An IoT Based Dual Axis Solar Vehicle with Obstacle Avoidance and Accident Detection using GSM and GPS

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ABSTRACT: *The purpose of our work is to discover the vehicle accident location by sending a message using a system which is placed within the automobile system. Moreover, there is a rapid rise in the event of the Roadway accident. This paper is about a system which is created to automatically detect a mishap as well as inform the nearest health centers and medical solutions about it. This system can also locate the area of the mishap so that the clinical solutions can be directed right away in the direction of it. The objective of this paper is to build up a Car unintended tracking system utilizing vibration Sensor, GPS as well as GSM Innovation. The system can be adjoined with the car alarm system and also notify the owner on his mobile phone. This discovery and also the messaging system is made up of an Arduino receiver, Microcontroller, and a GSM Modem. GPS Receiver obtains the area information from satellites in the form of latitude and longitude. The GSM modem sends out an SMS to the predefined mobile number and informs about this accident. This enables it to keep an eye on the mishap circumstances and it can immediately signal the police/ambulance service with the location of mishap. The entire modules are can run with the help of solar energy with battery power storage system (BESS).*
Keywords: GSM, GPS, Vibration sensor, accident, latitude and longitude, location.

I. INTRODUCTION

The usage of vehicle mobiles has boosted linearly over the last years, which boosted within the hazard of human existence. That is due to the fact that hence of the insufficient emergency facilities. In this paper, we are utilizing a vibration sensor which assists in making improvements to the emergency drawback process of the crash approaches. This system identifies the crash occasion and the collaborated of the crash are messaged to the rescue group. The Crash is discovered with the support of the Ultrasonic Sensor and Vibration Sensing Unit. The attitude wherein the vehicle has rolled off is recommended by means of a message. This utility helps in presenting possible provider to the bad emergency trouble assists in. The perform of the task is to find the auto where it is and also find the vehicle by the use of sending a message utilizing a procedure which is placed inside of automobile method most of the moments we may not have the potential to seek out crash discipline because we do not recognize the place crash will occur.

With a view to give healing for broken members, firstly we require recognizing the place the crash happened via place tracking and also sending a message to your related one or to the emergency drawback solutions. So in this job, we are making use of the average microcontroller for low-priced as well as moreover for handy working out.

Here we made use of developing programs for some distance better accuracy and GPS as well as GSM accessories which assists to map the vehicle wherever in the sector. The distinctive discipline of the car is distributed out to our far-flung gadgets (cell phones) utilizing GSM modem. We're within the procedure of solving this problem by suggesting a reliable provider and to cut down the loss of lives so long as viable. In our inspiration, the layout of the process guides us to seek out crashes in tremendously much less time and in addition move the basic understanding to the emergency remedy center within just a few secs overlaying the geographical works with, the moment and the perspective the place the vehicle had met with a mishap. This sharp message is shipped to the rescue staff (rescue) and the household inside the temporary length. This real-time application saves numerous priceless lives. The message is sent with the GSM element and the area of the basic thought is to center the auto method through obtaining the are living placement of the automobile via GPS as well as ship out the details through GSM aspect by the use of SMS service with an introduced attribute of GPRS transmission to the monitoring core through utilization of net [M. Al-Rousan, A. R. AI-Ali as well as K. Darwish et al, 2004] making use of a microcontroller, this project has absolutely been designed. It made use of EEPROM to hold the cell numbers. The crash is learned with the aid of the GPS element. The accident can also be identified precisely with the support of each Micro electro-mechanical process sensing unit and in addition vibration sensor. The perspective of the give up of the automobiles and truck can likewise be understood by way of the message through the resonance sensor sensing unit.

II. RELATED STUDY

Presently specifications, we can't find the place the mishap has occurred as good as a result no important points pertaining to it, inflicting the death of a character. The research work is taking place for the monitoring of the car also in dark clumsy places the place there's no community for getting the alerts. In literary works, a number of procedures to furnish protection as good as safety through monitoring the lorry's actual time special positioning and in addition info utilizing exclusive technologies has

been proposed. An exceptional survey of utilizing GPS, GSM and GIS has certainly been given in [IoanLita, Ion BogdanCioc, Daniel AlexandruVisan et alia, 2006] and in addition [Mrs.

Ramya Kulandaivel, P.Ponmalar, B.Geetha, G.Saranya et alia, 2012] the general mechanism is to provide the are living geographical placement of an auto utilizing GPS receiver and send this information to GSM facility by way of configurable application, that is all accomplished by way of the monitoring facility which is functioning as a manipulate unit that's hooked up not handiest by way of an optical wire however likewise linked wirelessly with TCP/IP protocols. The monitoring center disperses the information to the patron in a reasonable layout as well because it additionally continues the traveling records as well as presents the genuine time know-how regarding automobile on digital map with GIS method [IoanLita, Ion BogdanCioc, Daniel AlexandruVisan et al, 2006] one more procedure is that automobile terminal consists of a GPS receiver which draws out small print about environment with GPS satellites and also sends it via GSM community as good as to the nerve middle which reads.

III. EXISTING SYSTEM

The fast development of modern-day technological know-how as good as infrastructure has sincerely made our lives simpler. The arrival of technology has honestly moreover boosted the website traffic threats as well because the avenue accidents arise often which factors giant lack of lifestyles and also property when you consider that of the inadequate emergency centers. Our job wills most likely present and most advantageous method for this withdraw. An accelerometer may also be utilized in a car and truck alarm software to make certain that unsafe riding can be discovered. It may be utilized as a collision or rollover detector of the lorry for the period of and in addition after a crash. With signals from an accelerometer, a severe accident will also be mentioned. In step with this job when an automobile consult with an accident instantly, Resonance sensor will certainly find the sign or if an auto surrender, and also Micro electro-mechanical method (MEMS) sensing unit will undoubtedly spot the signal and sends it to AT89S52 controller. In the present process, we are making use of only GSM factor for interaction perform, yet there is no awareness of Accident precise field. There's no IoT innovation in the current system.

IV. PROPOSED SYSTEM

We propose a shrewd automobile procedure for mishap avoidance and making the sector much better as good as a refuge to reside. Convenient IR sensor is safe for finding human or animals as good as this procedure certainly can preserve lots of lives. Pre-collision detection process must be prepared with a mix of specific sensors. Discovering people or pets including challenges will, without doubt, supply us a way better carrier to shrink the dying of human in street crash. Have an effect on of the endorsed provider: presently criteria, we are not able to spot where the mishap has actually taken location as good as for that reason no info concerning it, main to the fatality of an individual. The

study is trained to work is taking the situation for monitoring the environment of the auto even in darkish clumsy areas where there's no community for obtaining the signals. On this job GPS is used for tracking the location of the auto, GSM is utilized for sending the message. For that reason, with this job utility, we are able to in finding the role of the automobile where the accident has happened to make sure that we are able to furnish the first aid as early as possible. This venture provides lorry crash discovery and sharp procedure with SMS to the man or woman defined cellular numbers.
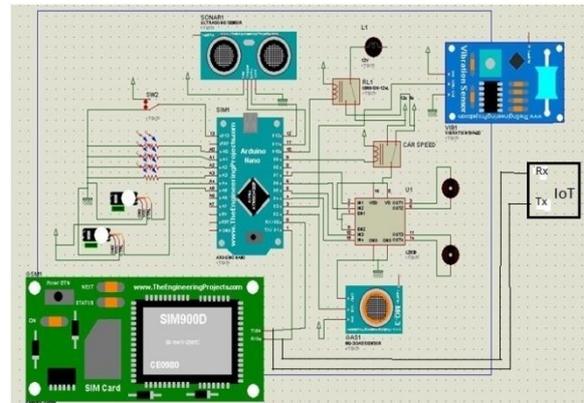

Fig.4.1. Schematic diagram of a proposed system

When the system is turned on, LED will certainly get on suggesting that power is provided to the circuit. When the IR sensors that we are making use of in our task sense any kind of barrier, they send out disrupt to a microcontroller. The GPS gets the area of the vehicle that met a crash and offers the information back. These details will be sent out to a mobile number through a message. This message will certainly be obtained utilizing GSM modem existing in the circuit. The message will certainly give the information of longitude and also latitude worth. Making use of these worth the placement of the vehicle can be estimated.

GPS LOCATION:

The Global Positioning System is a room based worldwide navigation satellite system that supplies reliable location (crash area) and also times anywhere in the world. The GPS satellites act as a referral factor from which receivers on the ground identify their setting. The essential navigating concept is based on the dimension of pseudo ranges in between the user as well as 4 satellites.

Fig.4.2. GPS module

ULTRASONIC SENSOR:

The Ultrasonic Sensing unit sends a high-frequency audio pulse and after that times how much time it considers the echo of the sound to mirror back. The sensor has 2 openings on its front. One opening up transmits ultrasonic waves, (like a little audio speaker), the other receives them, (like a little microphone).

Fig.4.3. Ultrasonic Sensor

ALCOHOL SENSOR:

The MQ-3 alcohol gas sensing unit includes overall 6-pins including A, H, B, and the various other three pins are A, H, Bout of the overall 6-pins we utilize just 4 pins. The two pins A, H are made use of for the home heating purpose and also the various other two pins are made use of for the ground and power. There is a heating unit inside the sensor, which is made up of aluminum oxide, tin dioxide. It has warmth coils to produce heat, and also hence it is used as a heat sensor. The below diagram shows the pin representation and the arrangement of the MQ-3 alcohol sensor.

Fig.4.4. Alcohol Sensor

LDR SENSOR:

A gentle elegant resistor works on the principle of photoconductivity. Picture conductivity is an optical phenomenon wherein the conductivity of the substance is elevated when light is absorbed with the aid of the fabric. The outcome of this method is more and more present starts flowing via the device when the circuit is closed and

accordingly it's mentioned that the resistance of the gadget has been lowered. That is the most original working principle of LDR.
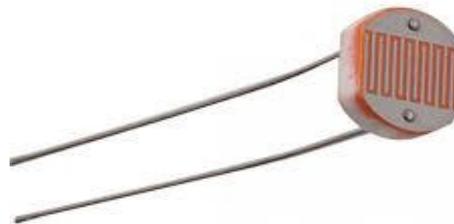
Fig.4.5. LDR model

VIBRATION SENSOR:

The module does not vibrate, vibrate switch is closed conduction state, the output low, the green indicator gentle comes ON. Vibration state, vibration switch instantly disconnect the output excessive, the golf green gentle just isn't on, the output is straightly related to the microcontroller to discover high and low, thereby detecting the vibration environment, play an alarming position.
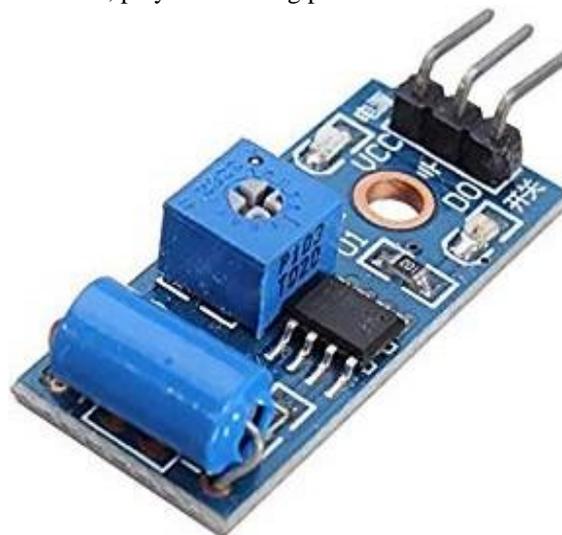
Fig.4.6. Vibration Sensor

SOLAR TRACKER:

Trackers straight photovoltaic panels or components toward the sun. These tools alter their orientation throughout the day to adhere to the sun's path to make the most of energy capture. In photovoltaic or PV systems, trackers aid lessen the angle of incidence (the angle that a beam makes with a line vertical to the surface) between the inbound light and the panel, which raises the amount of power the installation creates. Focused solar photovoltaics and focused solar thermal have optics that straight accept sunshine, so solar trackers need to be angled appropriately to accumulate energy.

Fig.4.7. Solar dual direction operation

The Arduino Nano controller is used to control all the sensor modules. A dual-axis tracking prototype is developed to capture the maximum sun rays by tracking the movement of the sun in four different directions. The car will move only when the person wears the seat belt and doesn't sip ant alcohol. For this, we have a seat belt and alcohol sensors. The ultrasonic sensor is used to measure the distance if any obstacle comes close to the vehicle and car will turn either left or right automatically. At the time if the vehicle goes with over speed then automatically the headlights of the vehicle goes dim.
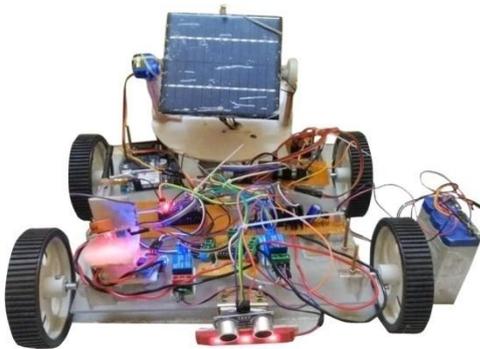

Fig.4.8. Prototype model

If the vehicle goes in normal speed then headlights of the vehicle are blown brighter, this operation can be done by Relays and switches. If the vehicle met with any accident vibration sensor will sense it, an alert SMS will be sent to people like friends, ambulance, Police through GSM module. By using ESP-12 Wi-Fi module, and GPS module the whole information about the vehicle means its speed, condition all are updated in the Android Application. Motor drivers are used to driving the motors with the same voltage.
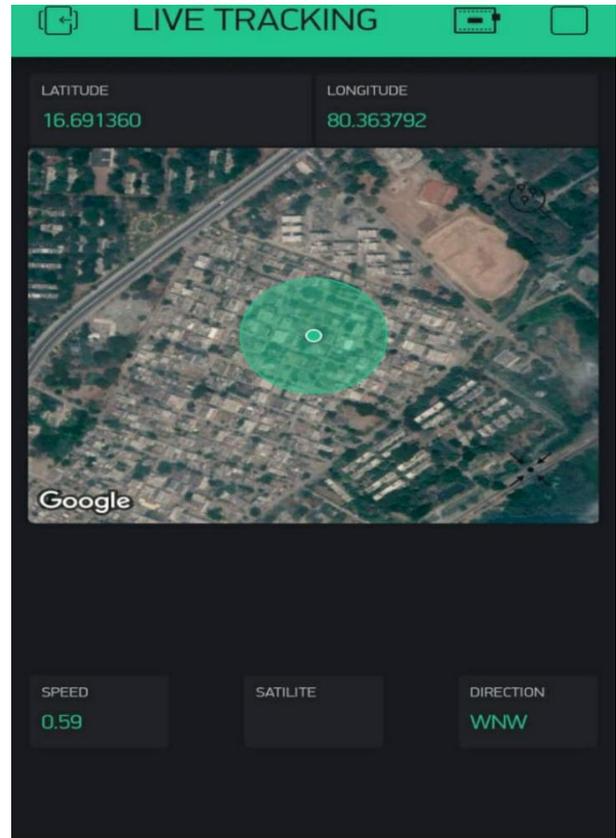

Fig.4.9. Final GPS output

The listed below number shows that at the point when accident struck the car Vibration Sensing unit, which finds the accident and also subsequently sends out the signals to Arduino. At this point the Arduino takes control and also begins accumulating the collaborates gotten from the controller which are later sent to the Central Emergency Situation Monitoring Terminal by utilizing the GSM Component. After that, the alert message will be sent on signed up mobile number through GSM.
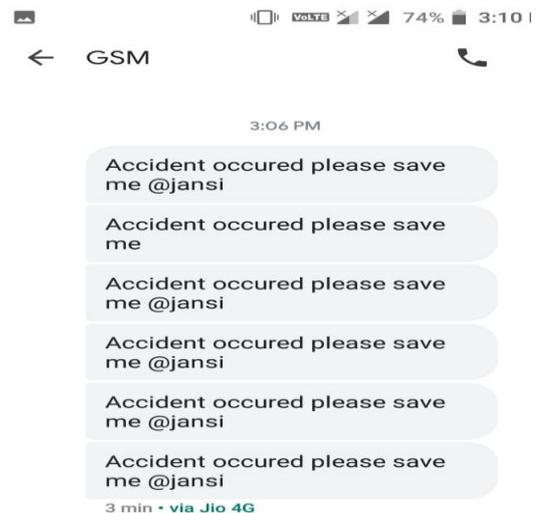

Fig.4.10. SMS from the GSM

V. CONCLUSION

The proposed process is cantered to furnish the knowledge concerning the accident occur with the place of the crash, prevents the under the influence of alcohol & power accident. I conclude that my theory used to be proper, that the angle of the photovoltaic panel coping with immediately on the sunlight made the solar power cargo the fastest. The attitude of the sunlight panel shall be

readjusted with admire to the activity of the solar. The auto does not relocate up until the chauffeur wears the seat-belt and likewise would not devour any alcohol. If the chauffeur goes rapid throughout night time the pinnacle lights of the automobile will immediately cut down as good as getting into typical circumstance if he enters common speed. If some other auto comes closer to our auto instantly an alert message will undoubtedly be given to the driver and progressively the velocity of the lorry will definitely be lowered.

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