

# Automated Vehicle License Plate Detection And Recognition Using Yolo And CNN

*Project Supervisors: Dr. Usman Nazir, Dr. Sana Bashir*

*Umer Mansoor, Wajahat Siddique, Nayab Bashir  
Knowledge Streams, Lahore, Pakistan*

## 1. Motivation

With a fervent drive to contribute to the evolution of intelligent transportation systems, the goal of this project is to develop an automated license plate recognition system using deep learning models. The purpose is:

- To reduce manual intervention.
- To enhance security and efficiency in traffic management.
- To aid enforcement agencies to recover stolen vehicles.
- Build a cost-effective alternative to expensive proprietary license plate recognition systems.

## 2. Problem Statement

In contemporary urban environments, the exponential increase in vehicular density necessitates advanced solutions for efficient traffic management and enhanced security.

Manual license plate monitoring is cumbersome and prone to errors. The lack of an automated system hinders timely response to security threats and contributes to traffic inefficiencies.

This research addresses the critical need for a robust automated license plate detection and recognition system to streamline traffic management, bolster security measures, and optimize urban mobility.

## 3. Models

### YOLOv8 for License Plate Detection:

- Chosen for its exceptional real-time object detection capabilities.
- Balances speed and accuracy, crucial for dynamic urban traffic scenarios.
- Outperforms competitors like SSD (Single Shot Detectors) and RetinaNet.

### Character Recognition Models:

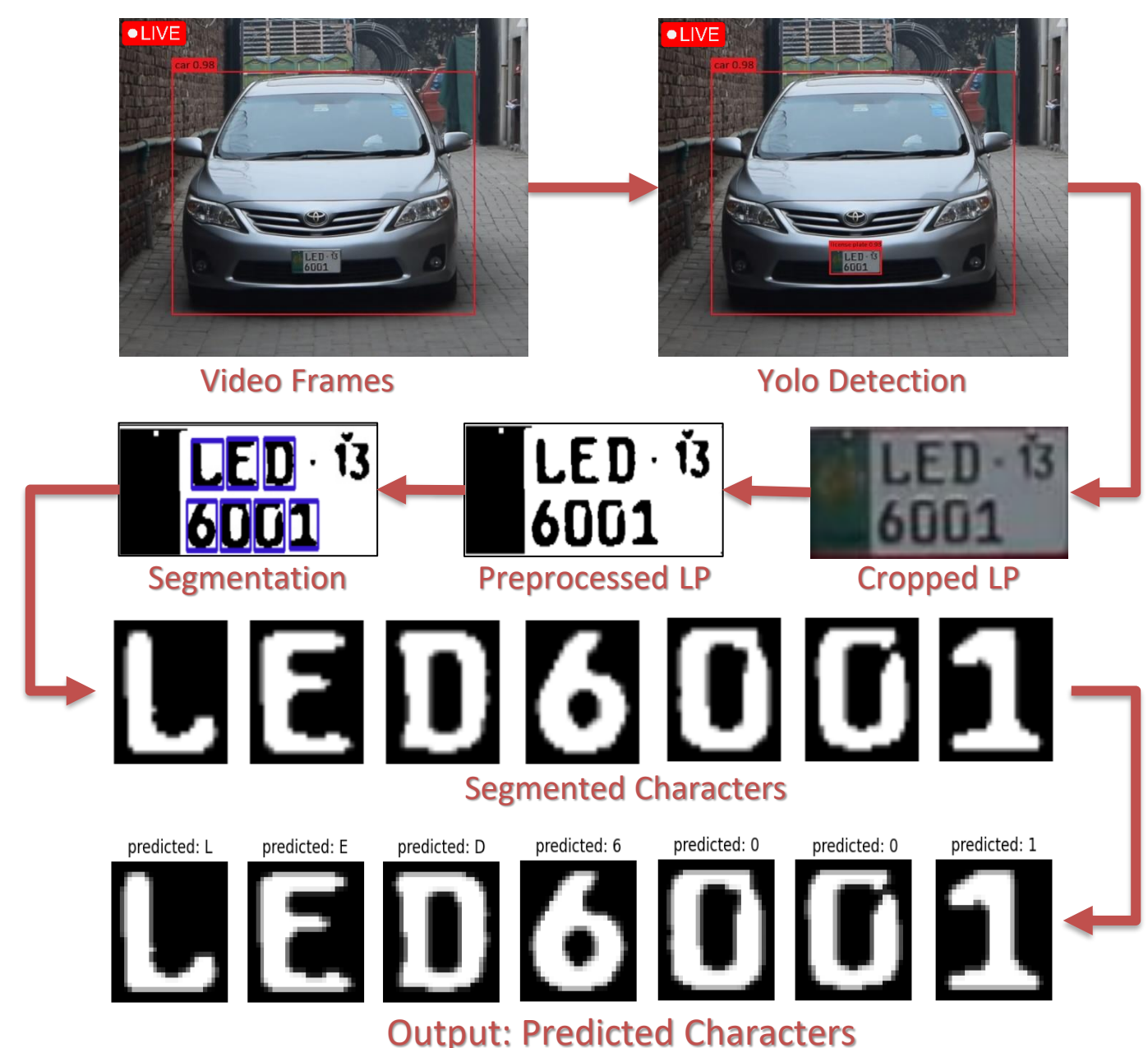
- Proposed four models for character recognition: CNN, MobileNet, Inception V3, and ResNet50.
- CNN emerges as the top performer.

### Evaluation Metrics:

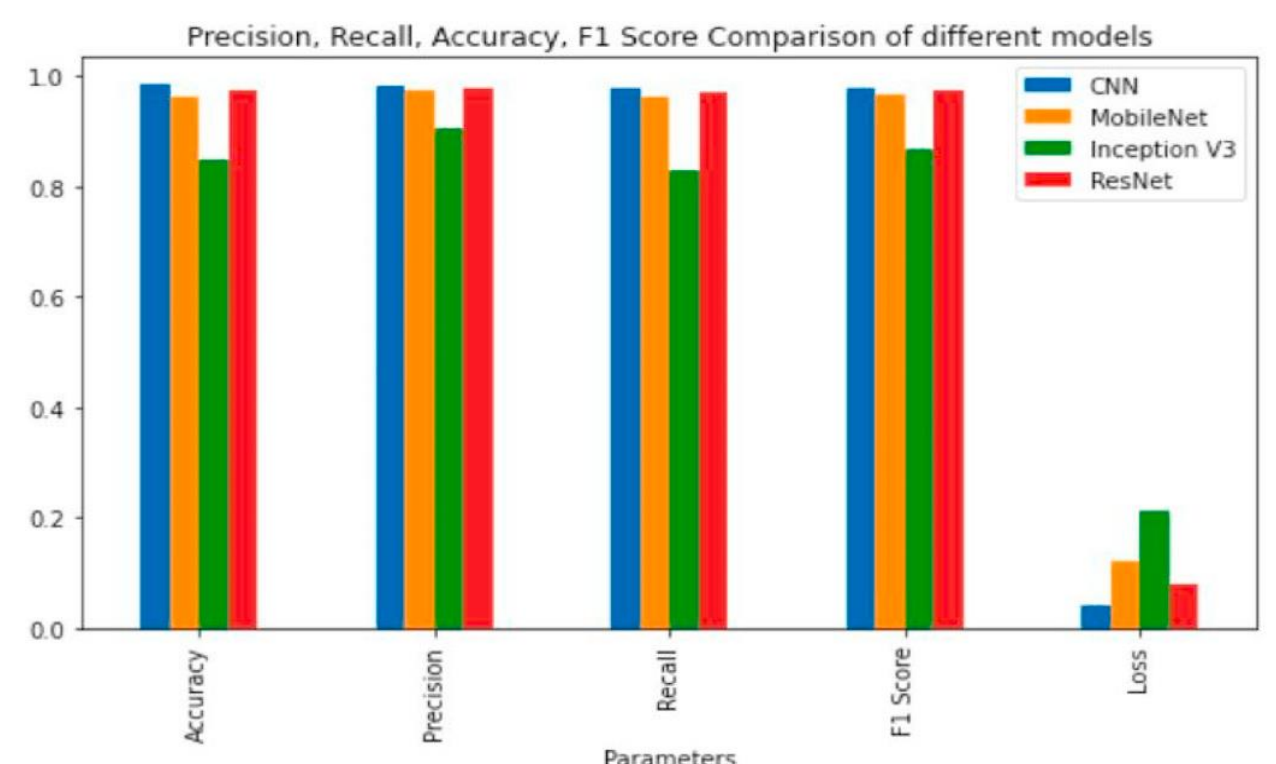
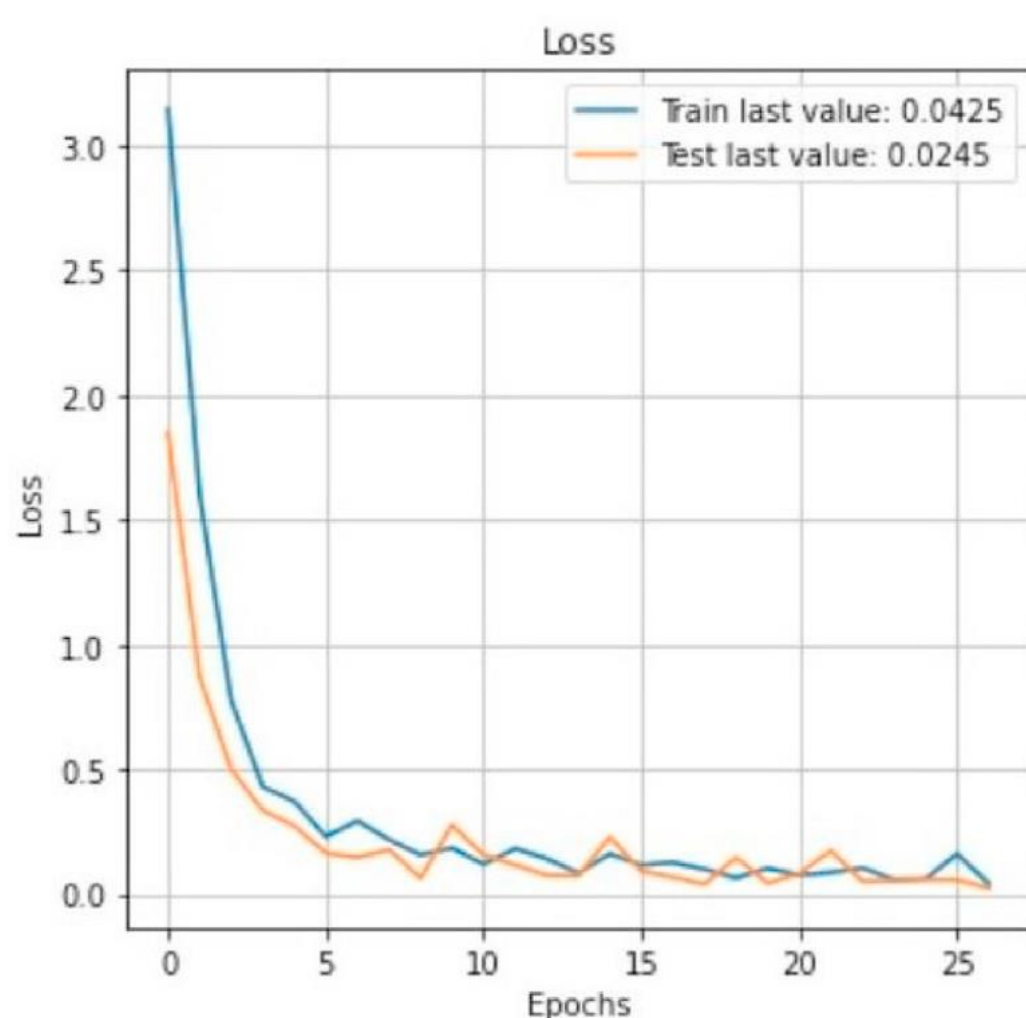
Performance assessed using five evaluation measures:

- Precision
- Accuracy
- Recall
- F1-Score
- Loss

## 4. Methodology:



## 5. Results



Parameters	CNN	MobileNet	Inception V3	ResNet
0 Accuracy	0.9850	0.9639	0.850385	0.9737
1 Precision	0.9803	0.9729	0.907655	0.9796
2 Recall	0.9780	0.9611	0.830481	0.9699
3 F1 Score	0.9791	0.9670	0.866688	0.9747
4 Loss	0.0425	0.1224	0.213159	0.0816