Overview of Traffic Flow Dynamics in Chicago

Traffic-Related Deep Learning Project

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Introduction

The goal of this project is to classfied traffic Statues (low, medium, high) based on historical traffic volume data on Chicago city.

Dataset Overview

- We used the Traffic Volume Dataset from Kaggle

https://www.kaggle.com/datasets/bobaaayoung/trafficvolumedatacsv

- Data Preprocessing:

One-Hot Encoding.

Label Encoding.

Feature Scaling.

Model Selection

- We selected a Convolutional Neural Network **(CNN)**

Model Architecture:

Input Layer: The input layer corresponds to the features after scaling.

Dense Layers: Two dense layers with 64 and 32 units respectively, each followed by ReLU activation.

Output Layer: A dense layer with 3 units and softmax activation, corresponding to the three traffic conditions (low, medium, high).

Model Training and Evaluation

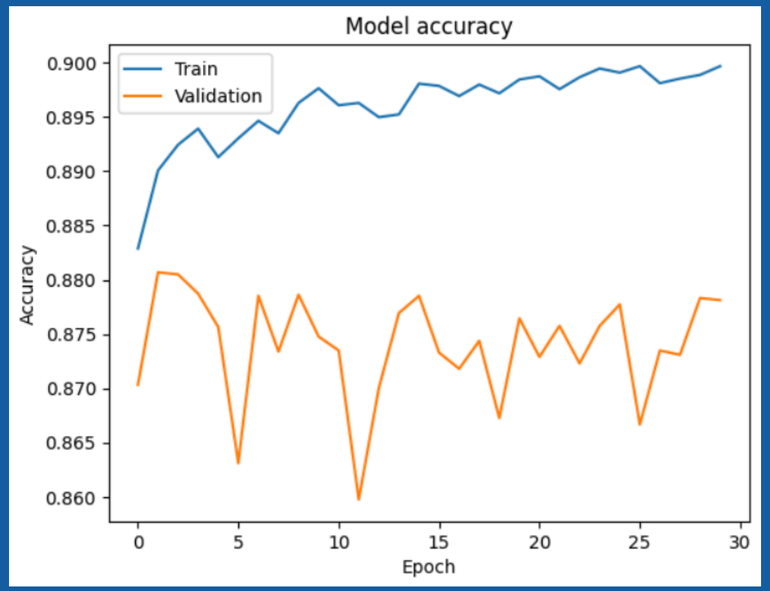
Training Process: The model was trained on the preprocessed dataset, with 70% for training, 30% **for validation.**

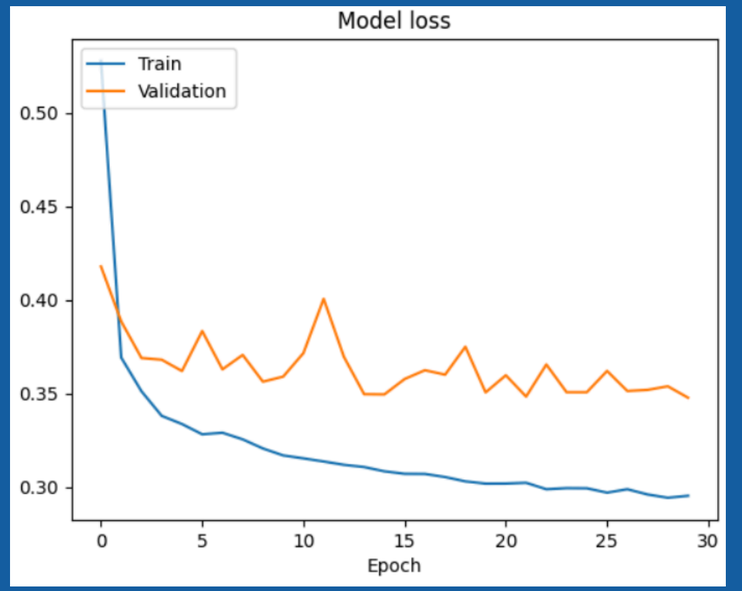
Evaluation Metrics: Accuracy: The final test accuracy for the CNN model was evaluated at the end of the training process. Validation and Loss Curves: The accuracy and loss during training and validation were plotted to assess the model's performance over time.

Test Result

- The CNN model achieved a test accuracy of 92%.
- Test Loss: sparse_categorical_crossentropy

The final test loss value was also recorded, demonstrating the model's performance.





Challenges and Solutions

Dataset

Finds appropriate dataset based on our idea

Choosing the best model

In the first, we struggle in many model until we find this model

Model Tuning

Hyperparameter tuning involved selecting the optimal number of epochs, batch size, and learning rate to achieve the best validation performance.

Data Preprocessing

Managing categorical data and feature scaling were key challenges that were addressed through one-hot encoding, label encoding, and standardization.

Conclusion

Key Findings

- The CNN model is highly effective in predicting traffic conditions with a test accuracy of 92%.
- Data preprocessing, particularly feature scaling and encoding, played a crucial role in model performance.

Thank you
for listening!