uOttawa

DTI5126 – FUNDAMENTALS/APPLIED DATA SCIENCE

Traffic volume in Minneapolis-Saint Paul westbound I-94

GROUP: 2

Introduction:

Roads are the main usable method for relocating regardless of the transportation method used. Traffic jams can cripple entire cities and occasionally damaging governmental services and human affairs.

Problem Statement:

Minneapolis-Saint Paul westbound I-94 is one of the busiest highways in Minnesota [2]. Detecting Traffic volume in this critical highway is essential as traffic jams in it can lead to a lot of problems that might affect society or individuals in throughout the year.

Objectives:

The main objective is to form a time series prediction of the traffic volume in I-94 highway. The output predictions can be used in various forms like determining service cars for the highway including patrol cars, towing trucks and others, road maintenance, ramp closures including exit roads, road tolls that might be constructed, and other road administrations like pedestrian bridges and more [4].

Background & Literature Review:

As per reviewing previously used models for the same dataset, most of them tried to solve this problem using regression. We have agreed on forecasting traffic volume as a time series problem.

Methodology:

What is required to be done is to detect the number and estimated volume of traffic. Traffic volume can be predicted using innumerous approaches such as the methods that were mentioned before. Generally, data should be cleaned to allow the detection of anomalies in data and finally reviewed seasonality and finally forecasting traffic volume as a time series problem.

References:

[1] Chandel, Apurv. “An Accurate Estimation of Interstate Traffic of Metro City Using Linear Regression Model of Machine Learning.” *Papers.ssrn.com*, 11 May 2020, papers.ssrn.com/sol3/papers.cfm?abstract_id=3598310. Accessed 20 May 2022.

[2] Ermagun, Alireza, et al. “Using Temporal Detrending to Observe the Spatial Correlation of Traffic.” *PLOS ONE*, vol. 12, no. 5, 4 May 2017, p. e0176853, 10.1371/journal.pone.0176853. Accessed 17 July 2019.

[3] Hogue, John. “UCI Machine Learning Repository: Metro Interstate Traffic Volume Data Set.” *Archive.ics.uci.edu*, archive.ics.uci.edu/ml/datasets/Metro+Interstate+Traffic+Volume.

[4] “I-94/I-35E in St. Paul Project - MnDOT.” *Www.dot.state.mn.us*, www.dot.state.mn.us/metro/projects/i94-i35e-stpaul/. Accessed 20 May 2022.

[5] Kanokwan Khiewwan, et al. “Application of Data Mining Techniques for Classification of Traffic Affecting Environments.” *Journal of Renewable Energy and Smart Grid Technology*, vol. 15, no. 1, 2020, ph01.tci-thaijo.org/index.php/RAST/article/view/240698. Accessed 20 May 2022.

[6] Mrs. B.Karthika, Et Al. “Traffic Flow Prediction Using an Improved Fuzzy Convolutional LSTM Algorithm.” *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, vol. 12, no. 10, 28 Apr. 2021, pp. 5541–5549, turcomat.org/index.php/turkbilmat/article/view/5361, 10.17762/turcomat.v12i10.5361. Accessed 20 May 2022.

[7] Yin, Zexuan, and Paolo Barucca. “Stochastic Recurrent Neural Network for Multistep Time Series Forecasting.” *Neural Information Processing*, 2021, pp. 14–26, 10.1007/978-3-030-92185-9_2. Accessed 20 May 2022.

[8] Zhao, Jingyu, et al. *Do RNN and LSTM Have Long Memory?*