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Intelligent Transportation System for Traffic Forecasting

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Abstract: *This paper aims to develop a tool for predicting accurate and timely traffic flow Information. Traffic Environment involves everything that can affect the traffic flowing on the road, whether it's traffic signals, accidents, rallies, even repairing of roads that can cause a jam. If we have prior information which is very near approximate about all the above and many more daily life situations which can affect traffic then, a driver or rider can make an informed decision. Also, it helps in the future of autonomous vehicles. In the current decades, traffic data have been generating exponentially, and we have moved towards the big data concepts for transportation. Available prediction methods for traffic flow use some traffic prediction models and are still unsatisfactory to handle real-world applications. This fact inspired us to work on the traffic flow forecast problem build on the traffic data and models. It is cumbersome to forecast the traffic flow accurately because the data available for the transportation system is insanely huge. In this work, we planned to use machine learning, genetic, soft computing, and deep learning algorithms to analyse the big-data for the transportation system with much-reduced complexity. Also, Image Processing algorithms are involved in traffic sign recognition, which eventually helps for the right training of autonomous vehicles.*

I. INTRODUCTION

Development and deployment of Intelligent Transportation System (ITSs) provide better accuracy for Traffic flow prediction. It is deal with as a crucial element for the success of advanced traffic management systems, advanced public transportation systems, and traveller information systems. [1]. The dependency of traffic flow is dependent on real-time traffic and historical data collected from various sensor sources, including inductive loops, radars, cameras, mobile Global Positioning System, crowd sourcing, social media. Traffic data is exploding due to the vast use of traditional sensors and new technologies, and we have entered the Various Business sectors and government agencies and individual travellers require precise and appropriately traffic flow information. It helps the riders and drivers to make better travel judgement to alleviate traffic congestion, improve traffic operation efficiency, and reduce carbon emissions. The era of a large volume of data transportation. Transportation control and management are now becoming more data-driven. However, there are already lots of traffic flow prediction systems and models; most of them use shallow traffic models and are still somewhat failing due to the enormous dataset dimension.

II. RELATED WORK

Past decades, machine learning, statistics, and deep learning methods have been demonstrated in traffic prediction simulations. Important ideas are autoregression[6] neural networks, 7 BN,8 and some pre-processing techniques like smoothing.9,10 Works in Liu et al.11 and Miller and Gupta12 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 algorithms13 and online traffic prediction14 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. Preprocessing 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.

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III. PROPOSED METHODOLOGY

Any technique that uses information and control technologies can be divided into small functions:

- Collection of Data
- Processing of Data
- Decision Making System

Arrangement and inspection support based on information. Multiple forms of wireless communication technologies have been introduced for the intelligent transportation system. Communications of radio modem on UHF and VHF frequencies are highly used for short and long-range communication in transportation system.
Below are steps to detect the count the vehicles:

STEP 1: open the application.
STEP2: User have to upload 4 images in 4 traffic lanes one by one in the order.
STEP 3: After uploading of these images, it goes to mode-YOLO3.
STEP 4: It detects the no of vehicles are passing.
STEP 5: And also count.
STEP 6: Release Green signal for highest vehicles count.
STEP 7: So, it is being processed under video surveillance.
STEP 8: Stop

A. Neural Network Algorithm

Stores information on the entire network

- Distributed memory.
- Scales to large data sets.
- The ability of parallel processing.
- The ability to work within sufficient Knowledge.

These are intended to observe collected dataset over certain time intervals. Research shows high accuracy in predicting congestion evolution when applying the modules. It can scale to large data sets.

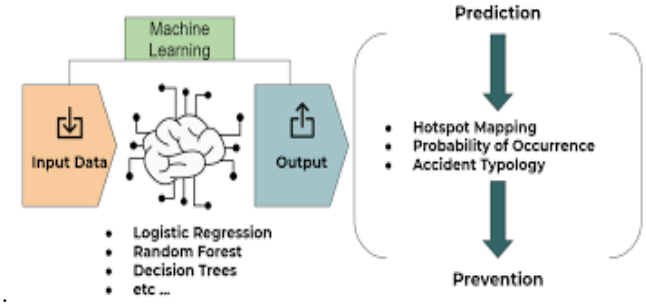

Figure 1: Architecture Diagram for Traffic Prediction

B. Identifying the Congested Situation

a. Collect the traffic data in every 5 min with features:
Location (Measured with GPS)
Direction
Speed
End Junction
b. Group every 5 min interval with their corresponding data.
c. Calculate the distance between each vehicle with all other vehicles within specified junction.
d. If the distance is less than the specific threshold between two vehicles then

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e. Those vehicles are considered to be the neighbourhood vehicles else
f. not considered as neighbour vehicles.
g. end if

C. Classifying the Congested Situation

This will eventually give us the matrix A.

a. Now assign 1 to A [i, j]
b. if A [i, j] < threshold then A [i, j] = 1 else A [i, j] = 0
c. end if
d. Count A [i, j] = 1 and label i, j as neighbourhood vehicles
e. Repeat above steps in every 5 min for 45 min
f. Plot the graph between neighbourhood vehicles and time interval.
g. if the neighbourhood vehicles show an increasing graph, then the traffic congestion is identified
h. else
i. No traffic
j. end if

D. Modules

a. **Collection of Dataset**
In this the data is collected from congestion area. It also involves the tracking of vehicles in the lane.
b. **Preprocess Dataset**
In this step, Pre-processing of data will occur.
c. **Run Neural Network Algorithm**
In this step, it uses the hidden layer to make prediction more accurate.
d. **Run Traffic Light Algorithm**
In this step, some of the parameters like length, queue, inflow and outflow are calculated
e. **Signals**
In this step, green signal is sent to the highest number of vehicles.

IV. RESULT ANALYSIS

The experimental results shown in below diagrams.

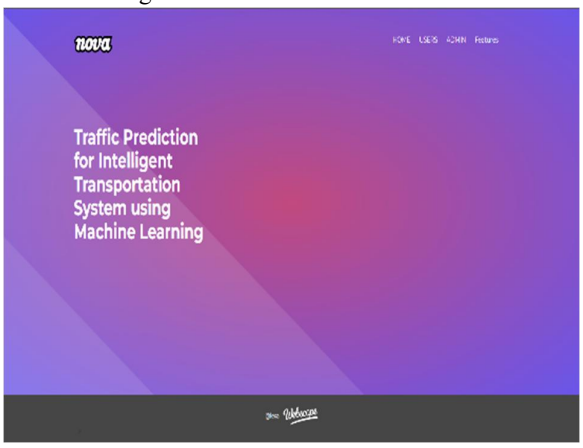

Figure 3: Home Page

In the above screen we can see different modules like users, admin, features. Users can login to user's page and admin can login to admin page.

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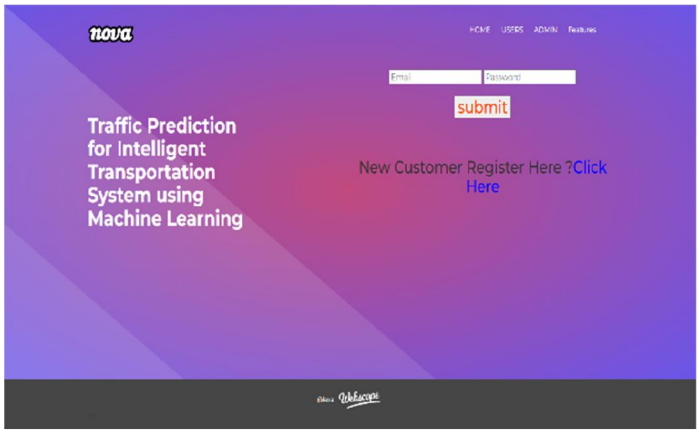

Figure 4: User Login

In the above screen we can login to our account and if doesn't have an account we create by clicking the "click here" nav bar.

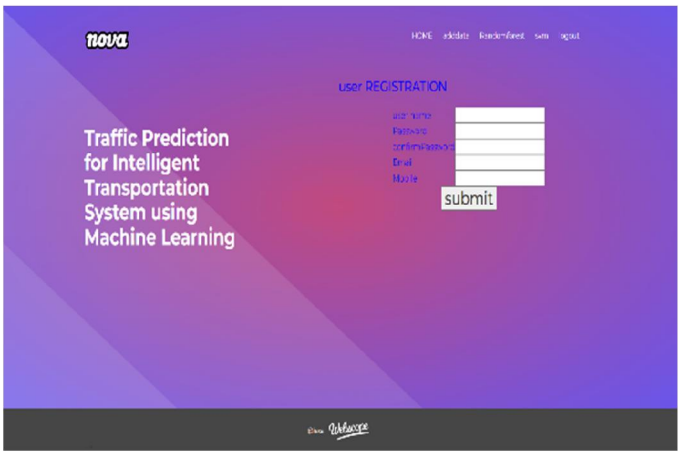

Figure 5: User Registration

In the above screen we can create an account by providing details like username, password, email, mobile number.

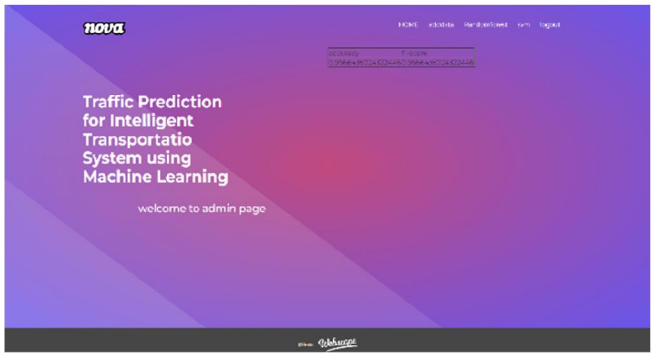

Figure 6: Accuracy

In the above Screen we can see the accuracy and f-score of the traffic.

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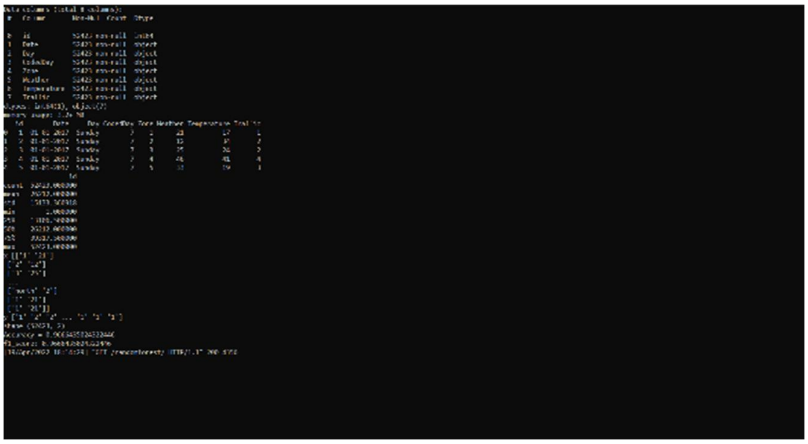

Figure 7: Prediction of Traffic

In the above screen we can see the traffic rate, temperature in different zones on a particular day.

V. CONCLUSION

In this paper we have proposed a framework for traffic prediction by intelligent transport system to control the traffic. It is very important problem in data analysis. Here we are using machine learning and genetic algorithm. This proposed algorithm gives the much higher efficiency than the existing system. From the dataset it modifies the complex issues.

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