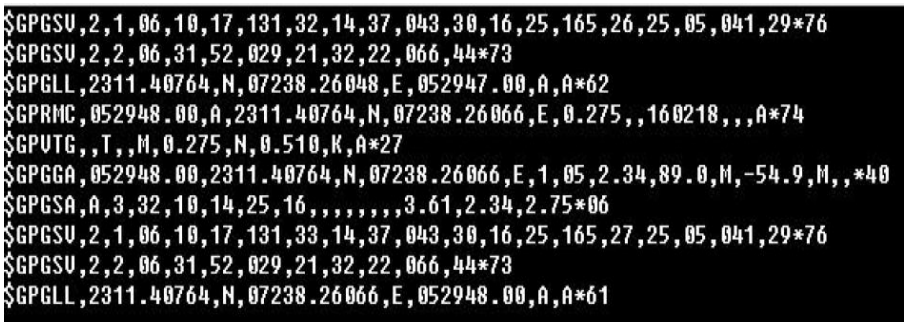


Fig. 11: Get Value from GPS with Diffrenct Sentences

Here use GPGLL (Global Poisoning Geographic Latitude and Longitude) sentence because in this system require only two value Latitude and Longitude, so GPGLL sentence have small character string. This character string range is 0 to 42. But here use only character string range 0 to 25; Causes of this short string range here use GPGLL sentence.

*D. Get Messages for Occurred Accidents*

*1)* When car is tilting of any Direction side, the system immediately sends the emergency message with accidental location to nearest police station and ambulance centre.

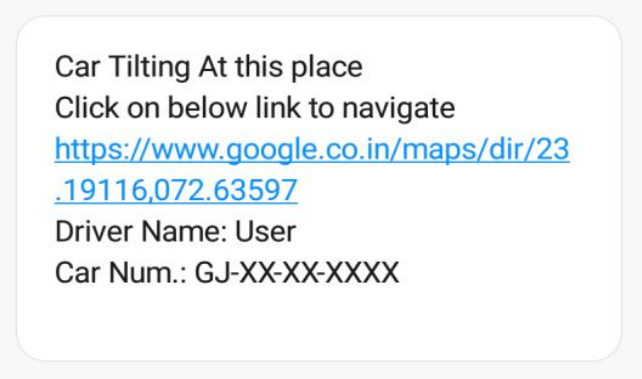


Fig. 12: Received Message for Car Tilting

*2)* When fire creates in the car, the system immediately sends the emergency message with accidental location to nearest police station, ambulance and fire brigade centre.

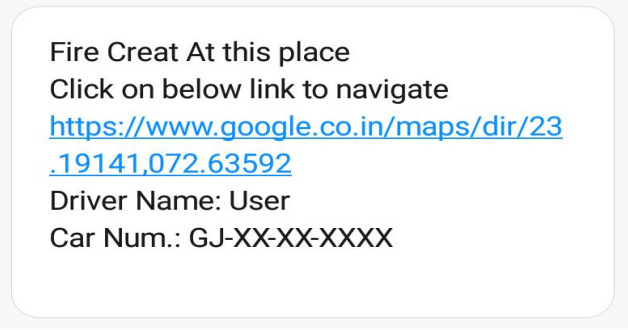


Fig. 13: Received Message for Fire Create in the Car

*3)* When car is crashed or collision happened of any body part of the car, the system immediately sends the emergency message with accidental location to nearest police station and ambulance.

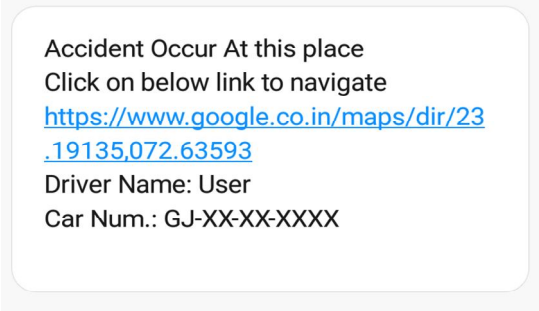


Fig. 14: Received Message for Car Crash or Collision

*4)* When detect panic button for any time need medical help, the system immediately sends the emergency message with accidental location to nearest ambulance centre.

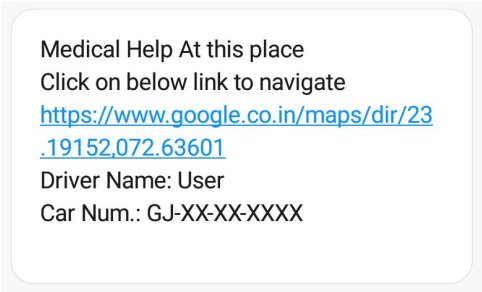


Fig. 15: Received Message for Medical Help

*E. Traced Location using Latitude and Longitude*

Generally GPS gets value in DDMM.MMMM format. This received GPS value is 2311.40582 N (latitude) and 07238.26195 E (longitude), but this format value is not supported in Google map and cant trace location, so require location in form of DD (Decimal Degrees) or DMS (Degree Minute Second) format.

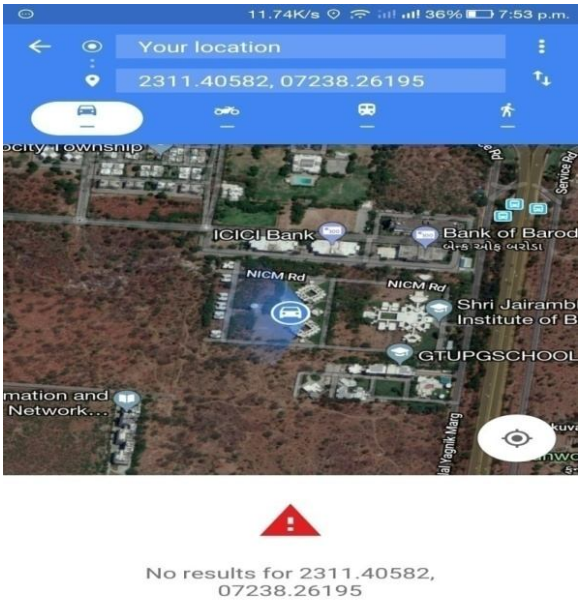


Fig. 16: No Result for DDMM.MMMM Format

It is most necessary to convert GPS value in DDMM.MMMM format convert into the form of DD (Decimal Degrees) or DMS (Degree Minute Second). Because DDMM.MMMM value is not supported in location tracing time this in Google map.
Conversion logic of DDMM.MMMM value into the form of DD (Decimal Degrees) is shown in below.

- D = DD (**DD**MM.MMMM)
- d = $\frac{\text{MM.MMMM}}{60}$
- Value = D + d

After this conversion process get DD (Decimal Degrees) for support in Google map. Also another way available to conversion value; there are DDMM.MMMM value into the form of DMS (Degree Minute Second). This conversion process is shown in below.

- D = DD (**DD**MM.MMMM)
- M = MM(DD**MM**.MMMM)
- S = (0.MMMM * 60)

After this process final form of this value is D° M' S", this value also support in Google map. But very difficult to write using this DMS value in Google map.

In this received message, the accident location navigation link is provided. Just click on this link to navigate. So no more time are needed to find accidental location and very easy to navigate compare to written latitude and longitude value in Google map.

*a)* Traced location using DD (Decimal Degree) Value.

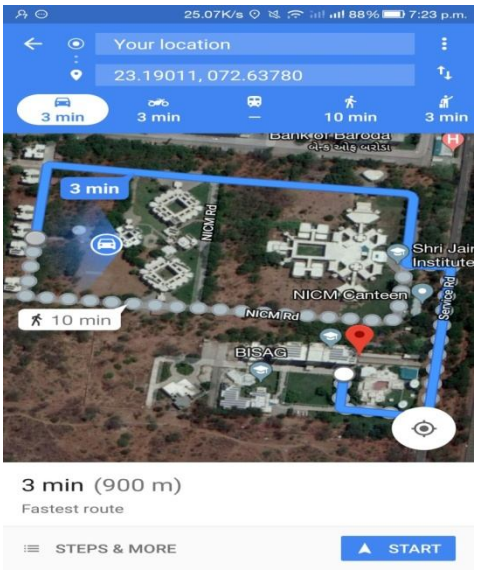


Fig. 17: Traced Location using DD (Decimal Degree) Value

If just click on link in to the received message, automatically put this DD value in the Google map and easily navigate the root.

Above two different methods for GPS value conversion. But DD (Decimal Degree) value very easy to put in Google map for navigation, because DMS (Degree Minute Second) value is complex to put in Google map.

## V. CONCLUSIONS

This proposed design is Cost effective, Power efficient and have high accuracy. This type of research design, the number of accidents can be minimized which occurs due to alcohol consumed drivers and save human's life because of accidental situations. This proposed design is based on different types of sensors to collect the car Condition parameters, process it to take the corrective decision at anytime and anywhere and transmitted with current location details using wireless communications elements GSM and GPS modem.

## VI. ACKNOWLEDGMENT

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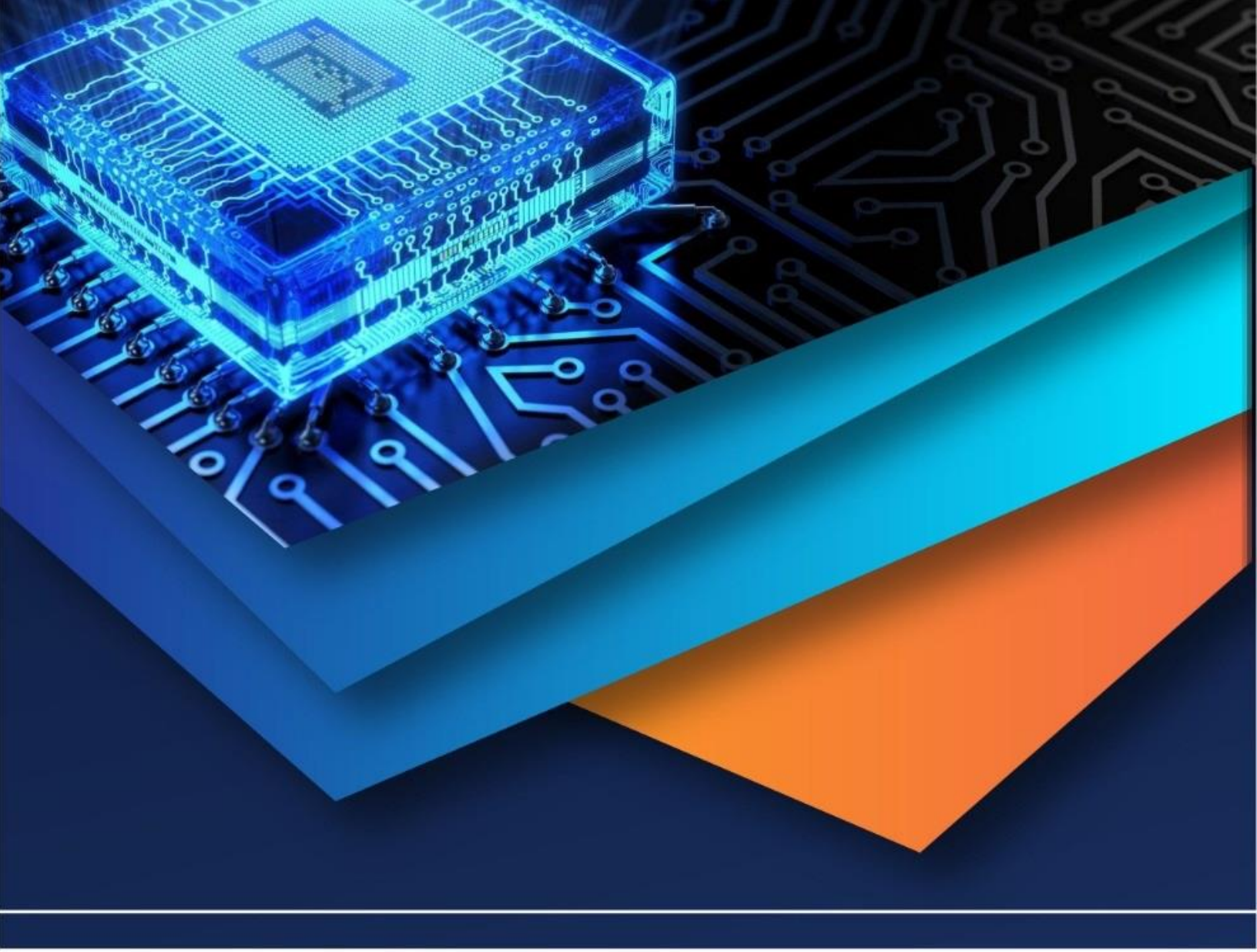

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