JES Journal of Engineering Sciences
Vol 13, Issue 06, June/2022
ISSN NO:0377-9254

TRAFFIC PREDICTION FOR INTELLIGENT TRANSPORTATION SYSTEM USING MACHINE LEARNING

[1]DUDEKULA SHARMILA, [2]V RAJANI PRIYA, [3]G RAMYA, [4]SHEELAM PRATHYUSHA, [5]MULLA ANISHA,[6]BUSHRA TAHSEEN
[1234]B.Tech Student , [5]Assistant Professor
DEPARTMENT OF CSE
Dr. K. V. SUBBAREDDY INSTITUTE OF TECHNOLOGY, KURNOOL

ABSTRACT

The aim of this paper is to create a method for forecasting accurate and timely traffic flow data. Anything that can disrupt the flow of traffic on the road is considered part of the traffic environment, including traffic signals, crashes, rallies, and even road repairs that can create a traffic jam. A driver or passenger will make an educated decision provided we have prior knowledge that is very close to estimated on all of the above and many other real life conditions that can impact traffic. It also aids the development of autonomous cars in the future. Traffic data has been and rapidly in recent decades, and we have pushed toward big data principles for transportation. Available traffic flow prediction approaches use some traffic prediction models but are still unsuitable for real-world applications. This prompted us to work on a traffic flow forecasting issue based on traffic data and models. Since the amount of data available for the transportation system is enormous, correctly forecasting traffic flow is difficult. We decided to use machine learning, genetic, soft computing, and deep learning algorithms to analyse big data for the transportation system with a lot less complexity in this project. Image Processing algorithms are also used in traffic sign detection, which aids in the proper testing of self-driving cars.

Keywords: Traffic prediction, neural network, Bayesian network, hybrid model, real-time data, historical data

I INTRODUCTION

Individual travellers, as well as various business sectors and government departments, need accurate and timely traffic flow information. It aids riders and passengers in making smarter travel decisions, reducing road congestion, improving traffic service quality, and lowering carbon emissions. Intelligent Transportation Systems (ITSs) are being developed and deployed to improve traffic flow prediction accuracy. It is treated as a critical component for advanced traffic control systems, advanced public transit systems, and traveller information systems to succeed. 1st. Real-time traffic and historical data obtained from multiple sensor outlets, such as inductive loops, radars, sensors, mobile Global Positioning System, crowdsourcing, and social media, are used to determine traffic flow. Because of the widespread use of traditional sensors and emerging technology, traffic data is exploding, and we have entered the age of large-scale data transportation. Transportation management and control are being more data-driven. [2] and [3].

However, there are many traffic flow modelling systems and models already in use; the majority of them use shallow traffic models and are still struggling due to the large dataset size.

Deep learning concepts have recently attracted a large number of people, including academicians and industrialists, due to their ability to deal with recognition issues, natural language comprehension, dimensionality reduction, object identification, and motion modelling. DL employs multi-layer neural network concepts to mine data's underlying properties from the lowest to the highest level [4]. They will find vast amounts of structure in data, which allows one to imagine it and draw logical conclusions from it. The development of an autonomous car, which can make transportation networks much more economical and reduce the risk of lives, is also a concern for most ITS departments and researches in this field. This concept also has the added advantage of saving time. In recent decades, there has been a lot of emphasis on safe automatic driving. Information must be delivered in a timely manner through driver assistance systems (DAS), autonomous vehicles (AV), and Traffic Sign Recognition (TSR) [5].

II RELATED WORKS

Past decades, machine learning, statistics, and deep learning methods have been demonstrated in traffic prediction simulations. Important ideas are auto-regression,[6] neural networks,[7] BN,[8] and some pre-processing techniques like smoothing.[9,10] Works in Liu et al.[11] and Miller and Gupta[12] show the approaches for using traffic datasets to predict traffic congestion, which provides information for drivers to avoid areas with heavy traffic. These prediction results can be benefit to many parts of the civil life, and even to government on traffic policies managing. Other applications about traffic such as traffic light control algorithms[13] and online traffic prediction[14] are also serving for this reason.

Spatiotemporal prediction takes both time and space into consideration when doing prediction, forecasting the traffic as a whole network. A stacked auto-encoders (SAE)[15] model is a way to apply deep learning on traffic prediction. Pre-processing technology, such as singular spectrum analysis (SSA),[16] is also important part in traffic prediction which can help have a deeper understanding on this field.

One typical usage of auto-regression idea is ARIMA,[17] which is widely applied in researches to predict the short-term traffic conditions. The model integrates the moving average parts with auto-regressive computation steps. Box–Jenkins methodology offers main steps for applying ARIMA models in forecasting.

Neural networks contain many different ideas such as ANN[18,19] and fuzzy neural networks (fuzzy NNs).[20,21] Neural networks are a computational model which imitates the behavior of biological brain. The model comprises a large amount of artificial neural units, connected with many others to formulate the way of information commute in biological neural networks. Since the neural networks in computer science may confuse the idea with biological ones, it is often called ANN. Neural network is widely used in prediction of traffic. Its multiple hidden layer editions are important basics of deep learning technology. Hidden layers give traffic prediction ability to handle with complicate traffic situations. Researchers implement different kinds of ANNs in predictions, not only in forecasting the traffic conditions, but also in varieties of fields which require more enhanced prediction models to achieve better results.

III SYSTEM DESIGN

SYSTEM ARCHITECTURE:

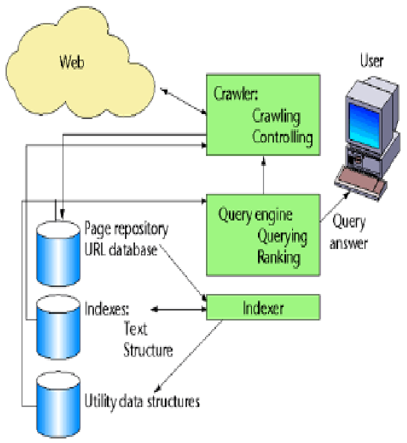


Fig 1 system architecture

DATA FLOW DIAGRAM:

1.The bubble map is another name for the DFD. It is a basic graphical formalism that can be used to describe a device in terms of the data it receives, the processing it performs on that data, and the data it generates as output.

2. One of the most popular simulation methods is the data flow diagram (DFD). It's used to represent the system's various components. The system itself, the data used by the process, an external entity that communicates with the system, and the knowledge flows in the system are all examples of these elements.

3. DFD depicts how data flows through the system and is transformed by a sequence of transformations. It's a schematic representation of data flow and the transformations that occur when data travels from input to output.

4. DFD is often referred to as a bubble map. At any level of abstraction, a DFD may be used to describe a system. DFD can be divided into categories, each representing a higher level of knowledge flow and functional detail.

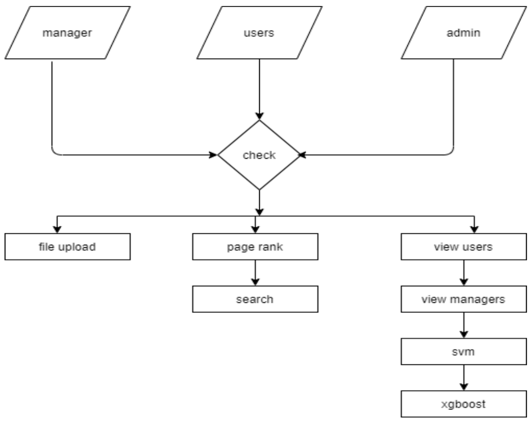
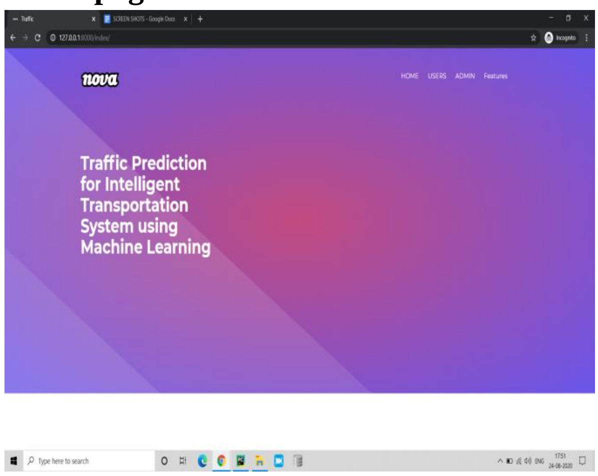


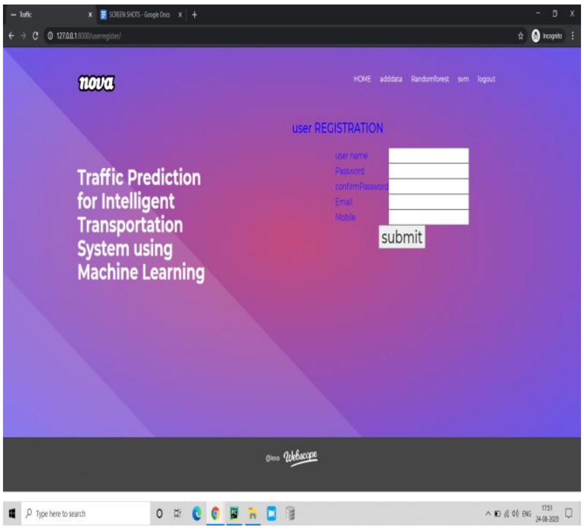
Fig 2 system implementation design

IV.RESULT

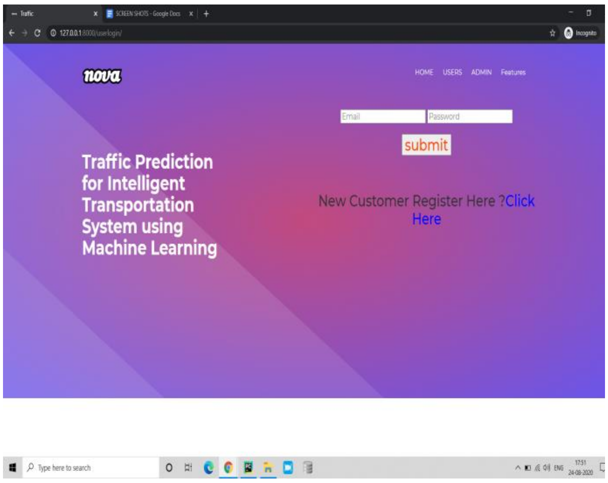
Home page:



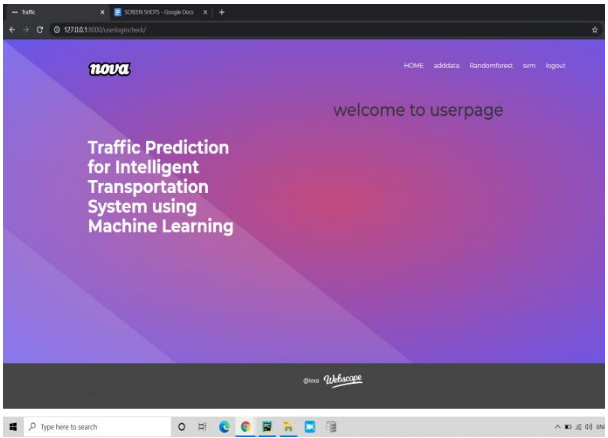
User Register Form:



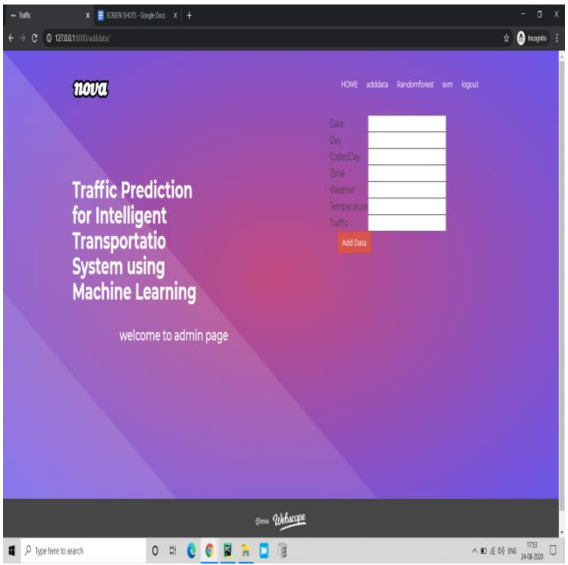
User Login Page



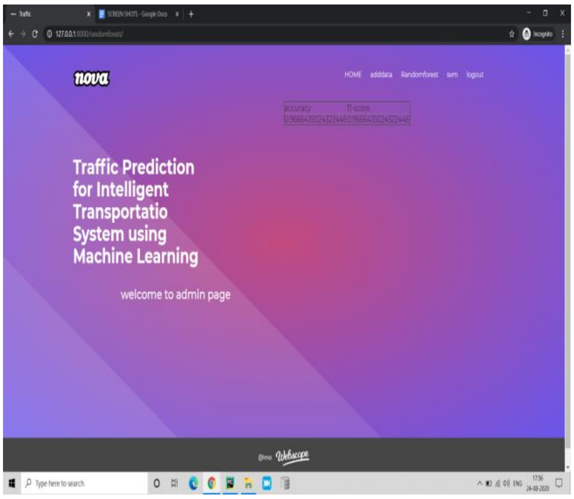
User Home Page



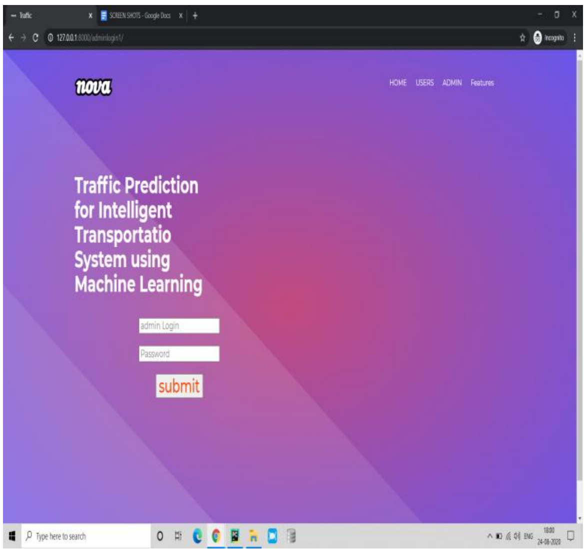
Add data:



Randomforest:

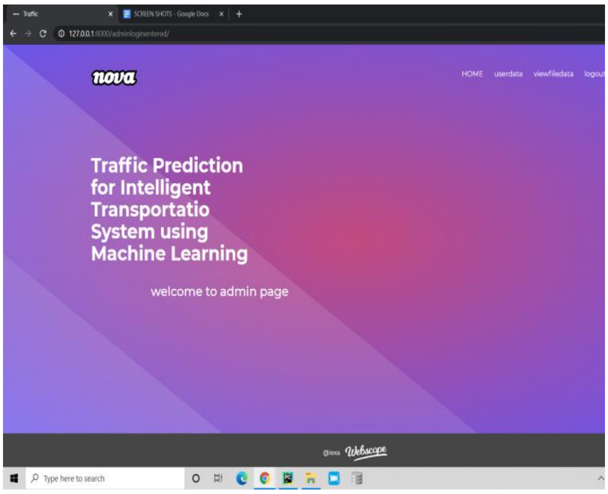


Admin login:

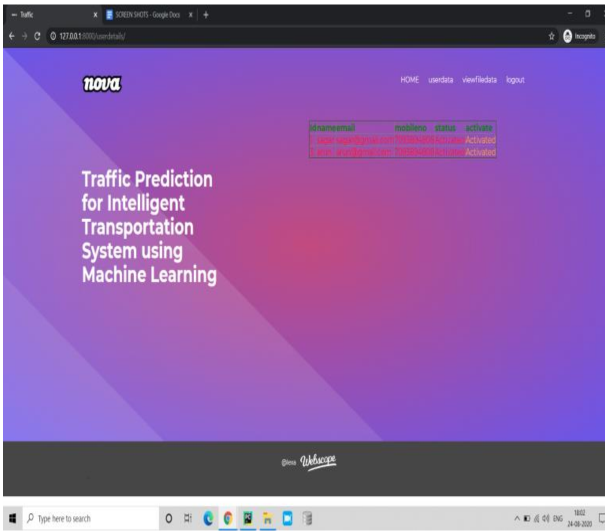


Journal of Engineering Sciences
Vol 13, Issue 06, June/2022
ISSN NO:0377-9254

Admin page:



User details:



V.CONCLUSION

While deep learning and genetic algorithms are essential problems in data processing, the ML community has not focused on them extensively. The proposed 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.

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, MansourehJeihani, and Ryan Fries. Accelerated incident detection across transportation networks using vehicle kinetics and support vector machines 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 NikiforosStamatiadis. 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] H Qi, RL Cheu, and DH Lee. Freeway incident detection using kinematic data from probe vehicles. In 9th World Congress on Intelligent Transport SystemsITS America, ITS Japan, ERTICO (Intelligent Transport Systems and Services-Europe), 2002.

[7] Z. Zhao, W. Chen, X. Wu, P. C. Y. Chen, and J. Liu. Lstm network: a deep learning approach for short-term traffic forecast. IET Intelligent Transport Systems, 11(2):68–75, 2017.

[8] C. Zhang, P. Patras, and H. Haddadi. Deep learning in mobile and wireless networking: A survey. IEEE Communications Surveys Tutorials, 21(3):2224–2287, third quarter 2019.

[9] 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.

[10] Yan-Yan Song and LU Ying. Decision tree methods: applications for classification and prediction. Shanghai archives of psychiatry, 27(2):130, 2015.

[11] Yiming He, Mashrur Chowdhury, Yongchang Ma, and PierluigiPisu. Merging mobility and energy vision with hybrid electric vehicles and vehicle infrastructure integration. Energy Policy, 41:599–609, 2012. [12] Jason Brownlee. Bagging and random forest ensemble algorithms for machine learning. Machine Learning Algorithms, pages 4–22, 2016.