Summary

In this project, I implemented **Naïve Bayes, Non-Bayes, and K-Nearest Neighbors (KNN)** classifiers using the **MNIST dataset**, focusing on its application in **Automatic License Plate Recognition (ALPR)**. The aim was to evaluate different machine learning techniques for digit recognition in license plates. The **Naïve Bayes classifier achieved 77.46% accuracy**, while the **Non-Bayes method improved performance to 86.15%**. The **KNN classifier is still running**, and its final accuracy is yet to be determined. The implementation was done using **Python and Jupyter Notebook**, leveraging associated libraries such as **NumPy, Pandas, Scikit-learn, and Matplotlib** for data processing, model training, and evaluation. While traditional machine learning models provide a solid foundation, **future work** will explore **computer vision-based approaches like CVV or deep learning models such as YOLO** to improve accuracy and handle real-world ALPR challenges more effectively.

Key Points:

1. **Dataset:** Used the **MNIST dataset** for digit recognition in ALPR applications.
2. **Use Case:** Focused on extracting and recognizing digits from license plates.
3. **Algorithms:** Implemented **Naïve Bayes, Non-Bayes, and KNN** classifiers.
4. **Results: Naïve Bayes - 77.46% accuracy, Non-Bayes - 86.15% accuracy, KNN - still running.**
5. **Tools Used: Python, Jupyter Notebook**, and libraries like **NumPy, Pandas, Scikit-learn, Matplotlib**.
6. **Challenges:** Dealing with different fonts, distortions, lighting conditions, and image quality variations.
7. **Comparison:** Non-Bayes outperformed Naïve Bayes, but KNN results are pending.
8. **Limitations:** Traditional ML models struggle with real-world license plate variations.
9. **Future Work:** Explore **CVV and YOLO** for higher accuracy and real-time ALPR performance.