

Deep Learning-Based Traffic Accident Prediction: An Investigative Study for Enhanced Road Safety

M. Girija^{*1}, and V. Divya²

¹Department of Computer Science, School of Computing Science, VISTAS, & Department of Computer Science, Valliammal College for Women, Chennai, India

²Department of Computer Science, School of Computing Science, VISTAS, Chennai, India

Abstract

INTRODUCTION: Traffic accidents cause enormous loss of life as well as property, which is a global concern. Effective accident prediction is essential for raising road safety and reducing the effects of accidents. To increase traffic safety, a deep learning-based technique for predicting accidents was developed in this research study.

OBJECTIVES: It gathers a large amount of data on elements including weather, road features, volume of traffic, and past accident reports. The dataset goes through pre-processing, such as normalization, to ensure that the scales of the input characteristics are uniform. Normalizing the gathered dataset ensures consistent scaling for the input features during the data processing step. This process enables efficient model training and precise forecasting. In order to track and examine the movement patterns of automobiles, people, and other relevant entities, real-time tracking and monitoring technologies, such as the deep sort algorithm, are also employed.

METHODS: The model develops a thorough grasp of the traffic situation by incorporating this tracking data with the dataset. Convolutional Neural Networks (CNN), in particular, are utilized in this research for feature extraction and prediction. CNNs capture crucial road characteristics by extracting spatial features from images or spatial data. With its insights into improved road safety, this study advances the prediction of traffic accidents.

RESULTS: A safer transport infrastructure could result from the developed deep learning-based strategy, which has the potential to enable pre-emptive interventions, enhance traffic management, and eventually reduce the frequency and severity of traffic accidents.

CONCLUSION: The proposed CNN demonstrates superior accuracy when compared to the existing method.

Keywords: Traffic Prediction, Deep Learning, Convolutional Neural Networks, Road Safety

Received on 17 November 2023, accepted on 10 February 2024, published on 21 February 2024

Copyright © 2024 M. Girija *et al.*, licensed to EAI. This is an open access article distributed under the terms of the [CC BY-NC-SA 4.0](#), which permits copying, redistributing, remixing, transformation, and building upon the material in any medium so long as the original work is properly cited.

doi: 10.4108/eetiot.5166

1. Introduction

Cars have increasingly become a part of every home as a result of the ongoing development in people's living conditions and the growing number of urban highways. Without doubt, utilizing a car for daily transportation has become a necessity. The issues with controlling traffic are

becoming more and more obvious in the context of the quick expansion of contemporary mobility due to the stark disagreements among individuals, cars, and roadways. Every year, numerous individuals lose their lives in road collisions [1]. The World Health Assembly has issued life-loss statistics that show that a staggering number of disasters happen every year all across the globe.

*Corresponding author. Email: girija.muniyappan@gmail.com

