Safest Route Proposing and Driver Alert System

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Abstract- Traffic accidents are one of the major causes of sudden death. In the growing smart cities, safety and security are major key points that need to be considered. In this system, we propose a 'Safest Route And Driver Alert System' using android application which not only provides the safest route but also alerts the driver from unsafe zones. In light of growing safety concern, routes in the digital map are annotated with a safety index to extend its functionality from traditional navigation system to a safety advisory system. Analysis of road accidents is crucial, to find the pattern of accidents and analyze the available data using the data mining techniques. To visualize the information Google maps API can be used. This system will help and alert the drivers not only about the shortest path but also help to find the safest path. The effectiveness of this system will improve the driving safety and increase situational awareness on the road.

*Keywords — **API, Driver safety, Unsafe zones.***

I. INTRODUCTION

The high and rising toll of death, injury and material damage caused by accidents has become a matter of serious concern for professionals involved in transportation planning and project appraisal in developing countries. The systematic analysis of safety in highway investment appraisal has two fundamental aspects: (a) Estimation of the effects of different projects and design features on accident rates. (b) The specification of a decision criterion or procedure which will allow the effects estimated to be incorporated in project appraisal. Accidents can occur in a different way in a different situation, there is no guarantee in future that these accidents occurring stop for that so many factors are affected like road condition, lighting condition, whether condition weight of the car or truck, no. of people on the vehicle, the speed at the time of the accident.

II. OVERVIEW

Existing map applications is able to optimize the shortest route based on various attributes but largely ignorant of route safety. As the traffic and condition of the roads are unknown to many drivers when they are traveling through the unknown city and this may cause many troubles as well as accidents so as to prevent this from happening, the safe route should be suggested and security of the vehicles are preserved. This system will regenerate the map with the road information and will also provide map information in the route to enhance its performance and to get better results based on safety index.

III. PROBLEM DEFINITION

Traffic accidents are the major cause of sudden death, as drivers are unaware of unsafe zones in unknown places also they are unaware of safest route. In various navigation application like google maps, we can get the shortest route, as in these systems there is no concern about safety. As of nowadays there is increase in no of accidents and the various accidents caused due to unaware of road and the safety of that road while some may have concern about the condition of the road as they may be patients or some old ones traveling also the night condition also differ the most that too is of the concern, In modern map application there is no safety index or any kind of safety advisory system. As of this system will help and alert the drivers about the safest route from source to destination. As well as provide them with alternative routes and the various categories of the routes, to categorize and select the route the various preferences are taken care of and based on this preference the perfect route can be selected.

IV. RELATED WORK

1. According to the research paper "A review of road accident data analysis was using data mining techniques" written By Ms. Apeksha V. Sakhare, Ms.Prajakta S. Kasbe in the year 2017. In this paper, the main aim of this research was to investigate the factors related to road accident and to use data mining techniques to predict accident seriousness factors. The analysis is done on accidents occurred on some specific location repeatedly or the same place always. So that, these type of data set analysis help to predict the   specific location and this analysis help to find features which affect accidents for this type of location. And the methodology of this paper used the k-means algorithm to make a cluster. It also studies the relationship between no. of crashes and injury, for crashes, there are different components affected like weather, road and driver disturb the mind and unreadable vehicle signals

also the reason of accident, analyzing this data to find the above mention reason.

2. According to the research paper "SafeJourney: A pedestrian map using safety annotation for route determination" written by K. H. Yew, Ta Thu Ha, S.

D. Silva Jose Paua Computer & Info. Sciences Dept., Universiti Teknologi PETRONAS, Perak, Malaysia. This paper presents the techniques to determine a relatively safe path here the focus is on Pedestrian map and attempt is made to include digital map annotated with safety index to extend its functionality from traditional navigation to a safety advisory system.in this Risk-prone areas are identified and annotated using path context. When User enters the preferred path context then system compute the best matching route Djikstra algorithm is used to determine the shortest route. Here technologies such as PHP scripts, MySQL, RDBMS, Flash client are used.

3. According to the research paper " DEVELOPMENT OF A SAFETY RISK MODEL FOR THE HIGHWAYS AGENCY ROAD NETWORK " written by

Hogg Consultant, Risk Solutions, Dallam Court. Mathie Safety Risk Modelling Manager, Highways Agency, Piccadilly Gate, Store Street, Manchester, M1 2WD. The paper presents the background to the development and intended use of the Safety Risk Model (SRM), an overview of the SRM itself and some example results and analyses. The paper concludes with observations relating to the main benefits that the SRM has provided to date and a summary of the future aims for its implementation and further development. It clearly demonstrates the extent of HA control and influence on safety risk and helps identify where to focus resources provides useful additional insight to inform safety decision making.

V. PROPOSED METHODOLOGY

The main objective of our system is to recommend the safest route to the drivers. This system will recommend the route with the help of Android application and available data. The survey will be used to take information of road mishaps and extract details of the various conditions of roads.

The proposed of safest route proposing and driver alert system consist of following stages:
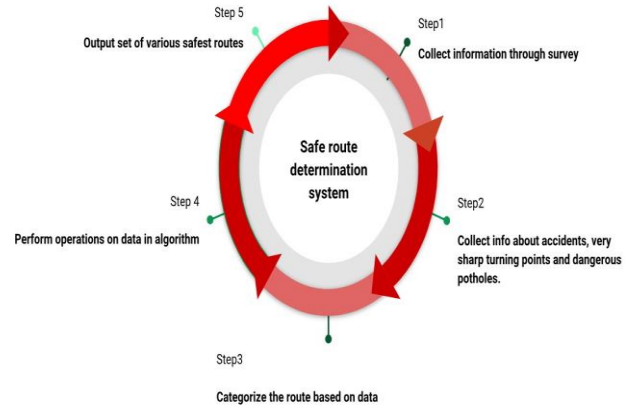

Fig 1: Steps involved in the system

The safe route determination system firstly will collect the information available through survey fed to the system then collect information about accidents and various conditions of the road and dangerous zones and analyze the information and categorize the data so as   to distinguish the routes and then perform operation on the data based on the algorithm and produce the sets of routes such as safe route and short route and alternative to them.
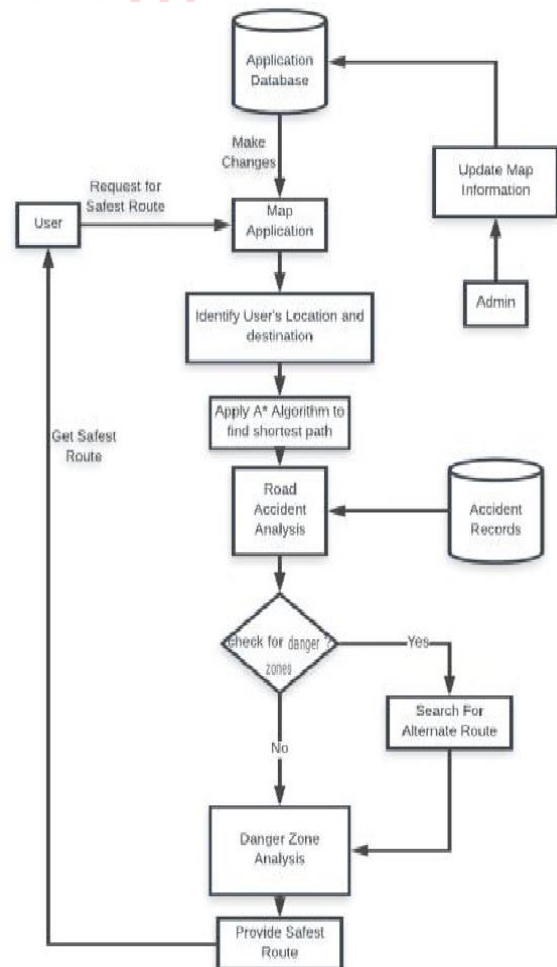

Fig 2: System Architecture

In the transportation system, safety is an important factor. Accidents can occur in different ways in a different situation. In the existing map application, we can get the shortest route while there is no concern about safety. In available map applications, there is no safety index or any kind of safety advisory system. This system will help to select the safest route and alert the drivers about the unsafe zones which lie from source to destination.

The user starts with the registration if the registration is successful then according to the preferences of the user and the destination location the route is formed then analysis on the traffics and danger zones are made on the basis of user preferences and the user is provided with the safest route.

Data mining techniques are used to analyses accident data provided by Navi Mumbai police. The analysis is done on accidents occurred on some specific location repeatedly or the same place.

An algorithm is used to make a cluster of unsafe zones between source and destination; clusters are analyses so as to improve performance and speed of result. It also studies the relationship between the number of crashes and injuries within the crashes.

A technique is used to determine a relatively safe path, The focus and attempt is made to construct digital map annotated with safety index to extend its functionality from traditional navigation to a safety advisory system. Due to this Risk-prone areas are identified and annotated using path context.

When user enters the preferred travelling path context, then system compute the best matching route. Foremost A* algorithm is used to determine the shortest routes and then based upon 80 percent safety and 20 percent cost criteria the best-suited path is marked for the users and is alerted when an unsafe zone is about to approach.
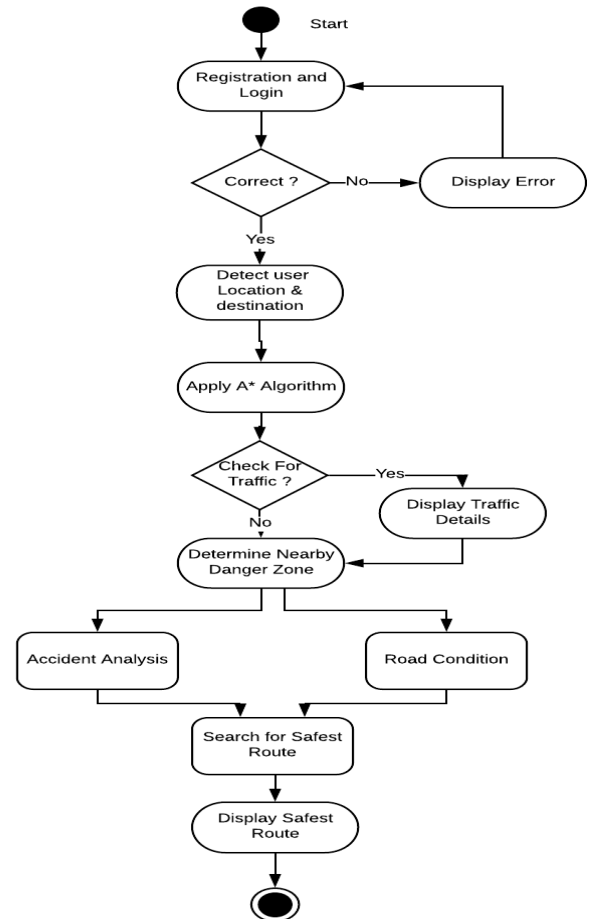

Fig 3: User System Architecture

The user starts with registration and then if the credentials are correct then he is redirected to search route then the route is determined with the various constraints such as traffic, analysis of accidents and road conditions and lastly the safest route is proposed.
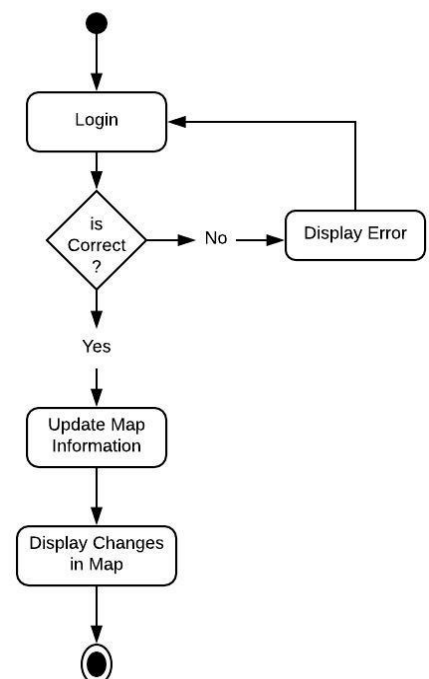

Fig 4: Admin System Architecture

The admin will log in the map application and access the admin panel within the system updates application information based on various parameters and then thee changes are displayed in the map application.

VI. RESULTS AND ANALYSIS

In this system, analysis has to do on accidents occurs on some specific location repeatedly or the same place always. So that, these type of data set analysis help to predict the specific location and this analysis help to find or alert the information the user to select the safest route.

In urban transport facilities in most of the Indian cities are in advocate and deteriorating over the years. the development of public transport system has not kept pace with the traffic demand both in terms of quality and quantity, as a result, the use of undesirable most such as personalized trans- port mainly two-wheelers and intermediate public transport mainly three-wheeler is growing at a rapid speed. Roads and paths today are heavily influenced by parked vehicles, hawkers and roadside business forcing pedestrian to walk on the street.

This result not only in restricting the traffic flow but also putting the pedestrians life at risk. So as to avoid all these factors the safe route determination system helps the user to find the route based on the user preferences.
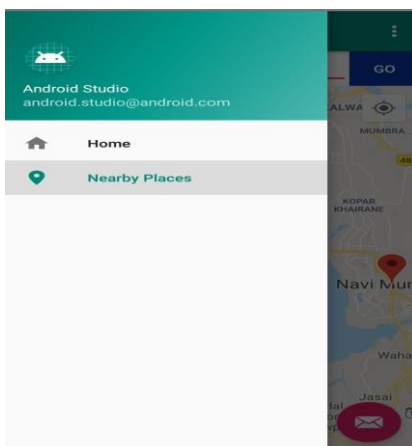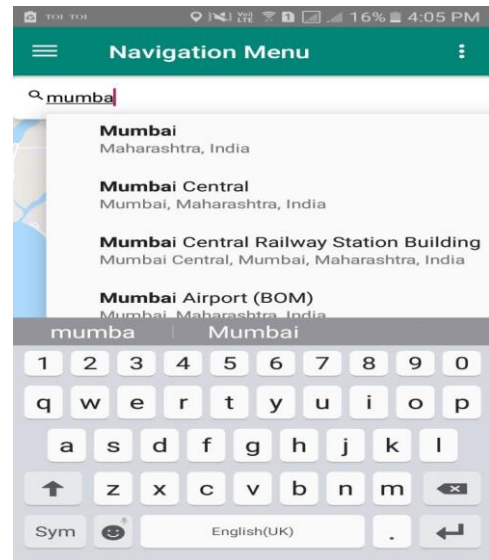

Fig 5: GPS

Fig 6: Menu
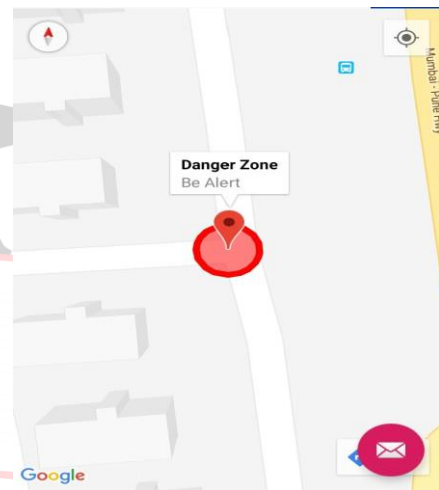

Fig 7: Autocomplete
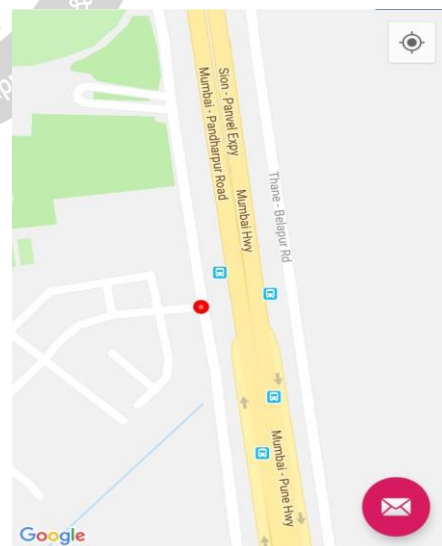

Fig 8: Danger Zone

Fig 9: Danger Zone Road

VII. CONCLUSION

The safety advisory system shows technicalities of using safety index to provide route guidance that potentially enhances drivers and pedestrian safety. The wide scale application of this system is possible through the map-

server. It has been observed that the real time collection of roads conditional information is essential and can be useful for various purposes. This concept can be extended to collect data from multiple cars for accuracy. This system will generate the map with the road information and will also provide map information such as how many hurdles, sharp turning point, etc in the route to enhance its performance and to get better results based on safety index.

REFERENCES

[1] "A review of road accident data analysis was using data mining techniques" written By Ms. Apeksha V. Sakhare, Ms.Prajakta S. Kasbe in the year 2017.

[2] SafeJourney: A pedestrian map using safety annotation for route determination" written by K. H. Yew, Ta Thu Ha, S.D. Silva Jose Paua Computer & Info. Sciences Dept., Universiti Teknologi PETRONAS, Perak, Malaysia.

[3] "DEVELOPMENT OF A SAFETY RISK MODEL FOR THE HIGHWAYS AGENCY ROAD NETWORK " written by Hogg Consultant, Risk Solutions, Dallam Court. Mathie Safety Risk Modelling Manager, Highways Agency, Piccadilly Gate, Store Street, Manchester, M1 2WD.

[4] Sachin Kumar,Durga Toshniwal, Analysing Road Accident Data Using Association Rule Mining, Computing, Communication and Security (ICCCS), 2015 International Conference on 4-5 Dec. 2015,DOI: 10.1109/CCCS.2015.7374211.

[5] Tibebe Beshah, Shawndra Hill, Mining Road Traffic Accident Data to Improve Safety:Role of Road- elated Factors on Accident Severity in Ethiopia World Congress on Information and Communication Technologies(2012).

[6] Johnson, D. A., Trivedi, M. M. (2011, October). Driving style recognition using a smart- phone as a sensor platform. In Intelligent Transportation Systems (ITSC), 2011 14th Interna- tional IEEE Conference on (pp. 1609-1615), IEEE.

[7] Sankari, A., & Vigneshwari, S. (2017). Automatic tumor segmentation using convolutional neural networks. 2017 Third International Conference on Science Technology Engineering & Management (ICONSTEM).doi:10.1109/iconstem.2017.8261291.

[8] Microsoft MapPoint, 2009. February 10th 2009. http://www.microsoft.com/mappoint.

[9] S.Krishnaveni, Dr.M.Hemalatha, "A Perspective Analysis of Traffic Accident using Data Mining Techniques," International Wireless Communications and Mobile Computing Conference (IWCMC) 2016.

[10] J.L. Adler, "Investigating the Learning Effects of Route Guidance and Traffic Advisories on Route Choice Behavior", Transportation Research Part C 9, 2001.

[11] Frantisek Babi, Karin Zuskaova, Liangzheng Xia, "Descriptive and Predictive Mining on Road Accidents Data," IEEE 14th International Symposium on Applied Machine Intelligence and Informatics (SAMI), 2016,DOI: 10.1109/SAMI.2016.7422987, pp. 87-92.

[12] Sinan Kaplan, Mehmet Amac Guvensan, Ali Gokhan Yavuz, and Yasin Karalurt, "Driver Behavior Analysis for Safe Driving: A Survey,"IEEE Transaction on Intelligent Transportation System(2015), DOI: 10.1109/TITS.2015.2462084,pp.3017-3032.

[13] Luis Martin, Leticia Baena, Laura Garach, Griselda Lopez, "Using data mining techniques to road safety improvement in Spanish roads,",K. Geetha,C. Vaishnavi, "Analysis on Traffic Accident Injury Level Using Classification," International Journal of Advanced Research in Computer Science and Software Engineering,Volume 5, Issue 2, February 2015,ISSN: 2277 128X,pp. 953-956.

[14] MORTH (2014) Road Accidents in India 2013. New Delhi:Ministry of Road Transport and Highways Transport Research Wing, Government of India, August2014. http://morth.nic.in/showfile.asp?lid=1465. Accessed 20 May 2015.

[15] Han J, Kamber M (2001) Data mining: concepts and techniques.Morgan Kaufmann Publishers, Burlington Ramzi A.