

Abstract

Comparative Study of Algorithms For Predictions of Traffic Flow and Road Accidents

by

Aditya Vishnu Garg

MAI in Computer Engineering

Trinity College Dublin

Supervisor: Prof. Siobhán Clarke

There is a rising trend in the number of vehicles registered in Ireland, reaching record-high figures of 2.68 million in 2018. Around 65% of the working community uses their own vehicle for the job. Therefore, the existing road transport network is under growing strain and needs more innovative solutions to improve the Intelligent Transport System (ITS) for efficient future planning.

The aim of this project was to research if traffic flow can be predicted, and if this data could be used to complement prediction of the road accidents. This approach makes use of the dataset collected by traffic counters on motorways using the embedded loop detector. Data from these counters is then processed and visualized to uncover trends, and changes due to seasonality factors. These patterns are then incorporated into machine learning models. Further, for the second research question, road accident data collected by the Road Safety Authority (RSA) is fused with the traffic volume data.

This study implements and compares three algorithms: XGBoost, Support Vector Machines (SVM), and Logistic Regression. A mean absolute error of 328 cars per hour for the long term and 139 cars per hour for the short term was found using XGBoost regressor. Henceforth, using this data, a classifier was trained to predict accidents, and a recall rate of 0.76 was achieved.