Automatic Messaging System for Vehicle Tracking and Accident Detection

[1]Sumeet Kumar Naik [2]Debasish RanSingh [3]Pratyush Ranjan Mohapatra
Gandhi Institute for Technology, Bhubaneswar

***Abstract*— This paper facilitates real time pursuit of an automobile and seeks to minimize the possibility of deaths by delay in the arrival of aid by alerting the concerned people about the mishap of the vehicle. According to a government survey, drowsiness and drunk driving constitute to 22 and 33 percent of accidents respectively in India. The number of lives lost can be diminished if the assistance can be procured at the earliest. To develop such a system which can notify the concerned people about the mishap, GPS module, GSM module, accelerometer is interfaced with Arduino uno which acts as the controller. The accelerometer detects the accident by a change in preset value of the vehicle orientation and sends the location through GPS module to registered sim card via GSM module without any indulgence of the driver or passengers. The planned system aims to cut back deaths in road accidents by quite nine p.c.**

Keywords*— *Accelerometer, automatic emergency messaging system, Accident detection, abrupt change in threshold value detector, Arduino, GSM Module, GPS Module

I. INTRODUCTION

Veh icles accident may be a terribly huge downside in Asian nation and different countries too. Most of the deaths within the world area unit because of road accidents. Asian nation faces the very best death rate within the world consistent with the govt road transport survey [1], the quantitative relation of road accidents in 2018 is 4.61 lakhs within which variety of deaths is 1.47 lakhs i.e., 402 folks dies per day in Asian nation.

Reasons for road accidents square measure speed driving, drink and drive, not following rule. in keeping with some survey the most reason for deaths within the road accidents is delay in providing emergency services. If the delay are often reduced the person may get saved. For Associate in Nursing accident victim it's terribly tough to alert the police room or the relations concerning the accidents. The projected system is employed to scale back the time delay between the accident and providing emergency services. The vehicle pursuit and accident detection device are often put in in any vehicle. Whenever a vehicle is taken or associate accident happened to the vehicle the coordinates is taken through international positioning system (GPS) module and is regenerate into Google map link through the formula within the microcontroller. The formula is preinstalled within the microcontroller.

In the event of associate accident, the traveller should receive facilitate promptly and also the folks related to the person should be notified immediately[2]. The paper proposes a system wherever label sensors mounted on the vehicle will observe a crash and signal the small controller that successively passes the information containing the coordinate location of the crash beside the identification details to the cloud server.

The google map link is distributed through International System of Units for mobile communication GSM module to a predefined mobile sort of members of the family and near police headquarters. The accident is detected through measuring device and also the price is compared with the brink price planned within the formula. The friend will get the exact location of the vehicle by clicking on the google map link provided among the SMS.

II. MOTIVATION

Road accidents contribute to majority of deaths in India. Most of the lives may be saved if they get medical help quickly in time. The project is geared toward reducing the quantity of deaths thanks to delay in arrival of help in road accidents.

III. PROBLEM STATEMENT

Va rious enquiry reports of road accidents were studied and it had been clear that the key reason for road accident death was the delay in providing facilitate to the accident victims. The measuring system based mostly transportation planned would inform the police room or accident victim's members of the family concerning the accident instantly, in order that facilitate to the livid in road accident may be delivered as presently as attainable. The medical emergency care unit would dispatch to the accident location with none delay, thereby the victim's survival possibilities can be increased.

IV. RELATED WORKS

The GPS and GSM modules square measure used that square measure wont to track the e xact location of the vehicle that's missing. this technique is in a full of life mode in each the conditions either the vehicle is in its on or off condition. And if any interruption is occurred in a full of life mode then it's detected by the IR detector and when sensing directly it'll send the google map link which can use to hunt out the exact location of the vehicle to the lover of the accidental victim. When obtaining the message owner of that vehicle can replies back and so the speed of the engine motor can decrease and moderately switches off the vehicle and doors square measure attending to be barred [3].

Veh icle to vehicle communication may be a highly regarded space of analysis within the transportation field system. Most of the systems are handling this accident detection [4]. At this time varied range of systems are supported GPS and CCTV accident detections. Accidents is detected on the premise of pressure device or frequency. Also, it will discover the accidents by the video-based detectors. Accidents will discover by the GPS module and speed etc. are liabilities to possess incorrect alarm and conjointly not thus fruitful.

GPS and CCTV based mostly accidents awareness system that encircle GSM to send latitude and line of longitude values however by this values user might not be ready to perceive the GPS message thus these results don't seem to be of any use for the loved one of accidental victim [5]. Most of the time the accidents square measure detected by the "Radio Frequency " based mostly detectors that square measure restricted to a selected space, suppose if it'll leave of vary then this method cannot notice the vehicle [6]. and also the video-based detection may be a terribly difficult technique [7].

Similarly, in [8] author urged that speed-based detectors appear to grant incorrect alert once some disturbances occurred. So, there's a desire to grow a system with less incorrect alerts and provides out exact location of the vehicle that can also be comprehendible to the loved one simply and therefore the vehicle following techniques uses GPS system through a several supplication.

Through several application GPS modules area unit used for vehicle chase techniques and everyone these techniques are unit terribly required for track the vehicles and their committee also can monitor the vehicle often [9].

Number of the way area unit obtainable for following a vehicle. Massive scale firms use net server for following a vehicle and small-scale firms uses differing types of mobile applications. Basically the golem applications unit developed for locating location distance and shrewd time to realize at a specific destination [10].

It is simple to mention that the exact location of the vehicle will be taken from GPS however much it's not possible. In spite of getting a complicated technology it's too troublesome to get the proper coordinate all of the time. Mistreatment Kalman filter it's simple to induce actual line of longitude and latitude values of the vehicle [11]. Everyone is aware of that there are a unit many ways for following the exact location of the vehicle that had met associate in nursing accident. Once accident happens, it's terribly troublesome for the victim to send word the relations, hospitals or police. During this state of affairs associate in nursing alert message will be sent to the predefined range within the system[12].

In [13], accident detection mistreatment smart-phone is projected. However, if accident is detected mistreatment mobile, then there's heaps of filters utilized in smart-phone to avoid false alarms. Therefore, detection risk is lower for tiny accidents like strike collision.

In [14], the thought of the system is already bestowed by the authors. In the projected system, multiple unhearable sensors are used for accident detection. an ultrasonic sensing element is employed to live the space.

In [15], system permits inter-c ity transport firms to trace their vehicles in period and provides security from armed robbery and accident occurrences.

Conventional transport sensing element systems for accident detection, like (ACDS) system and discussed in [16] Remote vehicle Accident Detection and revealing System apprize emergency responders straightaway by utilizing in-vehicle sensors, like accelerometers and airbag readying monitors to observe automotive accidents.

V. Implementation & Working

A. *Block Diagram*

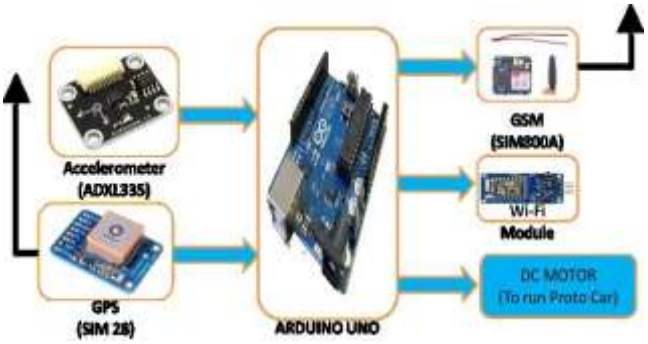

Fig. 1 : AMS Based Block Diagram

B. *Working*

The flow chart of the AMS based mostly System is given within the Fig. 2. Once the vehicle detects abrupt modification within the threshold values with the assistance of measuring device detector, that set the flag little bit of Arduino UNO as before long as accident is detected. Set the effective sensitive value for measuring instrument detector, throughout that accident or crash is detected. Once Arduino detects the accident or set bit through measuring instrument detector, Arduino activates the GSM module that has a manually saved signal of friend of accident victim, sends a pre-stored SMS to that selection.

Simultaneously, it further offers the message to the many friends that accident had occurred. This technique is known as automatic emergency message system.

This system is intended to tell regarding associate in nursing accident or crash that had occurred to the members of the family of the move persons. AMS system uses a electricity device which could realize the abrupt vibration once associate in nursing accident or crash had occurred. This sends a symbol to microcontroller. A GSM equipment is interfaced with the Arduino unit. The GSM equipment sends associate in nursing SMS to the predefined mobile variety and informs regarding the accident.

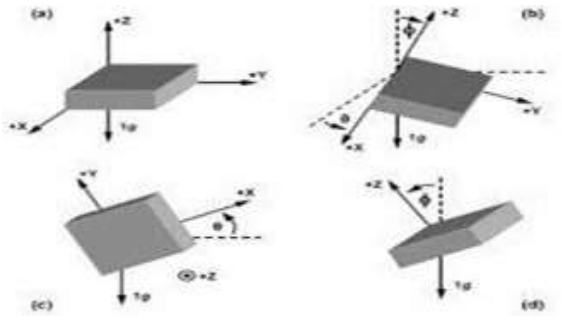

Fig. 2: Axis of Rotation of Accelerometer [4]

AMS is made around the ATMEGA16 microcontroller based mostly Arduino. This Arduino provides all the practicality of the SMS alert system. It conjointly takes care of filtering of the signals at the inputs. This point may be varied by adopting chump change within the ASCII text file. The distinctiveness of the AMS system is not solely alerting the neighbours by its siren. However, conjointly it sends a caution SMS to mobile numbers. This numbers may be modified by programming in Arduino.

C. Flow Chart

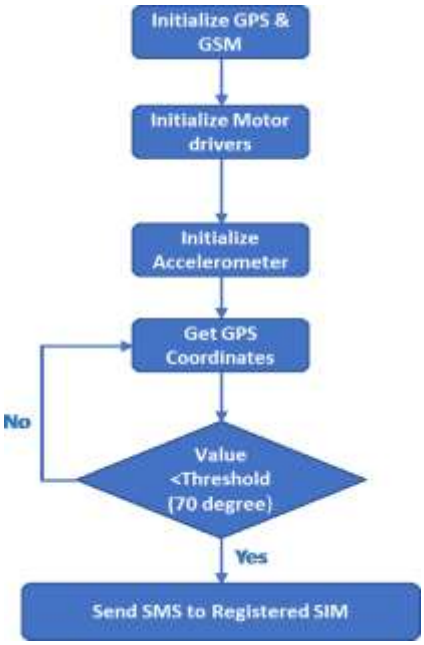

Fig. 3: Flow Chart of AMS based System

D. Tables

TABLE I. CONMP ARISION OF SENSOR VALUE WITH THE THRESHOLD VALUE

S. No.	*Threshold Value of Accelerometer*	*Accident Severity*	*Message Send*
1	x>80	No Accident	NO
2	70<x<80	Mild Accident	NO
3	x<70	Severe Accident	YES

E. System Set-up Prototype

Fig. 4: AMS for Vehicle tracking and Accident Detection

VI. RESULTS

The device was tested in rural areas and located that things of the vehicle was e xpected effectively in most of the cases. However, the e xact location link shown at intervals the message interfaces.

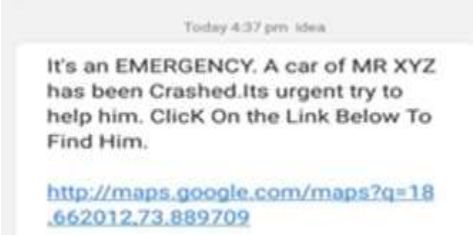

Fig. 4: Message interface of receiver section

Fig. 5: Serial monitor of Arduino for accelerometer value and GPS

VII. CONCLUSION

AMS system will play a significant role within the field of road accidents. By victimization automatic messaging system, it facilitates to the separated person in road accidents as quick as possible. Thereby it increases the victim's survival possibilities. If the vehicle company's tie-up with AMS system, the transmission may be used efficiently within the vehicle. For recent vehicle, there need to be Associate in nursing option to setup the AMS system in it. The deaths and additionally the severe conditions due to accidents the GSM technologies square measure used where the immediate action would be taken by the automobile / police service that might cut back the severity. In future, A Dashboard are going to be created to store all the accidents knowledge (drivers driving pattern) which can update to the friend, main road Hospital (rescue team) and Government Agencies to induce details of accidents.

The AMS system will browse the OBD (On-Board Diagnostic) information which is able to facilitate

automaker to sight any flaw in their style and conjointly helps the insurance firms to search out the fraud cases of claim.

REFERENCES

[1] Government of India, Ministry of Road Transport and Highways, Lok Sabha Unstarred Question No. 374 Answered on 19-07-2018

[2] F. B. Basheer, J. J. Alias, C. M. Favas, V. Navas, N. K. Farhan and C.V. Raghu, "Design of accident detection and alert system for motorcycles," 2013 IEEE Global Humanitarian Technology Conference: South Asia Satellite (GHTC-SAS), Trivandrum, 2013, pp. 85-89.

[3] R. Ramani, S.Valarmathy, Dr. N Suthanthira, S.Selavaraju, M.Thiruppathi, R.Thagam, " Vehicle Tracking and Locking Based GSM and GPS", Issue Date: Sept 2013)

[4] An Ericsson White Paper," Communication and Information Services for National Security and Public Safety", Ericsson Microwave System AB.I. S. Jacobs and C. P. Bean, " Fine particles, thin films and exchange anisotropy," in Magnetism, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271–350

[5] GONG xiaoyan, TANG shuming, WANG feiyue, "Traffic Incident Detection Algorithm Based on Non-parameter Regression" IEEE 2002.

[6] Li Chuanzhia, Hu Rufua, Hang Wenb, He Jieb and Tao Xianglib, " Study on the Method of Freeway Incident Detection Using Wireless Positioning Terminal" ICICTA on 20-22 Oct. 2008.

[7] Rajesh Kannan Megalingam. Ramesh Nammily Nair, Sai Manoj Prakhya "Wireless Vehicular Accident Detection and Reporting System" ICMET on 10-12 Sept. 2010 M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.

[8] M. B. I. Reaz, Jubayer Jalil, Md. Syedul Amin, " Accident Detection and Reporting System using GPS, GPRS and GSM Technology" ICIEV on 18-19 May 2012.

[9] J.S Bhatia and Pankaj Verma, " Design and Development of GPS-GSM based tracking system with Google map-based monitoring", IJCSEA, Vol.3, Issue. 3, pp. 3340, 2013.

[10] SeokJu Lee, Girma Tewolde and Jaerock Kwon: "Design and Implementation Vehicle Tracking System using GPS & GSM/GPRS Technology and Smartphone Application", IEEE, pp. 353-358, 2014

[11] " Cellular networks for massive IoT," Ericsson White P aper, Jan 2016

[12] W. Chris Veness, " Calculate distance and bearing between two Latitude/Longitude points haversine formula in JavaScript", 2016

[13] J. White, C. Thompson, H. Turner, B. Dougherty, and D. C. Schmidt, "Wreckwatch: Automatic traffic accident detection and notification with smartphones," Mobile Networks and Applications, vol. 16, no. 3, pp. 285–303, 2011

[14] U. Khalil, T. Javid, and A. Nasir, " Automatic road accident detection techniques: A brief survey," in International Symposium on WirelessSystems and Networks (ISWSN). IEEE, 2017, pp. 1–6.

[15] P. B. Fleischer, A. Y. Nelson, R. A. Sowah and A. Bremang, "Design and development of GPS/GSM based vehicle tracking and alert system for commercial inter-city buses," 2012 IEEE 4th International Conference on Adaptive Science & Technology (ICAST), Kumasi, 2012, pp. 1-6.

[16] R. Kannan , R. Nammily, S. Manoj , A. Vishwa, " Wireless Vehicular Accident Detection and Reporting System", International Conference on Mechanical and Electrical Technology (ICMET 2010).