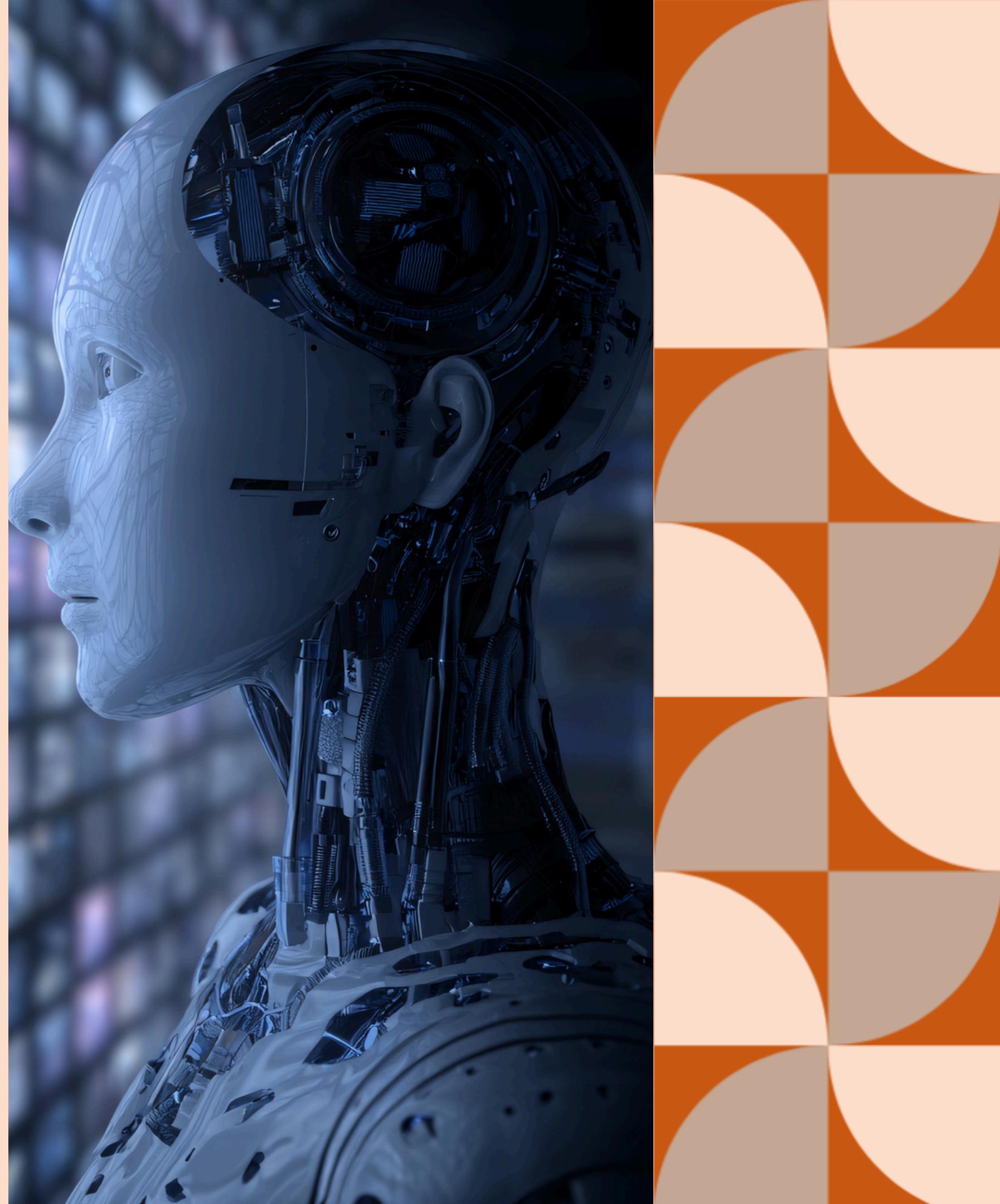


# End-to-End Computer Vision Pipeline

AI Internship Evaluation of Candidate Journey



# Project Overview

This project aims to develop a robust computer vision pipeline leveraging YOLOv8 and ByteTrack for real-time object detection and tracking in complex environments using LabelLerr

## Project Goal

To create an efficient pipeline that enhances object detection accuracy and facilitates seamless tracking in diverse scenarios.

## Technology Stack

The pipeline employs state-of-the-art tools including YOLOv8 for detection and ByteTrack for tracking, ensuring high performance and scalability.

## Implementation Strategy

A strategic approach integrates data collection, annotation, and model training, ensuring robust performance through iterative improvements and evaluations.

# Project Timeline

This timeline outlines the key milestones achieved throughout the development of the end-to-end computer vision pipeline, showcasing critical phases from data collection to deployment.

Data Collection  
completed

Data Annotation with  
Labellerr finished

Model Training and  
Evaluation conducted

Connecting with  
Bytetrack

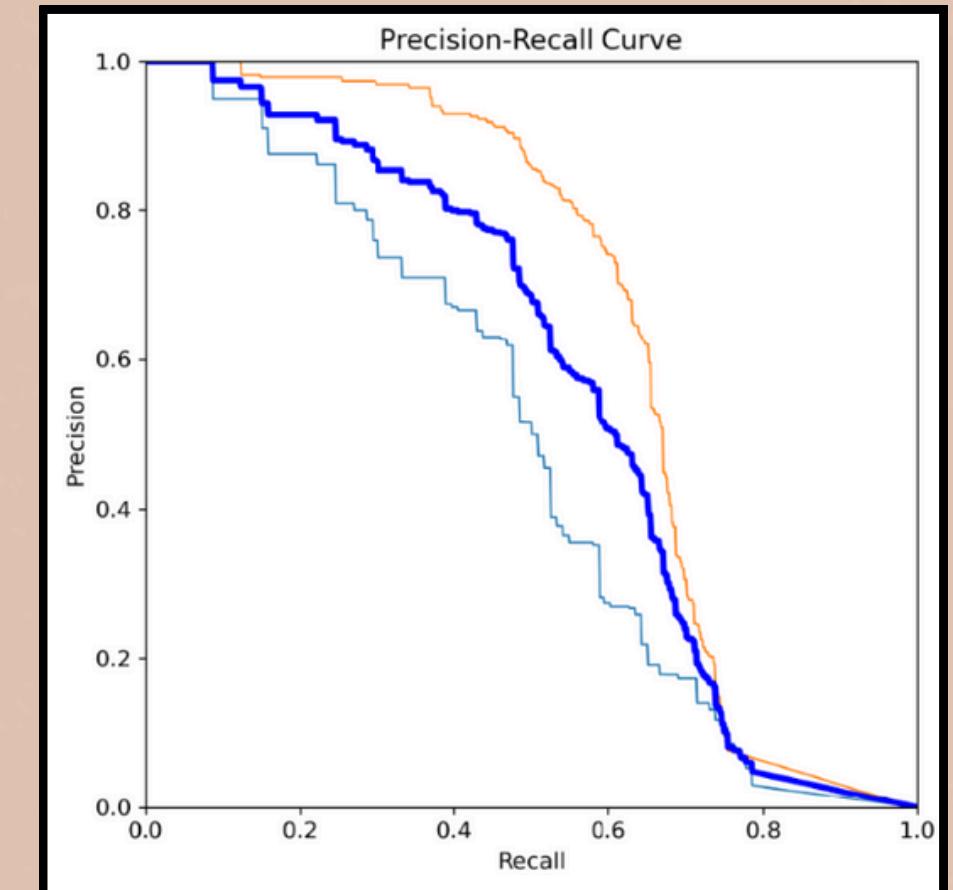
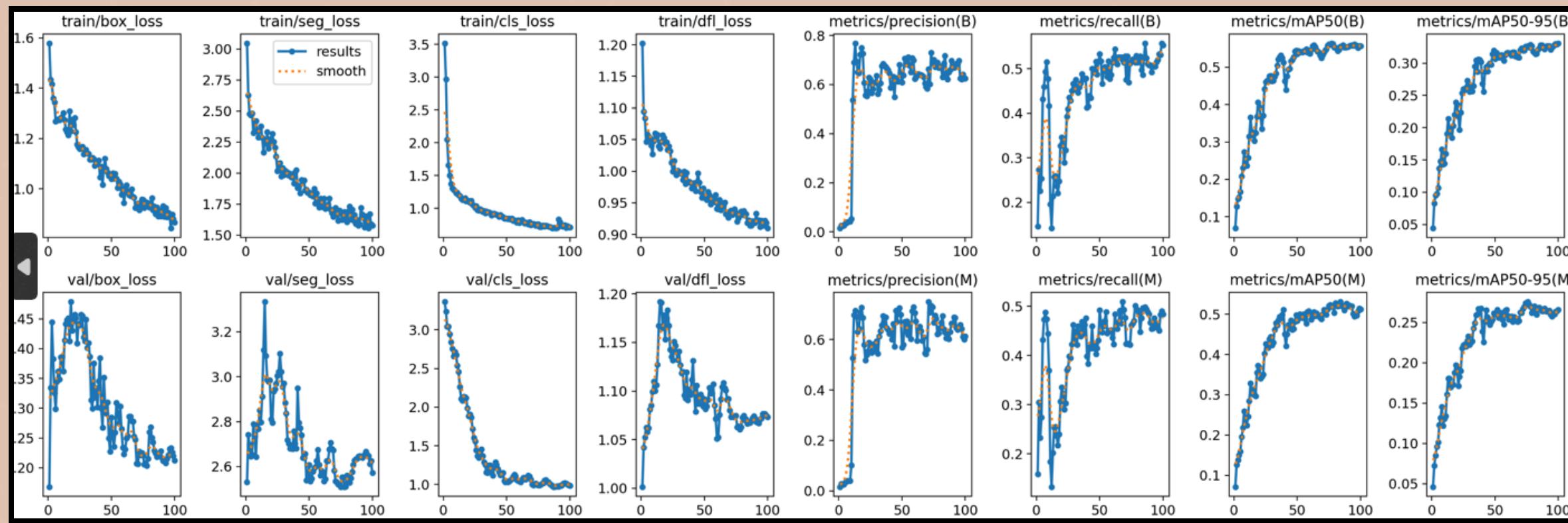
Generating output  
videos

# Diverse conditions for robust data collection

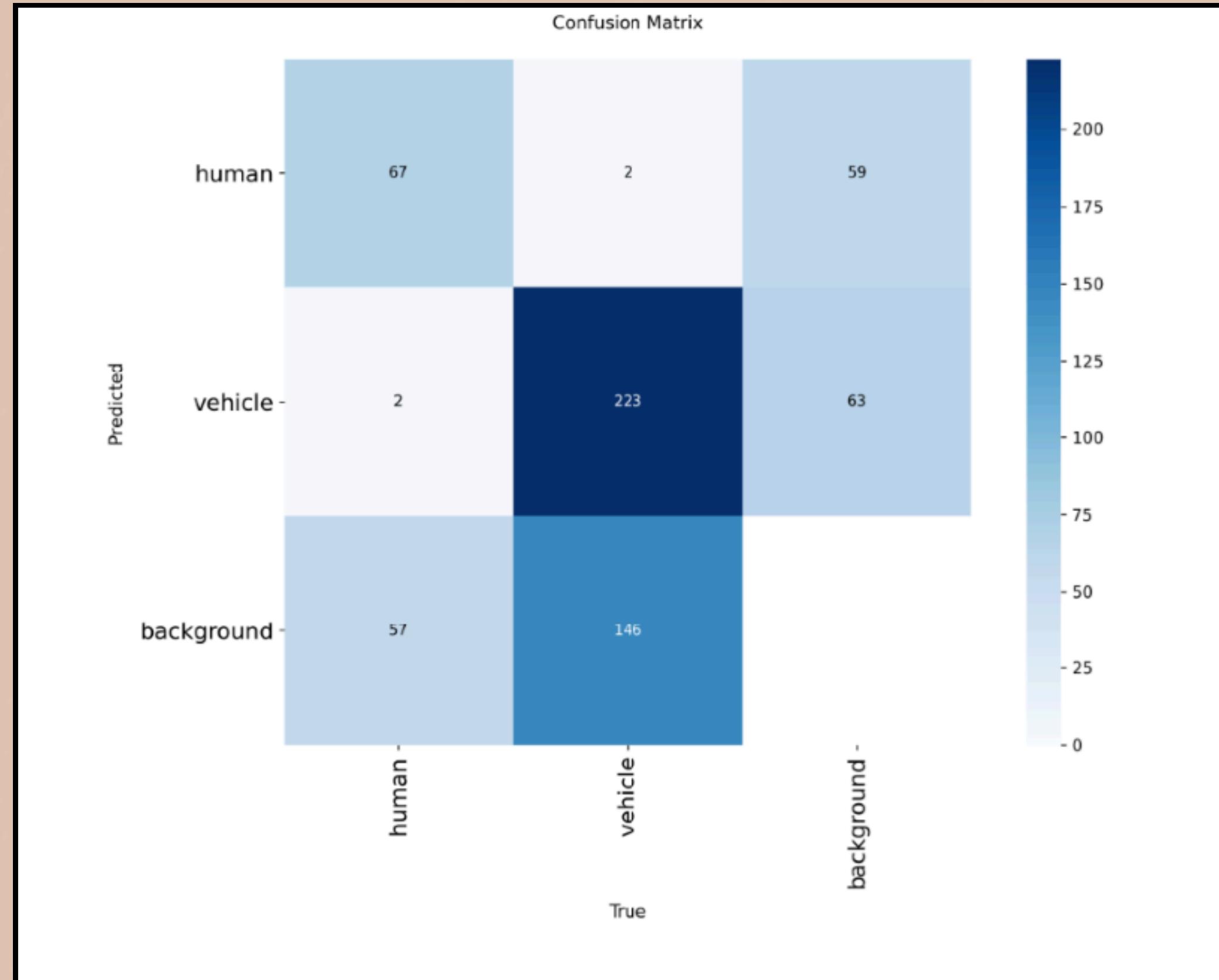


# Model Training

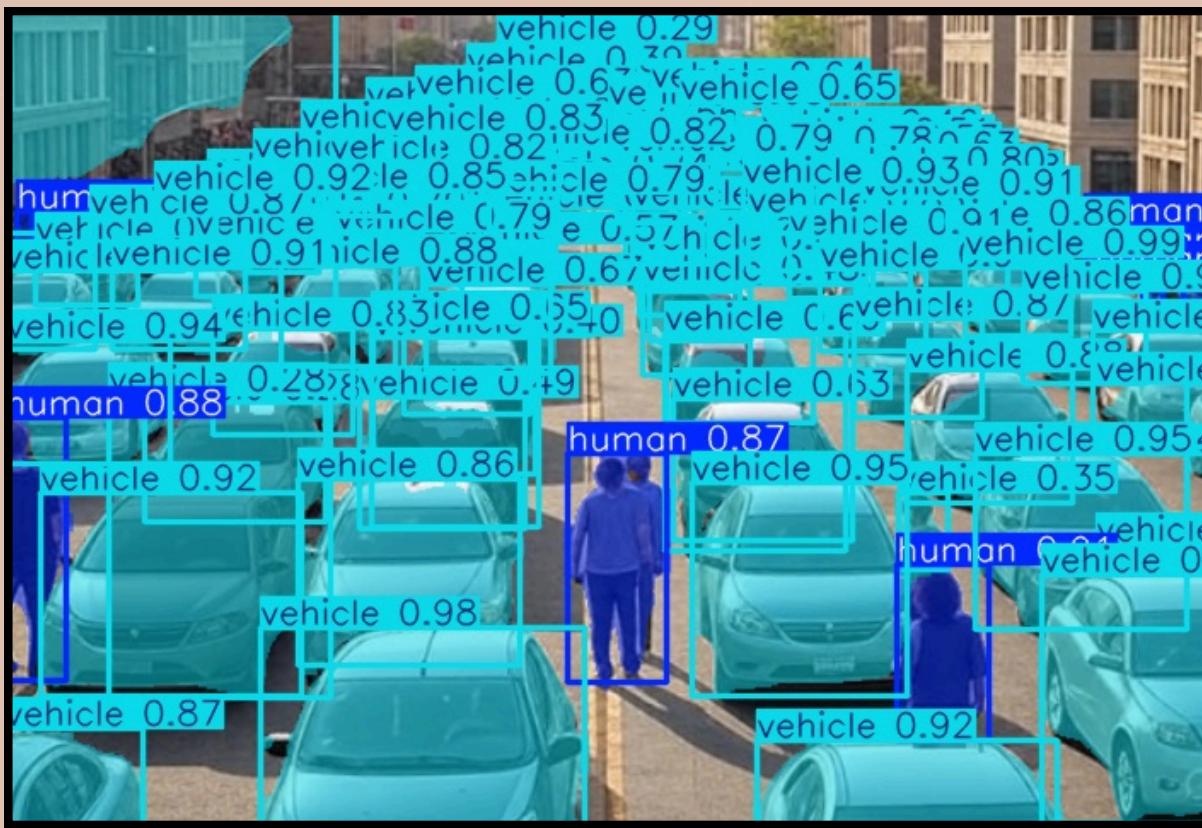
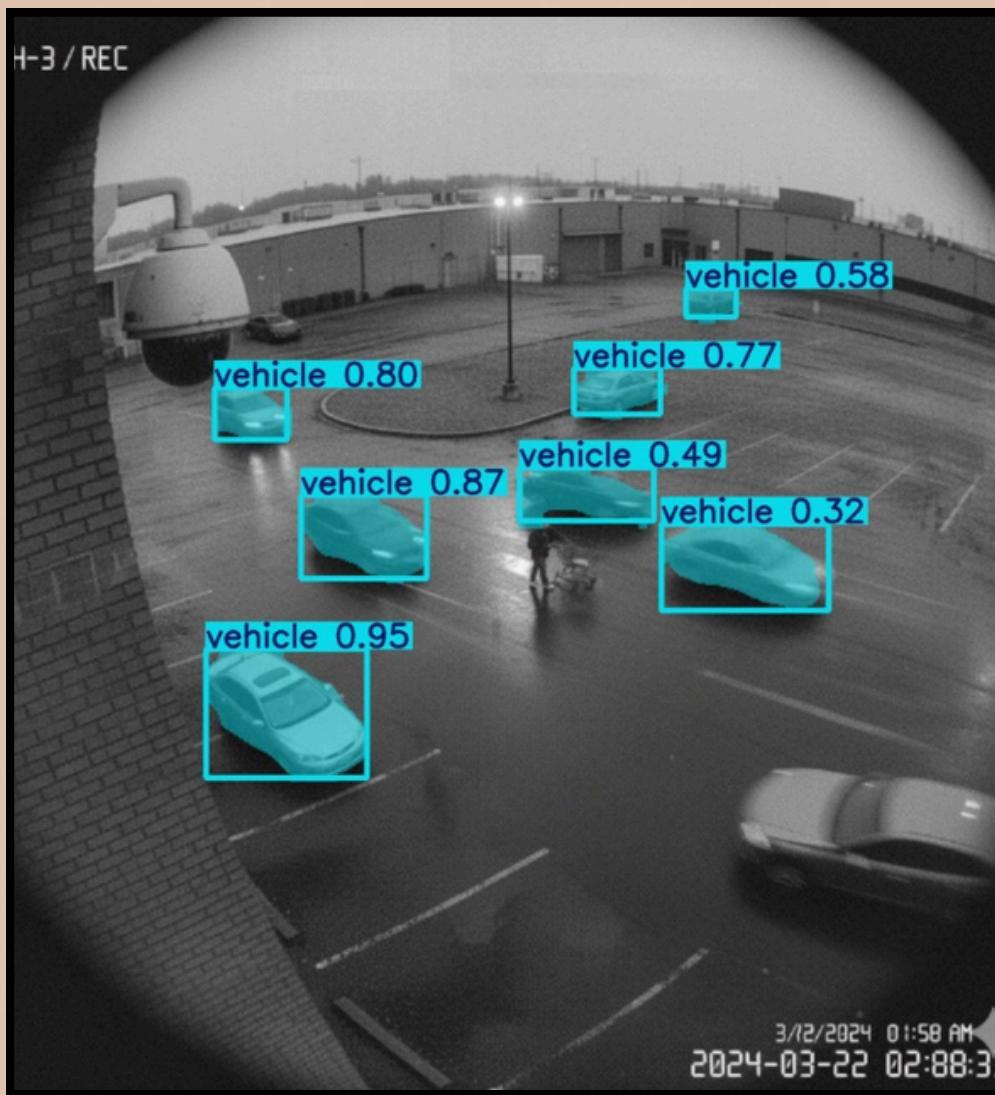
This section delves into the methodology and outcomes achieved during the model training phase, utilizing YOLOv8 for effective object detection.



# Confusion Matrix



# Predictions



# Key Learnings from the Project

## Insights gained during the project journey

- **Insight 1:** The Dataset, Not the Model, Was the True Bottleneck. Evaluation revealed the primary challenge was distinguishing objects from the background, proving that a diverse dataset with negative samples is more critical for real-world accuracy than model complexity.
- **Insight 2:** The AI Feedback Loop is the Engine for Scalability. Using the v1 model to pre-annotate the test set confirmed that correcting AI suggestions is exponentially faster than manual labeling, making this workflow the only viable path for large-scale projects.
- **Insight 3:** A Successful AI Project is a Full-Stack Product, Not Just a Model. The journey proved that the final .pt file is only one component; true success lies in managing the entire lifecycle, from data curation and API integration to building a compelling user-facing demo.

Thank  
You

