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Accident Prevention for Two Wheeler by Using Emerging Technologies

Swati Khokale[1], Priyanka Ahire[2], Prachi Shinkar[3], Yogita Gaikwad[4], Namrata Pawar[5]
Department of Information Technology
SITRC, Nasik, India

Abstract:- The importance of accident prevention is more Than after accident providing facilities to user. We observed that more accident happen because of potholes, in accident spots (danger zones) or crossing signal while fast driving, and many more reasons. So we are developing a prototype which can be prevent user from accident common circumstances, try to provide all the prevention in one compact system like potholes detection, danger (Accident) zone detection, GPS Tracker. Our system consists of controller unit, server unit, and display unit. Controller unit consist of Arduino, ultrasonic sensor, GPS Module, Accelerometer. Display unit consist of LCD and Buzzers. Server unit consist of web application, cloud and database. In this we are trying to detect potholes using ultrasonic sensor, checks danger zone using sorted data store in database. GPS Module connected with server, it always checks danger zone as well as using GPS we can track our vehicle. If pothole is detected then alert to user using buzzer. We performing Association Rule Mining, data classification using Éclat Algorithm and Clustering using K-means clustering Algorithm and perform data mining on accident data and divide it into different levels. Also generate a data report for Transport ministry.

Keywords:- *Arduino, Accelerometer, Buzzers, Data Mining, Éclat Algorithm, GPS Module, Load Cell, LCD, K-Means Clustering, Server Unit, Ultrasonic Sensor.*

I. INTRODUCTION

India is developing country, the advancement of Transport Systems, countries are identified on the basis of their "Roads". Now a day's road accidents are major issue in most of the counties in India as well, one of the reasons of road accident is due to potholes, irregularities of the road surface and high speed of driving. India has difficult road and traffic conditions.
Roads normally have many humps because of control the vehicle speed, but also accident are happens because of fast driving and unseen small hump or potholes from distance.

There are many issues we face while driving like Traffic jam, safety issues, rash driving, lawlessness and increasing load of vehicular traffic are decreasing the quality of road. Cause need to saw hump or potholes from some distance then we can slow our speed of vehicle. Mostly in rainy season we can't possible to saw road potholes and humps. As well as some most frequent accident happen these spots, we can take some precautions while travelling from that area, In order to eliminate the potholes on the road, and several researches have been done which is on application based.

II. LITERATURE

Priyanka C, Priya Darshini C, Vinayak G Shavi, Sarvar Begum [1] the main goal of this paper is to build safety system for two wheeler accident and drunk & cases this system which is integrated with the smart helmet and intelligent bike. The pressure sensor and accelerometer checks if the rider is wearing helmet or not. Alcohol sensors detect the alcoholic content in the rider's breath. If rider not wearing a helmet or it found an alcohol in the breath then bike automatically off. The GSM module integrated in helmet and when accident is happens it detects by using sensor hit on ground and motion will detect. The occurrence of an accident and sends information of the location of accident to the family members of the rider and the emergency contact numbers. This system includes Arduino UNO as a microcontroller. Viriyasaddha Panindriya, Jimmy Ashari, Christy lessandra, Monica Hidajat [2] The objective of this paper is to developing an android based application to monitor the safe driving of a user while traveling. Using these application users has given some indication so it can monitor their trip location and status therefore increasing the awareness about location. User can also find crime spots that will be passed while doing trips and share information to other users about crime spots. By using this application user can conclude that place is danger or not through the information of vulnerability point, comments from other user By Using application user can exchange their report, comment, voting at vulnerable point. On Google map notation like inner circle to view its current location while user travelling by using trip feature and automatically alert the user if the user is unsafe, can also provide information to his/her relatives when he/she does not Safe through the panic feature. The conclusions of this development are the application is expected to increase community awareness and to reduce the crime. Baye Atnafu ,Gagandeep Kau [3]in this paper ,different data mining technique can applied on road traffic accident data .To analyze the road accident data it can classified in different classes like grievous, minor, non injury of accident . In paper Random tree, J48, and Naive Bayes algorithms are selected that were show better performance in the previous studies and applied on data set to analyze road accident data. This entire algorithm applied on data

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the result of this algorithm compared then n prediction model is done and proves which algorithm to be best. It used classification algorithm for construct a different classes. Random Tree: - A random tree is a group of decision trees, which means that random tree works just like the decision tree operator except, for each split, only a random subset of decision tree is accessible.J48:-it is a tool used for testing a data which decide a target value for new test data. Naive Bayesian:-In this paper, it is used for to classify data into different classes. Association Rule: - which is used for to form an association rule on given dataset.

Prakhar Bhatt , Saransh Gupta , Prateek Singh , Preeti Dhiman[4] the model mentioned in the paper can help prevent many cases of deaths due to accidents. It uses a combination of embedded systems and the open source, highly popular android technology which is a separate software module to the hardware. Accelerometer used to record the changes in vertical axis. The hardware uses an accelerometer is for only input data to the entire system and provides a graphical and/or data transfer output. This data is sent to the android device via the Bluetooth module .Accident data is sent as a signal to the GSM and the GPS Modules which are embedded within the system and are programmed to contact the stored mobile numbers of the user's closest loved ones who help him in case of any unfortunate event. In any such happening, the GSM module sends a preferred text along with the current latitude and longitude of the vehicle. This road data is displayed on the Google map interface of the user. Stepheena Joseph, Mr.K.Edison Prabhu [5] road condition is dangerous because of rains and flood the potholes is occurred so it is unsafe for driver. The poor condition of a road and its surroundings are dangerous for human physical health. Uncertainty of roads and some sudden situation these cause Accidents. These are problems found by them so they are making a prototype, in this system they are use ARM Processor, Ultrasonic sensor HC-SR04, GPS Tracker, GSM/GPRS module. Ultrasonic Sensor detects potholes as well as Hump detection and store information on server time to time and reduce the speed of vehicle if needed. The ultrasonic sensor is used to detect the size and depth of pothole on road can GPS used for location tracking of pothole. All continuous information is stored in the database. Ancy John [6]the paper has to developed by using emerging technology he used fro prevent a user from accident. system uses a RF transmitter and RF Receiver. The objective of this system is to detect speed of vehicle by receiving a RF transmitter signal.

When vehicle in a RF transmitter zone it detect an alcohol by using sensor and eye sensor for detecting a driver is sleep or not. Smoke sensor also used for detect a smoke in car. In vehicle piezoelectric sensor also used to detect a accident condition if it occurred then is send to mobile application by using GPS.GPS give a trigger signal then it automatically connected to GPS satellite and give alert to cell phone about accident condition to his/her relatives.GPS system is already in our cell phone and by using a GSM module used for sending a text, image, video to relatives if accident is happen. In this system speed of vehicle is automatically control at some level specially near school.Madhumathy P, Saurabh Singh, Shivam Shukla, Unni Krishnan [7]now a today many accident are happened because of potholes for that In this paper provide solution related to the potholes and humps. Main concept is that provide cost effective solution and alert to the driver about the potholes and humps .there is three unit use first is sensing sub unit, second is server subunit and third user sub unit. The system uses a hardware ultrasonic sensor for detection of potholes and hump and all data will stored on database. a hardware module that provide alert to the drivers when the pothole detected. In the architecture of proposed system uses ARM processor LPC2148: ARM is 32 bit processor that uses RISC architecture it consumes less power, reduce heat and also low cost, GSM SIM 900A, LCD display JDH162A. When road are flooded with rain water then alert is sent from store information in the server.

Amrit Kaur[8] in this paper it will focus on road traffic accident. The lead cause of death and injury. Different data mining technique have been used to help traffic accident severity such as association, clustering, J48, Classification. Data Mining used for analyze huge amount of data and turn it into useful information and knowledge. In this paper data mining technique can used Association used for reveal the association relationship between objects.Clustering its name suggest that cluster of same object. It is a group of objects whose class are unknown.J48 is a version of an earlier algorithm. it is used for Decision trees to represent information, and offer a fast and powerful way to express (decision tree) in data.Classification is used to predict the different classes as per category.So different data mining technique an applied on traffic accident severity for find accuracy. it would be helpful for improving the efficiency and security service level of the road transportation system. shin, Min-Hyun Kim, and Seibum B.Choi [9]in this paper they found that ultrasonic sensor is highly used in every system most probably but sensor are used for near distance and distance measurement given ultrasonic sensor have some limitations like short detection range and vulnerabilities or disturbance in communication. This paper research on improving ultrasonic sensor range using SNR (signal to noise ratio) and increase ultrasonic sensor range. The proposed system used novel algorithm for ultrasonic distance sensor to increase the sampling rate of sensor. They are trying to increase sampling rate and SNR enable signal and targeted distance. This paper result shows that ultrasonic sensor by changing the software in sensor.Nilam Kumbhar, Dipali Mhetre,Amarina Mujawar, S.T.Khot [10] driving the vehicle on the road having bad condition is very dangerous to the driver. Due to rains, oil spills quality of the road decreases. Such hurdles may cause road accidents. In this paper solve this problem .In this system ultrasonic sensor is used to sense the pothole. Image of such location is captured using WEBCAM. The GPS system finds the position of pothole. All the data is saved in the database. This collected information of bad condition roads is helpful for recovery of the road. Aravinda B1, Chaitra Lakshmi

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C1, Deeksha,Ashutha K2 [11] the paper presents the solution on zone where accident is happens because of curve road. In curve road driver are not see the opposite side vehicle because of this problem every year many accident are happens. .so purpose of this paper is to prevent the user accident in curve road. Solution to this problem is to provide alert to driver about opposite side vehicle. The hardware used for this system is ultrasonic sensor put one side of road before curve and LED light put after the curve. When any vehicle comes to curve sensor sense the data and LED glow opposite side. LED work as ON/OFF so by alerting a user can slow down there vehicle. In given diagram when vehicle come then sensor sense the vehicle and alert to user light will glow .if vehicle not come sensor not glow. The purpose is to decrease accident in curve road. So ultrasonic sensor use to detect vehicle come from another side. B.V.K. Vijaya Kumar, Jinzhu Chen, Fan Bai,[12] in this paper paper different data mining technique is used to analyze road accidents. Road accident data analyst use data mining technique for identify which factor is responsible for accident. Accident is frequently happen at specific location the analyst of location can help to prevention of road accident. Association technique used to form a rule on data that used to identify a correlation between data or object. The group of accident location can be categorized by applying a k-means algorithm. Location can categorized into three form high, low, medium frequency based on categorized data it divide the accident location based on threshold values then used association rule. B.V.K. Sachin kumar,Durga Toshniwal [13] in this paper we provide Multi-lane Pothole Detection system to detect multilane potholes Crowd sourced is used for multiple vehicle purpose and find road incline angle using that data detect localize potholes on the multilane roads and compare this result to the single lane crowdsourcing.GPS is used for location tracking and accelerometer use for detection of the potholes and also bandwidth required for accurate detection of the potholes. In multilane pothole detection system Car Sims is used it is vehicle simulation kit that allow to simulate sensors and Support Vector Machine (SVM) is used for classify the region of potholes and identify the boundary of two classes of data and Filter multi-stage detection system is used to detect localize potholes and analyze tradeoff in the number of vehicle involved in the system and compare multilane result with the single lane detection. We can detect potholes with the 20 vehicles on single road and 100 vehicles per lane with 2m accuracy. Haw-Yun Shin, Fok-Leong [14] in this paper used the wireless sensor network which uses three modules: Bike device module the bike device module includes a ZigBee module with a unique identification address. Bike path establishment module Bicycle paths are equipped with two WSN devices that collect data and serve as a bridge between the bicycle devices and the cloud database, and cloud service these three modules were used to address issues related to cycling activities, including green power supply, activity and health records, and immediate safety issues. Each module designed in this study is individually these modules can be used to increase the speed of cycle & existing way .in this paper established a large scale module, such as in national forest parks, to enable park management to control the location and safety of ride easily.S.P. Bhumkar, V.V. Deotare, R.V.Babar [15] in this paper, car can make an intelligent and interactive to giving an alert to driver. The data can be given to police for further used by giving the data police can find what is the reason accident is happens on Google map. Fatigue is main factor occurred in most of the accident.

Main focus is to control speed of vehicle while to detect the symptoms of fatigue. The system uses hardware is eye blink, alcohol, gas sensor. All sensor check the data if any accident condition identified then automatically trap the driver. In this paper objective is to prevent the driver from accident and in Google map data is display so driver can see which place is safe for live. Alcohol sensor detects the alcohol in user breath if it detect then automatically vehicle will off. Eye blink sensor continuously monitor the eye blinks the it give buzzer to driver. Accident is detected all this sensor data show on pc through software for analyst. Analyst work on that data And find the reason of accident.Artis Mednis, Girts Strazdins, Reinholds Zviedris, Georgijs Kanonirs, Leo Selavo[16] these frameworks utilize accelerometers for information procurement. Short survey of pothole location calculations executed in such accelerometer-based frameworks. It also has the capacity to distinguish occasions (potholes for our situation) progressively. Accumulation of crude information for disconnected post-preparing is classified as an extra component. It should utilize a non specific Android OS based advanced cell with accelerometer sensors as the equipment/programming stage. Convenience to different stages is classified as an extra component. This paper depicts accelerometer information based pothole recognition calculations for sending on gadgets with restricted equipment/programming assets and their assessment on genuine information procured utilizing distinctive Android OS based advanced cells.

A. Equations Mathematical Model

The working of system depends on various parameters. Following set theory shows mathematical formulation used in proposed system:

Danger zone and potholes detection=Q ,P, φ, q0, qf.

Q = q0, q1, q2, q3, qf

q0 = Starting state/Initial state

qf = final state.

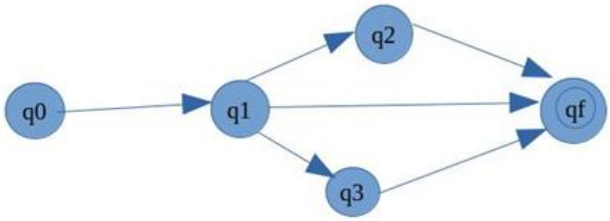

Fig 1: Mathematical Model

δ(q0, yes) = q1, q2, q3

δ (q1, yes) = q1, q3
δ(q2, yes) = qf

δ(q3, yes) = q2, q1

δ(qf, yes) = q0

where

q0=Starting state/Initial state

q1=Location tracking

q2=Potholes and humps detection

q3= Danger Zone

qf=Buzzer

III. CONCLUSION

In our proposed system we have to develop a prevention of accident for two wheeler by using emerging technologies. It helps to prevent a user from accident. In proposed system we have to detect Danger zone and potholes by using sensors and hardware such as GPS, ultrasonic sensor, Arduino, accelerometer, buzzer, LCD. Danger Zone is detected through GPS and web application. Automatically alert to the user using buzzer or LCD.Proposed system is help to prevent user from accident as well as in proposed system we have to detect an accident in case it happened. If accident is detect then it automatically message is to be delivered on registered number. In proposed system we perform a data mining process on an accident dataset. we perform a data mining by Appling k-mense and Eclate algorithm .k-means is used for generating a cluster and eclat is frequently which location accident are happened is to be find out.

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