RESEARCH ARTICLE   OPEN ACCESS

Road Accident Prediction and Alert System

Harshwardhan Gunjal , Om Hole, Abhijeet Atole, Rutuja Pawar
(UG Students,Information Technology, SVPM's College of Engineering Malegaon (bk), Baramati
Email: gunjalharshwardhan19@gmail.com, holeom619@gmail.com,
abhijeetatole2001@gmail.com,rutupawar2305@gmail.com)

--************************-------------------------------

Abstract:

A significant portion of fatalities from road accidents occur each day worldwide. Building automatic systems to identify traffic accidents and shortening the time between an accident happening and the deployment of first responders to the scene are two effective ways to lower the number of traffic fatalities. Recent strategies make use of the automatic accident detection and notification system built into the car. Although these methods are effective, they are costly, require complicated upkeep, and are not offered in all automobiles.

On the other hand, due to improvements in the processing speed and sensors used in smartphones, it has only recently become viable to utilise a smartphone to identify road accidents. The majority of smartphonebased accident detection systems use the vehicle's high speed to detect an accident. The solution that we suggested comprises two phases: the detection phase, which is used to find accidents. the phase of notification during which information is sent.

--************************-------------------------------

I. INTRODUCTION

A significant global public issue is traffic accidents. The second most common cause of death is car accidents. The biggest reason for the death of a person following an accident is the lack of availability of the resources. Therefore, response time is essential in events involving motor vehicle accidents for the prompt delivery of emergency medical services to accident victims and is anticipated to have an effect on mortality. Moreover, as each minute is passed while an injured crash victims do not receive emergency medical care can make a large difference in their survival rate, for example, Analysis shows that if we decrease just 1-minute in accident responses time that can increase chances of saving an individual's life up to six percent. The purpose of this proposed system is to use smartphones to detect vehicular accidents and to address these emerging problems and reduce casualties as much as possible by finding the nearest available casualties. Designing and implementing an automated system to report to emergency responders. The detection system will

help reduce her 4,444 deaths from vehicle accidents by reducing response time for emergency services.

In this work, we use Android smartphones to detect and report accidents. Send to the nearest available emergency responders. H. Hospital and police station Accurate location of casualties in an emergency. on rescuer side Accept location and medical data for nearby incidents Rescue them as soon as possible. Accident detection and rescue operations are time-sensitive activities. real time action is required. The system must be able to recognize and respond to situations real time. Real-time response should be considered when designing the architecture. The traffic volume per day is huge. Accident detection and rescue systems are essential per vehicle.

II. AIM &OBJECTIVE OF SYSTEM

The main purpose of our traffic accident prediction system is to analyze past accidents in the area. This will allow us to identify the most accident-prone areas and set up urgently needed assistance. Near Forecasts supported constraints such as weather, pollution, and road structures.

OBJECTIVE:

Machine learning algorithms can process a large number of classification parameters and retrieve useful patterns. It can efficiently handle large amounts of data and is scalable. In computer science and related fields, artificial neural networks are computational models that simulate the central nervous system (particularly the brain) of animals, allowing machines to learn and discriminate information like the human brain.

1. Prediction of traffic accidents based on traffic data
2. To show danger zone
3. To show speed limit alerts
4. Use Machine Learning to Improve Prediction Accuracy

III.   RELETED WORK DONE

Development of a micro-level collision prediction model using a machine learning approach to study pedestrians bicycle accident. Zone-wise traffic analysis was collected for each state (STAZ). Given this complexity Approaching all ensemble strategies gives a slightly better fit than his original DTR model. Executed Decision tree regression (DTR) modeling analysis highlighting the effects of different STAZ traffic and highways Characteristics of pedestrian and bicycle accident occurrence. A faster transition from the concept of a real-time accident prediction model to a practical, proactive traffic safety management system. flexibility, portability, Current technology lacks adaptability, timeliness, and robustness. Real-time (RTCPM) classification methods such as logistic regression were used. Over a three-year period, the study examined his RTA incidence in 81 cities. We use a negative binomial panel count data model with random parameters. This study did not investigate why the random parameter strategy could achieve such good results. According to the results of this study, employment rate and urbanization rate had a positive impact on accident rate. In the resulting model, red lights and speeding are affected by 2% and 14% respectively. Number of traffic accidents, traffic volume, lane width, and access point density are examples of qualitative and quantitative data. Use the multi-criteria method. The choice of objective function is based on the premise that it should be easy to measure and clear to decision makers. This study highlights that the model developed is only a basic model that provides a good starting point for further research. New road maintenance standards were introduced. The number of vehicles, lighting conditions and road features are observed. Focus on traffic accidents, also known as MVC (Motor Vehicle Collision). A lot of data is used, including three different levels of accident severity: minor, major, and fatal. Navie Byes and XG Boosting techniques are used.

IV.   PROPOSED SYSTEM

This section logically presents the mechanics of the proposed system structure. with each module building the overall system architecture. Or the proposed system called "Intelligent Accident Detection" consists of two phases of a detection phase to detect the occurrence of an accident, and a reporting phase to notify the nearest hospital or police station in case of emergency help. All smartphone-based incident detection and notification systems are open to false alarms. Added useful support functions to the suggestion system a system that increases the accuracy and reduces the probability of the detection process of false alarms. The proposed system presents a confirmation screen showing: In case of false alarms, as the user can see the accident the user can cancel the alarm and the notification will be canceled. if he can't quit accidents are then admitted. The proposed system allows intact people take images, locate them and send them to emergency responders for reporting incident.

The number of casualties due to traffic accidents is a history of global road safety crises. The most obvious reason for someone's death in the event of an accident, first aid facilities are not available. Delayed transmission of an accident report to an ambulance or ambulance hospital. Our System Proposal "Emergency Accident Reporting System" Assistance" helps overcome this problem, which consists of two phases of detection. A system architecture is a conceptual model that can define the structure and behavior of that system. This is the formal representation of the system. Depending

on the context, system architecture can be used to refer to either the model that describes the system or the methods used to build the system. Building a good system architecture helps with project analysis, especially in the early stages.

An overview of the model is shown below. Our model consists of traffic accident data forming a dataset after data preprocessing. Data preprocessing is one of the most important tasks in data mining. Handle missing value handling, attribute removal, and transform data into a structured format for analysis.

The resulting datasets are currently subjected to various data mining techniques. Clustering is performed on the specified dataset. The main purpose of performing clustering is to divide the data into different clusters or groups so that objects in one group are similar to each other and objects in other clusters are different. Several clustering algorithms are available.

Association rule mining is a very popular data mining technique that extracts interesting hidden relationships between various attributes in large data sets. Association rule mining produces a set of rules that define the underlying patterns in the dataset. Connectivity is indicated by the frequency of their co-occurrence in the dataset.
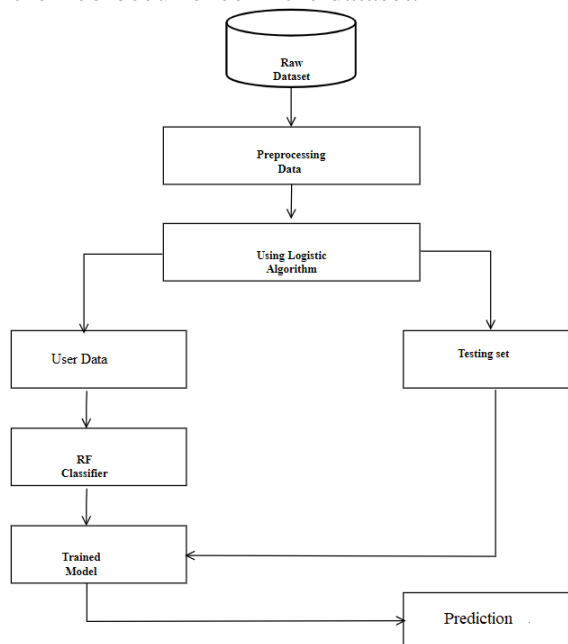
V. CONCLUSIONS

The system design methodology is a proposed automated system for detecting and reporting accidents. The architecture design considers volume, speed, diversity and accuracy of big data. An architecture and design methodology for an intelligent incident detection and notification system for emergency response is proposed. Inexpensive smartphone-based accident detection systems reduce the time between an accident occurring and first responders being dispatched to the scene of an accident, making them extremely useful in saving lives during an accident. Detection and notification systems are subject to false alarms. The proposed system adds helpful support features to the system to increase the accuracy of the detection process and reduce the chance of false alarms. The proposed system presents a confirmation screen giving the user the option to confirm the accident. So if a false positive occurs, the user can cancel the alarm and the notification will be cancelled. An uninjured person or bystander can take a picture, locate it, and send it to rescue workers to report the accident.

REFERENCES

[1] Z. Zhu, S. Chen, Y. Yang, A. Hu, and X. Zheng, "VISSIM simulation based expressway exit control modes research," Proc. Eng., vol. 137, pp. 738–746, Feb. 2016, doi: 10.1016/j.proeng.2016.01.311.

[2] M. Li, X. Chen, and W. Ni, "An extended generalized filter algorithm for urban expressway

traffic time estimation based on heterogeneous data," J. Intell. Transp. Syst., vol. 20, no. 5, pp. 474–484, Sep. 2016.

[3] Y. Feng, B. Hu, H. Hao, Y. Gao, Z. Li, and J. Tan, "Design of distributed cyber–physical systems for connected and automated vehicleswith implementing methodologies," IEEE Trans. Ind. Informat., vol. 14, no. 9, pp. 4200–4211, Sep. 2018.

[4] J. Yang, J. Zhou, D. Fan, and H. Lv, "Design of intelligent recognition system based on gait recognition technology in smart transportation," Multimedia Tools Appl., vol. 75, no. 24, pp. 17501– 17514, Dec. 2016.

[5] L.-W. Chen and Y.-F. Ho, "Centimeter-grade metropolitan positioning for lane-level intelligent transportation systems based on the Internet of vehicles," IEEE Trans. Ind. Informat., vol. 15, no. 3, pp. 1474–1485, Mar. 2019.

[6] S. Korjagin and P. Klachek, "Innovative development of intelli- gent transport systems based on biocybernetical vehicle control sys- tems," Transp. Res. Procedia, vol. 20, pp. 326–333, Jan. 2017, doi: 10.1016/j.trpro.2017.01.038.

[7] D. Su, Z. Guo, Z. Li, and Y. Zhou, "Operation risk model and monitoring-warning system of expressway tunnels," Transp. Res. Proce- dia, vol. 14, pp. 1315– 1324, Jun. 2016, doi: 10.1016/j.trpro.2016.05.204.

[8] L. Wang, Y. Li, and Z. Lin, "Design of intelligent power supply system for expressway tunnel," IOP Conf. Ser., Earth Environ. Sci., vol. 108, Jan. 2018, Art. no. 052062.

[9] J. Sun, Z. Li, and J. Sun, "Study on traffic characteristics for a typical expressway on-ramp bottleneck considering various merging behaviors," Phys. A, Stat. Mech. Appl., vol. 440, pp. 57–67, Dec. 2015.

[10] Y. Zhu, N. Gao, J. Wang, and C. Liu, "Study on traffic flow patterns iden- tification of single intersection intelligent signal control," Procedia Eng.,vol. 137, pp. 452–460, Feb. 2016, doi: 10.1016/j.proeng.2016.01.280.

[11] L. Wang, M. Abdel-Aty, Q. Shi, and J. Park, "Real-time crash prediction for expressway weaving segments," Transp. Res. C, Emerg. Technol., vol. 61, pp. 1–10, Dec. 2015.

[12] X. Xue, Y. Jia, and Y. Tang, "Expressway project cost estimation with a convolutional neural network model," IEEE Access, vol. 8,pp. 217847– 217866, 2020.

[13] X. Jia, W. Zhou, T. Lei, L. Jing, and Y. Shen, "Impact analysis of expressway construction on ecological carrying capacity in the three-river headwater region," J. Traffic Transp. Eng., vol. 7, no. 5, pp. 700–714, Oct. 2020.

[14] T. Chen, X. Shi, and Y. D. Wong, "Key feature selection and risk prediction for lane-changing behaviors based on vehicles' trajectorydata," Accident Anal. Prevention, vol. 129, pp. 156–169, Aug. 2019.

[15] J. Wang, T. Luo, and T. Fu, "Crash prediction based on traffic platoon characteristics using floating car trajectory data and the machine learning approach," Accident Anal. Prevention, vol. 133, Dec. 2019, Art. no. 105320.

[16] L. Wang, M. Abdel-Aty, J. Lee, and Q. Shi, "Analysis of real-time crash risk for expressway ramps using trafficgeometric, trip generation, and socio-demographic predictors," Accident Anal. Prevention, vol. 122,pp. 378–384, Jan. 2019.

[17] L. Zheng and T. Sayed, "A novel approach for real time crash prediction at signalized intersections," Transp. Res. C, Emerg. Technol., vol. 117, Aug. 2020, Art. no. 102683.

[18] Q. Cai, M. Abdel-Aty, J. Yuan, J. Lee, and Y. Wu, "Real-time crash prediction on expressways using deep generative models," Transp.Res. C, Emerg. Technol., vol. 117, Aug. 2020, Art. no. 102697.

[19] L. Yu, B. Du, X. Hu, L. Sun, L. Han, and W. Lv, "Deep spatiotemporal graph convolutional network for traffic accident prediction," Neurocomputing, vol. 423, pp. 135–147, Jan. 2021.

[20] J. Fang, D. Yan, J. Qiao, J. Xue, and H. Yu, "DADA: Driver attention prediction in driving accident scenarios," IEEE Trans. Intell. Transp. Syst., early access, Jan. 1, 2021, doi: 10.1109/TITS.2020.3044678