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Road Accidents Prediction and Classification

Asst. Prof. Syeda Badrunnisa Begum[1], Shaheen Naikar[2], Ashwini B[3], Marilinga Y[4]
[1, 2, 3, 4]*Department of Computer Science and Engineering, Ballari Institute of Technology & Management, Visvesvaraya Technological University, 583104 Ballari, India*

Abstract: ***Road accidents leads to death, disability and hospitalization of people across world which leads to loss of potential income of individual and also affects the economy of the country. For every 10 people killed during road accidents across world one person belongs to India. In year 2020, total of 3,66,138 road accidents occurred leading to loss of 1,31,714 persons lives, injuring 3,48,279 persons. Number of road accidents and damage caused by it can be reduced by identifying the factors leading to it. In this project, we are applying the concepts of data mining and machine learning to identify the various factors that affect road accidents and its severity. The application will take variety inputs such as age of vehicle, light condition, road surface condition, speed limit etc. and will use random forest machine learning algorithm to calculate the severity of a possible accident. The severity of a possible accident will be displayed on a scale of 1 to 3, 1 being the highest and 3 being the least severe so, that they drive safely and take precautions. This data can be used in future to analyze inputs and improves the accuracy of the system output. In case of severity 1 which is the case of possibility of fatal accident an alert message will be sent to police so that they can take any preventive measures and therefore this application can prove to be very helpful in reducing accident fatality rates in the country.***

Keywords: Road Accident, Economy, Severity

I. INTRODUCTION

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II. OBJECTIVES

1) To design a framework that can get trained and extract the features from the large existing dataset.
2) To develop a probabilistic model that can predict the crash from the learner features.
3) To compute the efficiency of the proposed mode.

III. FUNCTIONAL REQUIREMENTS

1) Importing dataset, cleaning it, identifying missing values and normalizing data.
2) Splitting dataset into training data and testing data.
3) Initially tried implementing model using random forest algorithm, logistic regression algorithm, decision tree algorithm and applied hyperparameter tuning to check which gives higher efficiency.
4) Random forest algorithm gave higher accuracy and hence model is implemented using it

IV. NON-FUNCTIONAL REQUIREMENTS

1) *Scalability:* Machine Learning algorithms can process large number of classification parameters and are able to obtain useful patterns. It can process huge amounts of data efficiently and can be scalable.
2) *Performance:* Model is implemented using random forest algorithm which gave higher efficiency when compared to, logistic regression algorithm, decision tree algorithm and applied hyperparameter tuning.

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V. DESIGH

We have developed a web-site for our model. It has four major components, they are:

1) *Front-End:* User entered inputs are taken and sent to the back end for processing.
2) *Back-End:* The user entered data is process here using machine learning model to identify the severity of accident. The machine learning model is deployed here.
3) *Machine Learning Model:* Machine learning model is implemented using random forest algorithm as it showed highest accuracy when compared to other algorithms. It is deployed on the backend. It processes user entered data and predict the severity on a scale of one to three: 1 being fatal, 2 being serious and 3 means slight chances of accidents. The predicted output is displayed to the user on the frontend. If the predicted output is 1=fatal then, an alert message will be sent to police so that they can take appropriate actions. The alert message will contain coordinates of the location of the user.

A. System Design

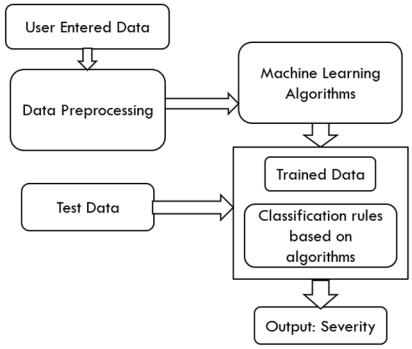


Figure V.1: System design

VI. RESULT

The home page that is the front end as shown in figure VI.I will take inputs from the user. The data collected from user involves age of driver, vehicle type, age of vehicle, engine capacity, day of week, weather conditions, light conditions, road surface conditions, gender and speed limit. For this user entered data output is predicted in terms of severity of accident.

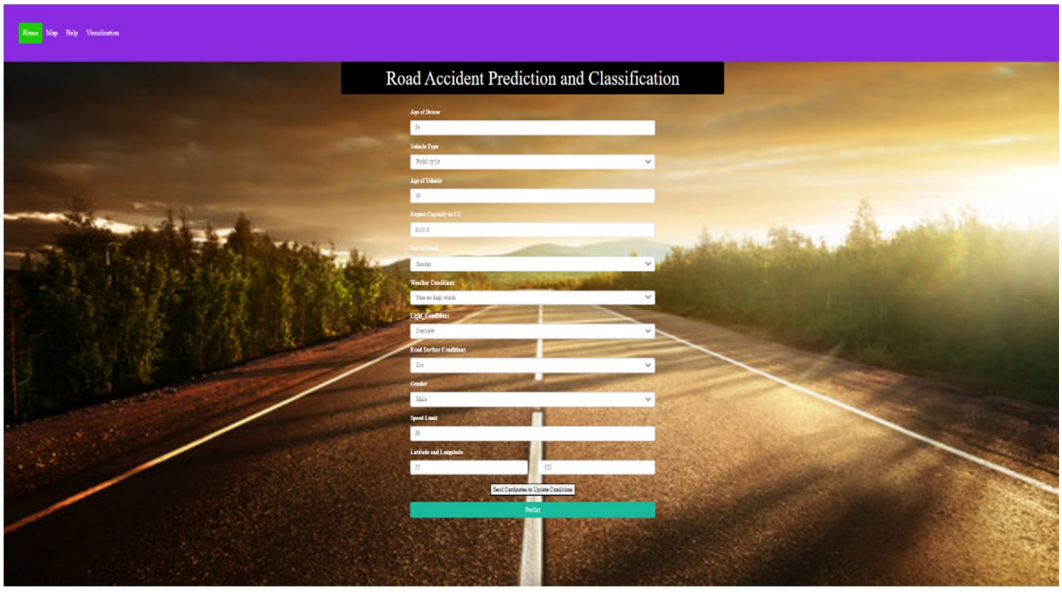


Figure VI.1: Home page

When the user clicks on Predict, user entered data is sent to the backend, where it is feed into Random Forest machine learning algorithm. The output is shown in figure VI.2.

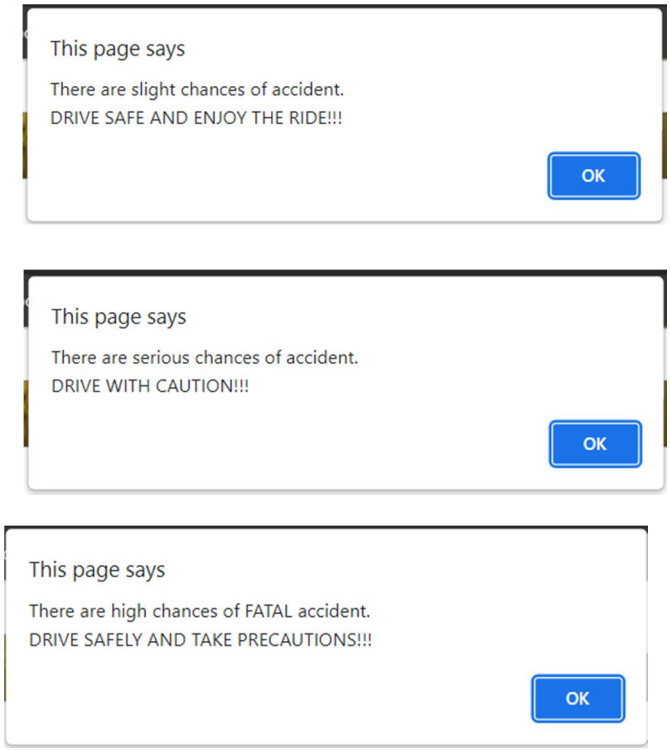


Figure VI.2: Output

The user can call to helpline services in emergency conditions using the helpline numbers provided in help section as shown in figure VI.3.

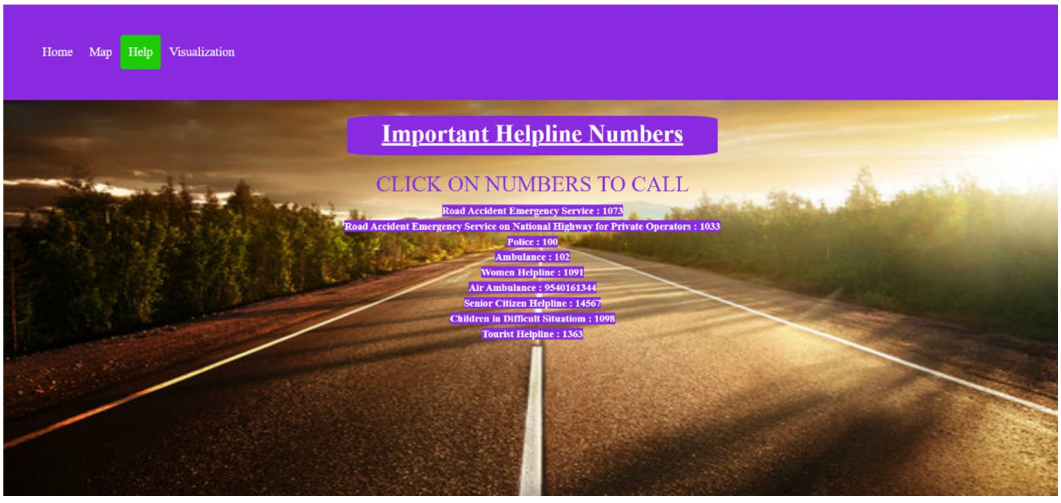


Figure VI.3: Helpline Numbers

Google map showing red spots which represents the hot zones of road accident is also provided to user, which they can use to know the accident-prone zones and hence choose safer routes for driving as shown in fig VI.4.

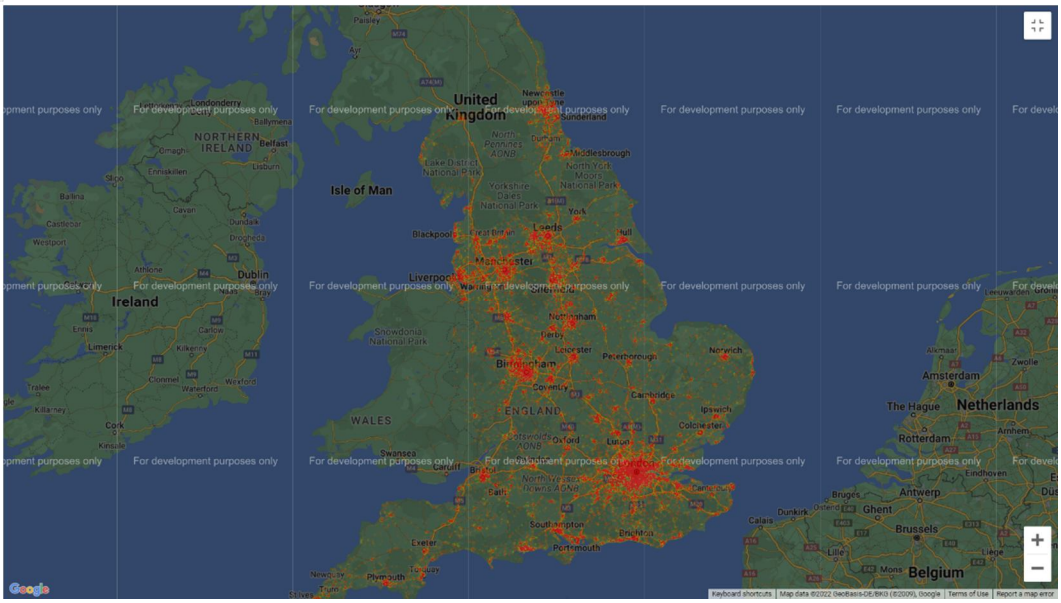


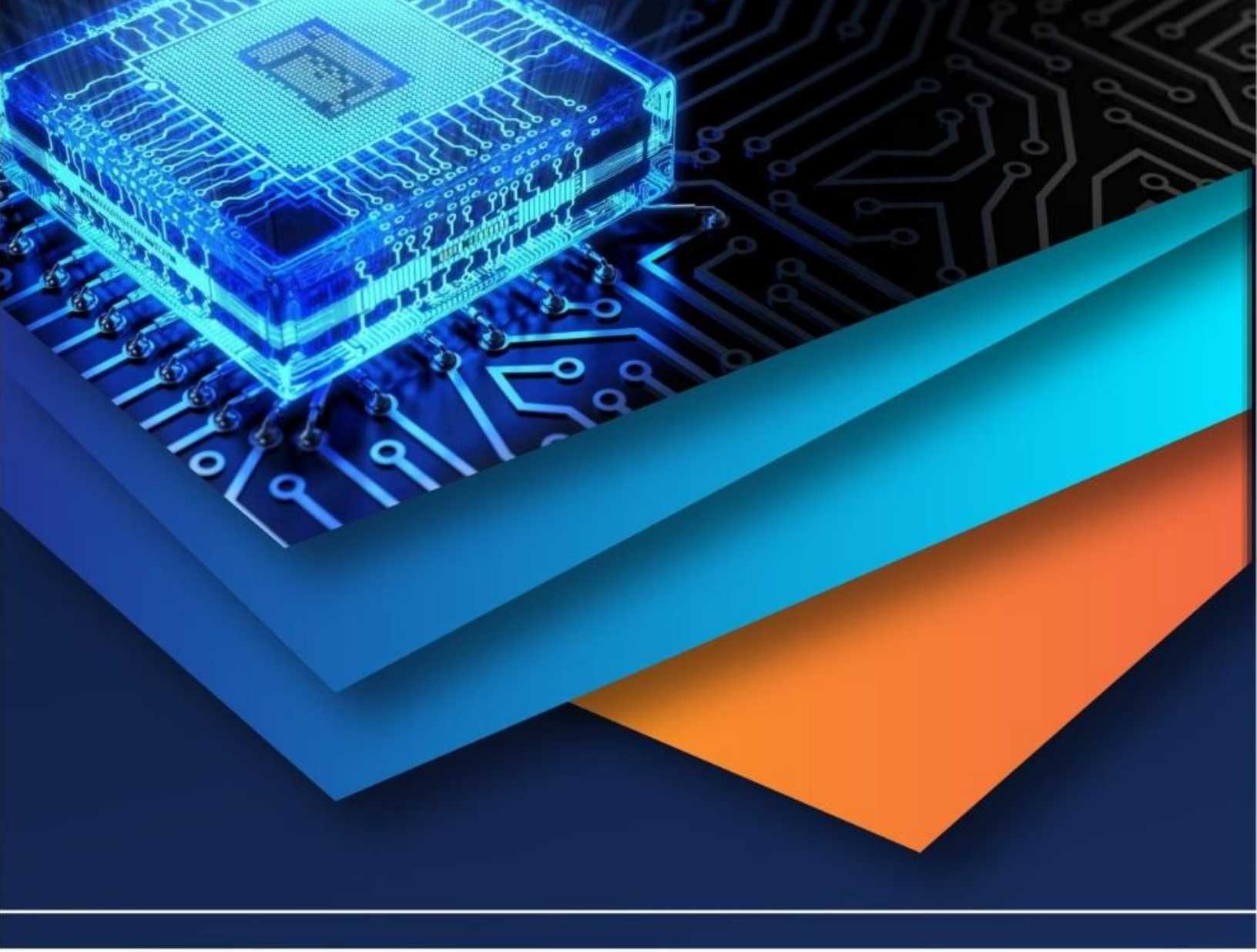
Figure VI.4: Map

VII. CONCLUSION

This project used machine learning technology to predict the severity of accident at any given location. Machine learning technology has enabled us to analyse data to predict the severity of accident with accuracy that is greater than that of humans. This project can be used in future by government or organizations to prevent road accidents or at least reduce complication due to it.

REFERENCES

[1] Hultkrantz, L., Lindberg, G., Andersson, C., (2006). "The value of improved road safety. J. of Risk and Uncertainty." 32: 151-170.
[2] Atubi Augustus O,(2010). "Road Traffic Accident Variations in Lagos State, Nigeria: A Synopsis of Variance Spectra." Afr. Res. Rev. 4(2):197-218
[3] Banik, B. K., Chowdhary, M. A. I., Hossain, E., and Moumdar, B. (2011). "Road accident and safety study in Sylhet Region of Bangladesh." J. of Engg. Sci. and Tech. 6(4):493-505.
[4] Quazi Sazzad Hossain, Sajal Kumar Adhikary, Wan Hashim Wan Ibrahim, Rezaur R.B.,(2005). "Road Traffic Accident Situation in Khulna City, Bangladesh, Proceedings of the Eastern Asia Society for Transportation Studies." 5: 65 - 74,
[5] Taimur Usman, Liping Fu, Luis F. Miranda-Moreno,(2010). "Quantifying safety benefit of winter road maintenance: Accident frequency modeling. Accident Analysis and Prevention." 42(6):1878-1887.
[6] Dinesh Mohan,(2011). "Analysis of Road Traffic Fatality Data for Asia. J. of the Eastern Asia Society for Trans." Studies. 9: 1786 – 1795.
[7] Jinsun Lee and Fred Mannering (1999). "Analysis of Roadside Accident Frequency and Severity and Roadside Safety Management, Final Research Report. Washington State Transportation Center Washington."
[8] Goli, S., Shruti, Siddiqui, M. Z., & Gouda, J. (2018). "High spending on hospitalised treatment: Road traffic accidents and injuries in India." Economic and Political Weekly, 53(14), 52- 60.
[9] World Health Organisation. (2013). "Global Status Report on Road Safety." Geneva: World Health Organisation.
[10] World Health Organisation. (2018). "Global Status Report on Road Safety." Geneva: World Health Organisation.
[11] Morth (2014) "Road Accidents in India 2013. New Delhi: Ministry of Road Transport and Highways, Transport Research Wing, Government of India, August 2014" .http://morth.nic.in/showfile.asp?lid=1465.
[12] Omar AH and Ashawesh K,(2008). "Road safety: A call for action", Libyan J Med, 3(3):126-127.
[13] Haigney, D. E., Westerman, S. J. (2001). "Mobile (cell) phone use and driving: A critical review of research methodology." Ergonomics, 44:132– 143.
[14] BESHAH, T., HILL, S.(2010). "Mining Road Traffic Accident Data to Improve Safety: Role of Road-Related Factors on Accident Severity in Ethiopia." Proceedings of AAAI Artificial Intelligence for Development,22-24
[15] Jayaprakash G Hugar, Mirza Muhammad Naseer, Abu Waris, Muhammad Ajmal Khan, (2020). "Road Traffic Accident Research in India: A Scientometric Study from 1977 to 2020". SSRN Electronic Journal, 10.2139/ssrn.3893062.
[16] Guozhu Cheng , Rui Cheng , Yulong Pei , and Juan Han, (2021). "Research on Highway Roadside Safety". Journal of Advanced Transportation, vol. 2021, Article ID 6622360.
[17] Santhani M Selveindran, Gurusinghe D. N. Samarutilake, K. Madhu Narayana Rao, Jogi V. Pattisapu, Christine Hill, Angelos G. Kolias, Rajesh Pathi, Peter J. A. Hutchinson & M. V. Vijaya Sekhar, (2021). "An exploratory qualitative study of the prevention of road traffic collisions and neurotrauma in India: perspectives from key informants in an Indian industrial city (Visakhapatnam)". BMC Public Health, Article number: 618.



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