iJRASET
International Journal For Research in
Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** VIII **Month of publication:** August 2022

DOI: https://doi.org/10.22214/ijraset.2022.46306

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue VIII Aug 2022- Available at www.ijraset.com

Traffic Prediction for Intelligent Transportation System Using Machine Learning

Fareeduddeen V. M[1], Dr. J. Sreerambabu[2], M. Mohammed Riyaz[3]
[1]PG.Scholar, [2]Head of the Department, [3]Assistant Professor, Master of Computer Applications Department, Thanthai Periyar Government. Institute of Technology, Vellore-2

***Abstract:** This Document aims to develop a tool for predicting correct and timely traffic flow info. Traffic surroundings involves everything which will have an effect on the traffic flowing on the road, whether or not it's traffic signals, accidents, rallies, even repairing of roads which will cause a jam. If we've got previous info that is extremely close to approximate regarding all the higher than and many more lifestyle things which may have an effect on traffic then, a driver or rider will create an knowing decision. Also, it helps within the way forward for autonomous vehicles. within the current decades, traffic information are generating exponentially, and that we have stirred towards the large information ideas for transportation. Available prediction ways for traffic flow use some traffic prediction models and are still dissatisfactory to handle real-world applications. This reality impressed us to figure on the traffic flow forecast problem build upon the traffic information and models. It is cumbersome to forecast the traffic flow accurately as a result of the info on the market for the transportation is insanely vast. during this work, we tend to planned to use machine learning, genetic, soft computing, and deep learning algorithms to analyse the big-data for the transportation with much-reduced quality. Also, Image process algorithms are concerned in traffic sign recognition, that eventually helps for the correct training of autonomous vehicles.*

***Crucial Words:** Prediction, pre-processing, Traffic, Deep Learning, Model, Vehicles*

I. INTRODUCTION

Various Business sectors and government agencies and individual travellers need precise and suitably traffic flow data. It helps the riders and drivers to create good travel judgement to alleviate traffic congestion, improve traffic operation potency, and low carbon emissions. The event and preparation of Intelligent transit (ITSs) give higher accuracy for Traffic flow prediction. it's modify as a vital part for the success of advanced traffic management systems, advanced public transportation systems, and person data systems.

The dependency of traffic flow relies on time period traffic and historical information collected from numerous detector sources, together with inductive loops, radars, cameras, mobile global Positioning System, crowd sourcing, social media. Traffic information is exploding because of the immense use of ancient sensors and new technologies, and that we have entered the time of an outsized volume of knowledge transportation. Transportation functions and management are currently changing into additional data-driven. However, there are already several traffic flow prediction systems and models; most of them use shallow traffic models and are still somewhat failing because of the large dataset dimension. Recently, deep learning ideas attract several persons involving academicians and man of affairs because of their ability to modify classification issues, understanding of linguistic communication, spatiality reduction, detection of objects, motion modelling. DL uses multi-layer ideas of neural networks to mining the inherent properties in information from very cheap level to the very best level. They will establish large volumes of structure within the information, that eventually helps us to ascertain and create important inferences from the information.

Most of the ITS departments andd researches during this time also are involved regarding developing an autonomous vehicle, which might create transportation systems a lot of economical and this idea the danger of lives. Also, saving time is that the integrative good thing about an. In current decades the several attention have created towards the safe automatic driving. it's necessary that the data are provided in time through driver assistance system (DAS), autonomous vehicles (AV)and Traffic Sign Recognition (TSR).

II. SYSTEM ANALYSIS

A. *Existing System*

In existing system, regardless of vehicles will increase on roads, the traffic too will increase and therefore the accessible road network capability isn't possible to handle this more load. There are 2 attainable approaches to resolve this issue. Traffic flow refers to the quantity of vehicles passing through a given purpose on the route during a bound amount of your time. Most of the time, because of factors like geographical location, traffic conditions, driving time, atmosphere and private circumstances of the driver, every vehicle on the route can have a speed that's somewhat totally different from those around it.

B. Proposed System

It is very important problem in data analysis. Here we are using deep learning and genetic algorithm. These proposed algorithm gives the much more efficiency than the above system. From the dataset it modifies the different issues. It's also helpful in the perspective of environment friendliness to reduce carbon emission, communication technology to provide traveller information to increase the safety and efficiency of the road transportation systems.

III. DEVELOPMENT ENVIRONMENT

A. Hardware Requirement

Processor Type : I5 3^{rd} gen processor.
Processor Speed : 2.6GHZ
RAM : 8 GB
Hard Disk : 1TB

B. Software Requirement

Back end : Machine learning, Python
Operating system : Windows 10.
Platform : Google Colab
Cloud Platform : Google cloud
Data set : CSV
Framework :Tensorflow

IV. MODULE DESCRIPTION

A. Collection Of Real-Time Data

The type and quality of the data available in real-time plays a crucial role in dictating the possible approaches to our prediction problem. As suggest before, main sources of real-time information include induction loop detectors and surveillance systems, GPS-enabled public vehicles and data collected from users in real-time, for instance through smartphones. Cabs and buses often incorporate location systems which can also be used for planning and traffic control.

In addition to a source of real-time data, historic information is also essential regardless of the approach. While data driven methods rely on the network's history to predict its evolution, model-driven methods require it in order to calibrate the parameters used in the traffic simulation.

B. Data Pre-Processing

Pre-processing refers to the transformations applied to our information before feeding it to the algorithm. Data Preprocessing is a method that is used to convert the raw information into a clean data set. In other words, whenever the data is gathered from different origin it is collected in raw format which is not feasible for the analysis.

When it comes to creating a Machine Learning model, data preprocessing is the earliest step marking the initiation of the process. Typically, real-world data is incomplete, inconsistent, (contains errors or mistakes), and often lacks specific attribute values/trends. This is where data preprocessing comes the scenario – it helps to clean, format, and organize the raw information, thereby making it ready-to-go for Machine Learning models.

C. Data Availability

After pre-processing, data availability can be divided in three different groups:

Static observations: real-time data obtained in fixed locations in the network, e.g. from induction loops or surveillance systems. This often includes metrics such as traffic flow, density, volume, avg velocity, occupancy or queue length at specific points in the network.

Route observations: usually obtained from GPS enabled cabs and buses, smartphones or traffic operators. This includes metrics such as travel duration, queue length and accidents that are obtained from a random point in the network.

Global observations: usually get from secondary source, this data can be as varied as weather reports, special events (e.g. cricket match) or other monitoring which should be considered for prediction purposes, such as the day of the week.

D. Prediction Metrics and Targets

Depending on the selected approach and desired output, a large no of variables can be predicted. In its simplest form, the target is the direct prediction of an input variable at some point in the future.

Common targets try to define the state of the network at some specific points in terms of vehicle density, traffic flow and avg velocity. Other common yet often derived targets include travel duration and queue length. Other different outputs could be useful for road managers. It is often important to predict propagation on road networks caused by traffic condition changes, weather incidents or road works.

E. Measuring Prediction Accuracy

In order to assess the standard of the traffic prediction systems, it is essential to ascertain metrics that allow the comparison of the various methods. This evaluation must consist on a comparison between the traffic forecast result and the actual traffic conditions at that point in time. The following metrics are the foremost common:

1) *Mean Relative Error:* Also called Mean Absolute Percent Error (MAPE), Percentage Absolute Error (PAE), Ratio of Absolute Error and accuracy (1 − MAP E). This metric corresponds to the avg absolute percentage change between forecasted and true value, relative to the true value.
2) *Mean Absolute Error (MAE):* This metric corresponds to the average absolute difference between predicted and true values, also called Mean Absolute Deviation.
3) *Root Mean Square Error (RMSE):* This metric corresponds to the square root of the mean of the square difference between observed and forecasted values.

V. SYSTEM ARCHITECTURE

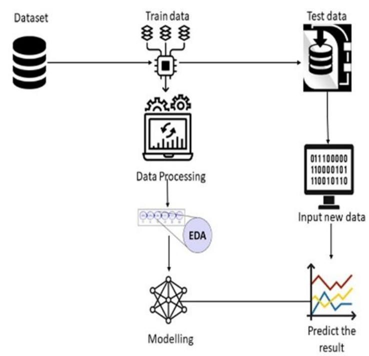


Fig: System Architecture

A. Data Flow Diagram

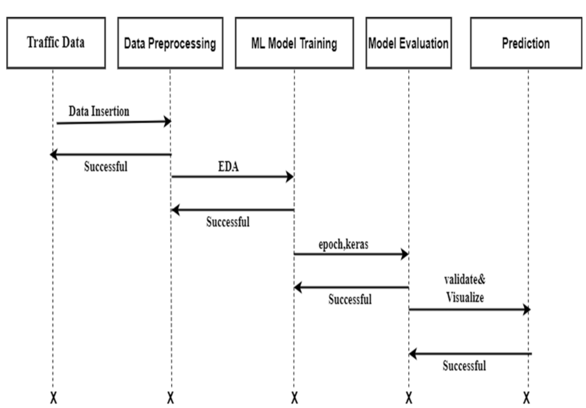


Fig: Flow System

VI. CONCLUSION

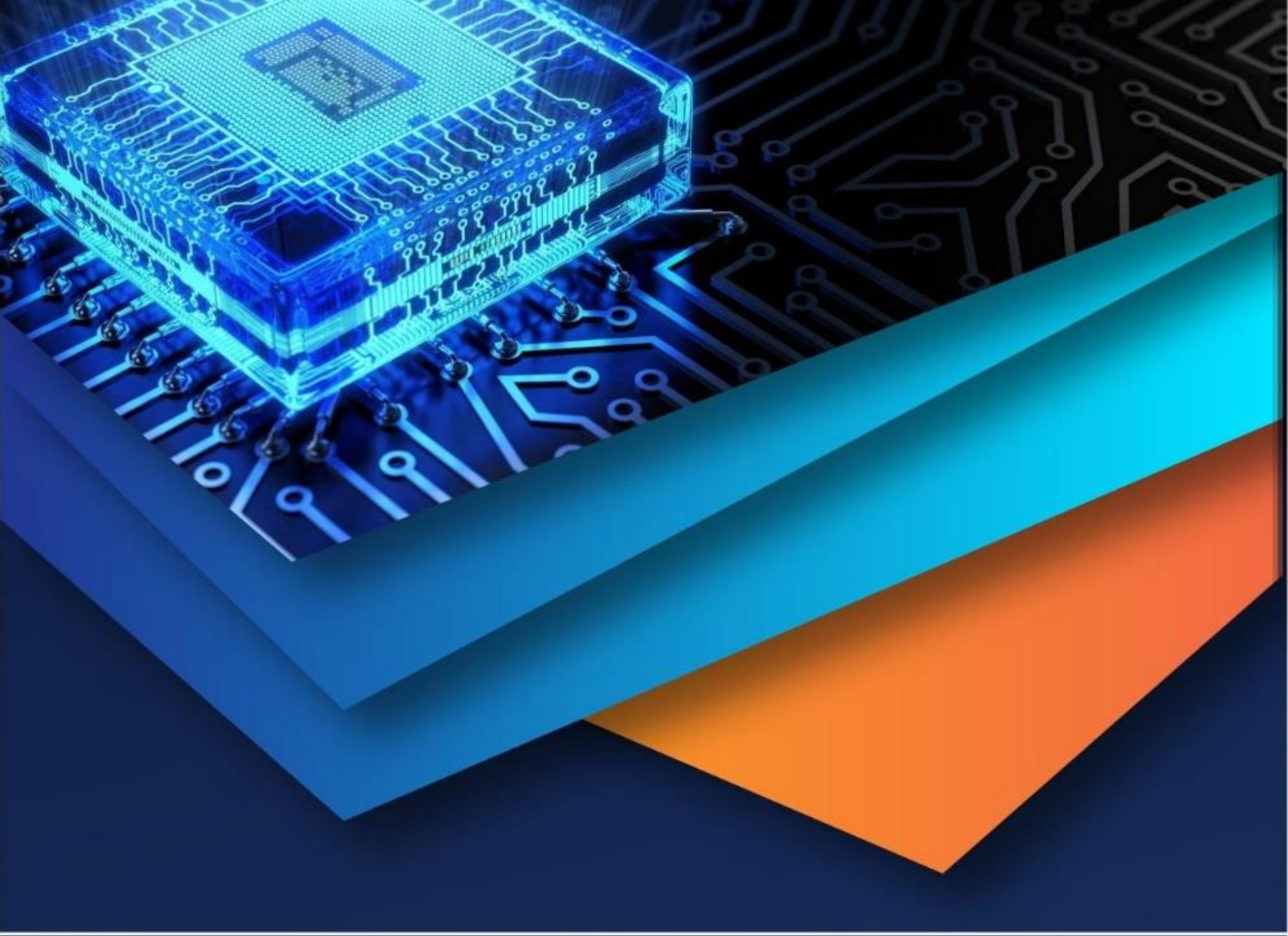
While machine learning and genetic algorithms are essential issues in data processing, the ML community has not focused on them extensively. The projected algorithm not only outperforms current algorithms in terms of precision, but it also increases the dataset's complexity. We also plan to link the web server and the programme. Even, the algorithms can be developed to achieve a much higher level of precision. Although deep learning and genetic algorithm is a main problem in data analysis, it has not been dealt with extensively by the ML community. The planned rule offers higher accuracy than the prevailing algorithms also, It improves the complexity issues throughout the dataset. Also we have planned to integrate the online server and therefore the application.. Also the things algorithms will be further improved to much more higher accuracy.

VII. FUTURE ENHANCEMENT

Although deep learning and genetic rule is a crucial problem in information analysis, it's not been controlled extensively by the machine Learning community. The projected rule provides higher accuracy than the present algorithms additionally -, It improves the quality problems throughout the dataset. Also we've planned to integrate the net server and therefore the application. Also the things algorithms are going to be more improved to far more higher accuracy.

REFERENCES

[1] Fei-Yue Wang et al. Parallel control and management for intelligent transportation systems: Concepts, architectures, and applications. IEEE Transactions on Intelligent Transportation Systems, 2010.
[2] Yongchang Ma, Mashrur Chowdhury, Mansoureh Jeihani, and Ryan Fries. Accelerated incident detection across transportation networks using vehicle kinetics and support vector machine in cooperation with infrastructure agents. IET intelligent transport systems, 4(4):328–337, 2010.
[3] Rutger Claes, Tom Holvoet, and Danny Weyns. A decentralized approach for anticipatory vehicle routing using delegate multiagent systems. IEEE Transactions on Intelligent Transportation Systems, 12(2):364–373, 2011.
[4] Mehul Mahrishi and Sudha Morwal. Index point detection and semantic indexing of videos - a comparative review. Advances in Intelligent Systems and Computing, Springer, 2020.
[5] Joseph D Crabtree and Nikiforos Stamatiadis. Dedicated short-range communications technology for freeway incident detection: Performance assessment based on traffic simulation data. Transportation Research Record, 2000(1):59–69, 2007.
[6] C. Zhang, P. Patras, and H. Haddadi. Deep learning in mobile and wireless networking: A survey. IEEE Communications Surveys Tutorials, 21(3):2224–2287, thirdquarter 2019.
[7] Chun-Hsin Wu, Jan-Ming Ho, and D. T. Lee. Travel-time prediction with support vector regression. IEEE Transactions on Intelligent Transportation Systems, 5(4):276–281, Dec 2004.
[8] Yan-Yan Song and LU Ying. Decision tree methods: applications for classification and prediction. Shanghai archives of psychiatry, 27(2):130, 2015.



10.22214/IJRASET

INDEX COPERNICUS 45.98

IMPACT FACTOR: 7.129

TOGETHER WE REACH THE GOAL

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY