SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION

WINTER SEMESTER 2023-24

SWE1018 - HUMAN COMPUTER INTERACTION

TOPIC : VEHICLE DETECTION & COUNTER

FACULTY : PROF. ANBARASU B

SLOT : E2

TEAM MEMBERS :

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- **21MIS0123 –PRANAY**
- **22MIS0350 - VAMSHI**

Evaluate your interface with Nielsen's Heuristics

Usability Heuristics for User Interface Design

1: Visibility of System Status

2: Match Between the System and the Real World

3: User Control and Freedom

4: Consistency and Standards

5: Error Prevention

6: Recognition Rather than Recall

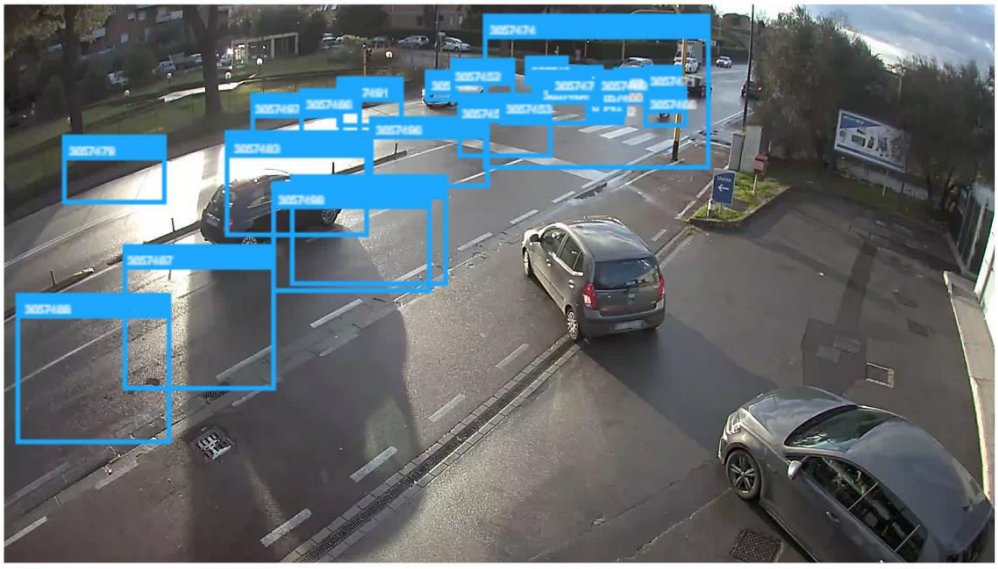
7: Flexibility and Efficiency of Use

8: Aesthetic and Minimalist Design

9: Help Users Recognize, Diagnose, and Recover from Errors

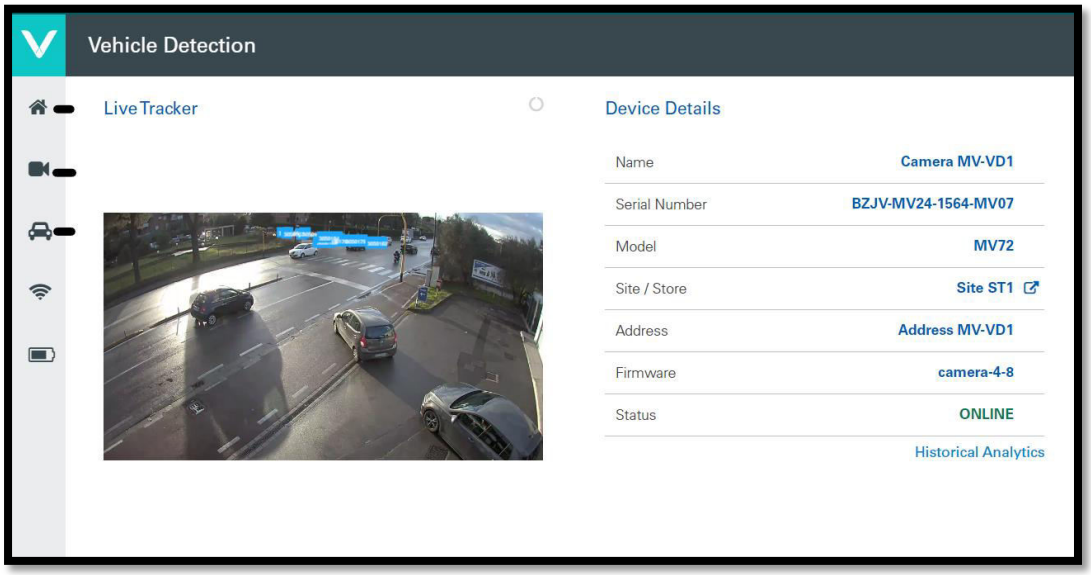
10: Help and Documentation

1. Visibility of System Status



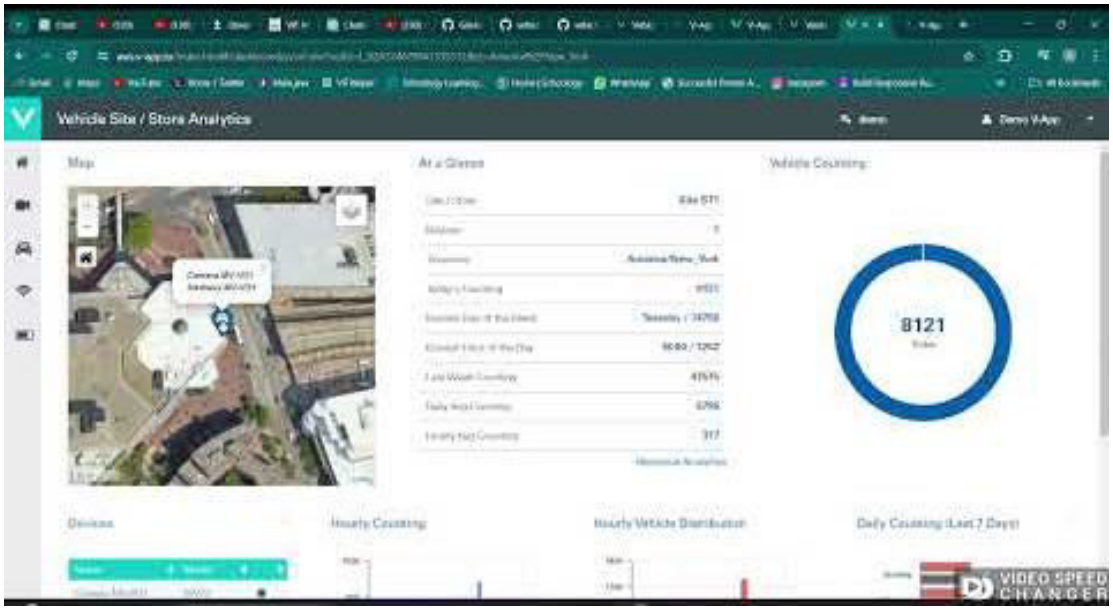
- Including a status indicator showing when the system is actively detecting vehicles, when it's idle, or when it encounters an error.

2: Match Between the System and the Real World



- Example: Using icons like Home to represent HomePage.
- Using Car icon to represent Vehicle Analytics
- Using Camera icon to represent Live Tracker

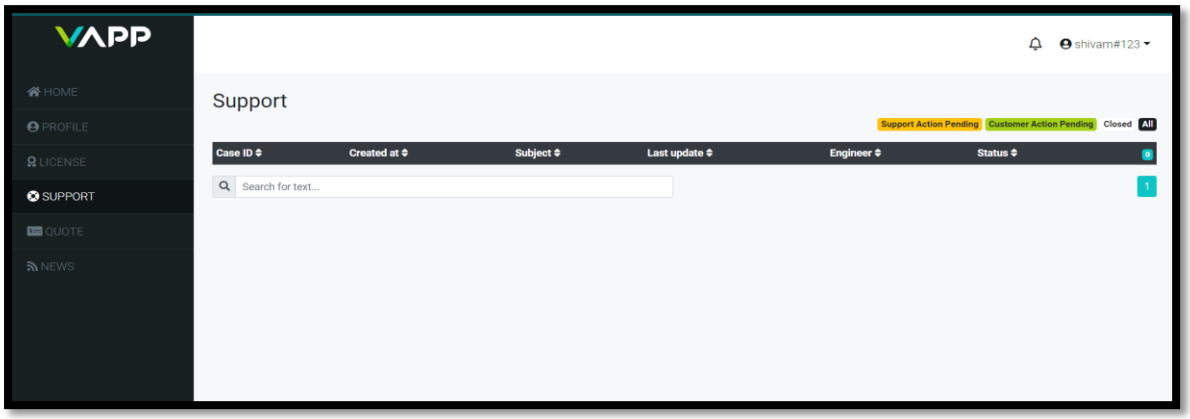
3.User control and freedom:

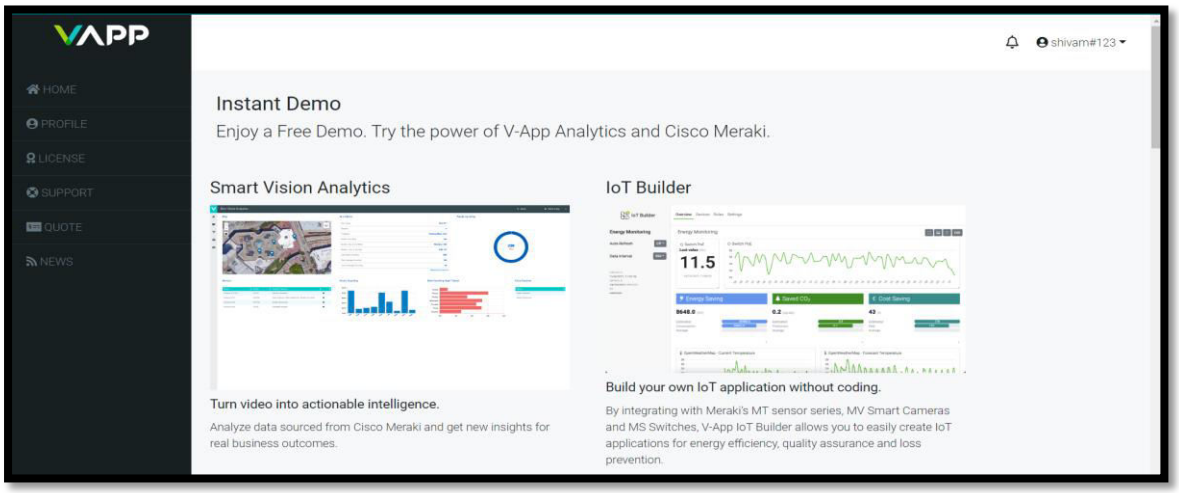


Example: Demonstrating how users can easily navigate through the system, go back or undo actions, and have control over their interactions.

4. Consistency and standards ; Aesthetic and minimalist design:

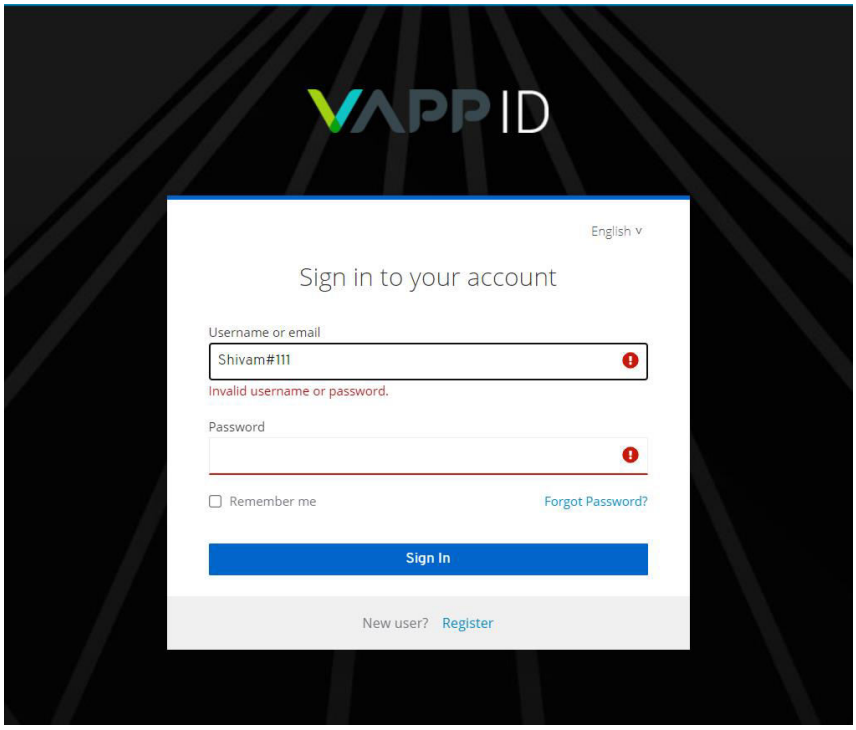
- Showcasing how consistent design elements such as uniform layout, color schemes, and navigation patterns are across different screens or modules within the system.
- Keeping the interface clean and uncluttered, focusing on essential information such as real-time detection updates and configuration options

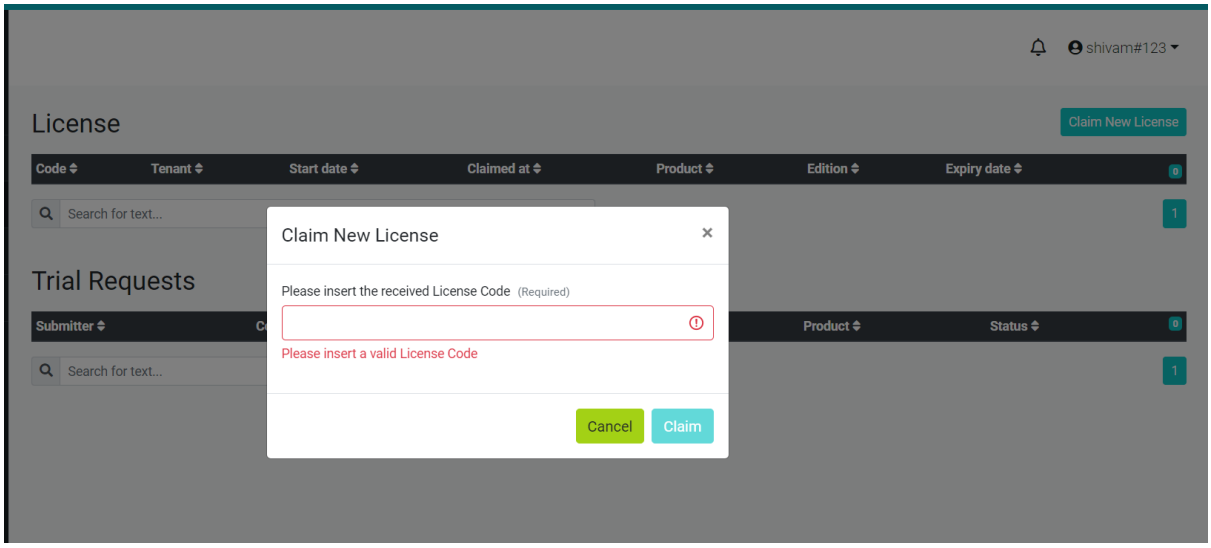




5. Error prevention And Helping users recognize, diagnose, and recover from errors:

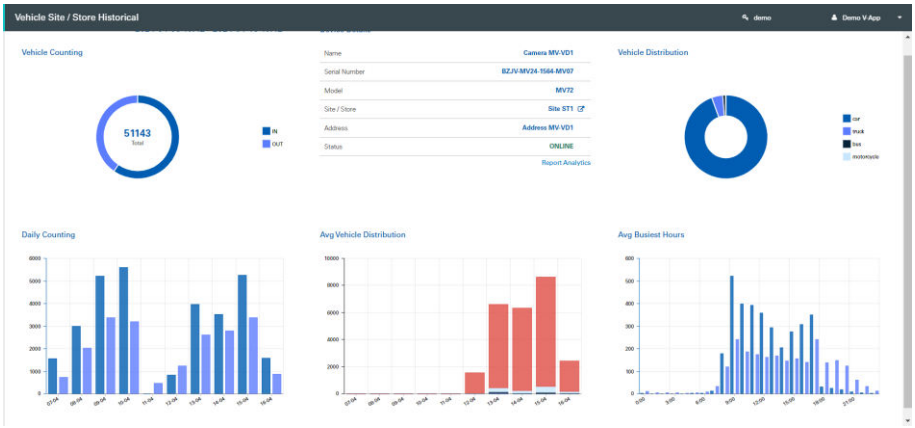
- Highlighting features that help prevent errors, such as confirmation dialogs for irreversible actions, input validation to catch mistakes before submission, and clear instructions to guide users.





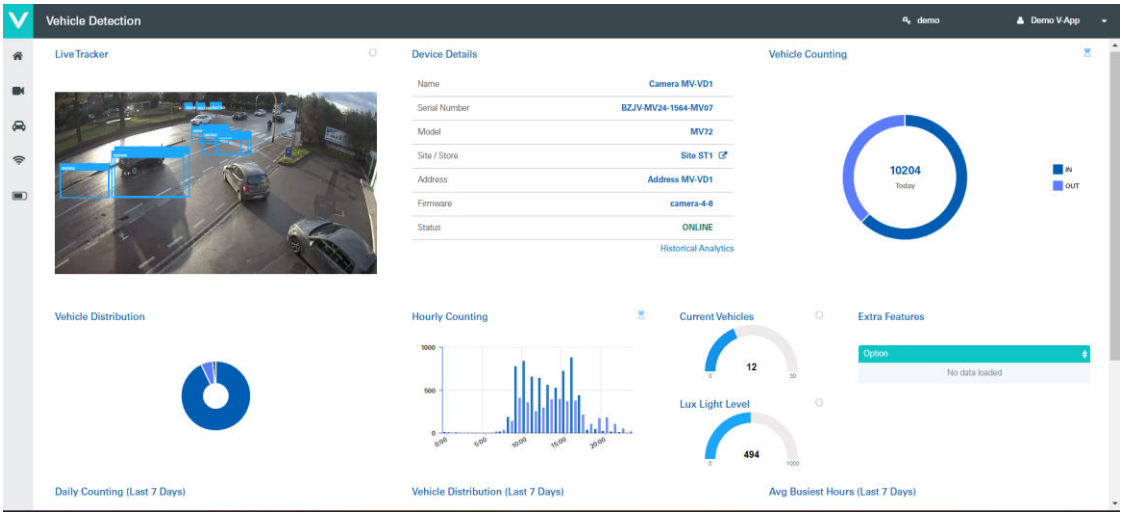
6. Recognition rather than recall:

- Display relevant information and options contextually. For example, showing vehicle detection results alongside corresponding camera feeds without requiring users to recall which camera they are viewing.



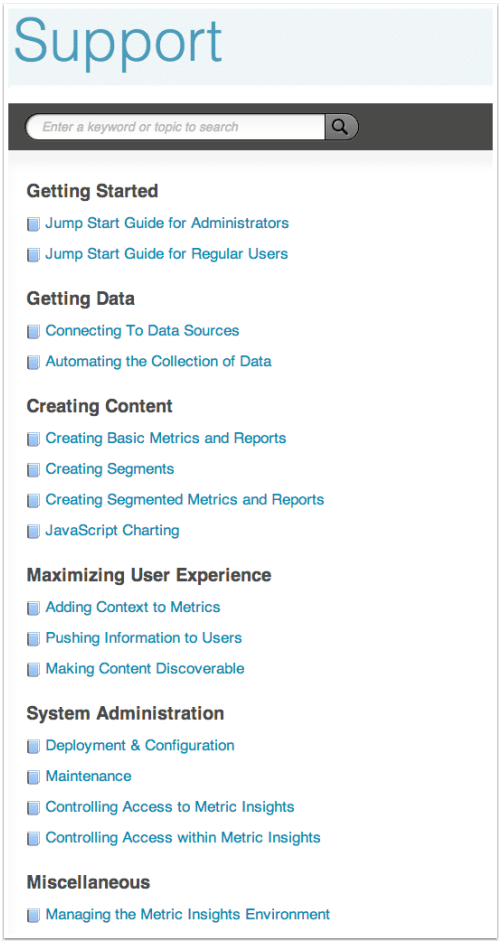
7. Flexibility and efficiency of use:

- Showing how the interface caters to both novice and expert users by offering shortcuts, customizable settings, or advanced features that enhance efficiency without compromising usability for beginners.



8. Help and documentation:

- Including a comprehensive user manual or help section within the app, covering topics such as setup instructions, troubleshooting common issues, and FAQs. Offer tooltips or contextual help for complex features.



VEHICLE DETECTION AND COUNTER

BY Pranay Gorantla (21MIS0123), Shivam Diwakar (21MIS0075), Vamshi (22MIS0350)

Guided By Prof. Anbarasu | School Of Computer Science Engineering And Information (SCORE)

INTRODUCTION

Developing state-of-the-art technology to enable accurate vehicle detection and counting on roads and highways is the aim of the Vehicle Detection and Counter project. Effective traffic management is a growing concern for transportation authorities and city planners in metropolitan regions as traffic volume increases. Our research uses state-of-the-art computer vision techniques and machine learning algorithms to develop a reliable and stable real-time vehicle detection and counting system. Data generated by this system will be critical for monitoring, infrastructure construction, and traffic analysis.

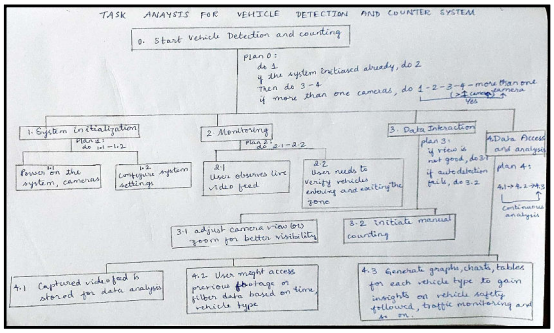
SCOPE OF THE PROJECT

The scope of the vehicle detection and counter project encompasses the development of a robust and efficient system for accurately detecting and counting vehicles in a given area. This includes the design and implementation of computer vision algorithms capable of analyzing video feeds or image data to identify vehicles, classify them based on their type (e.g., cars, trucks, bicycles), and track their movement over time. The project will involve the integration of hardware components such as cameras or sensors with software algorithms to achieve real-time processing and analysis of vehicle data. Additionally, the system will provide features for data visualization, reporting, and analysis to enable stakeholders to monitor traffic flow, identify congestion patterns, and make informed decisions for traffic management and infrastructure planning purposes.

PROBLEM STATEMENT

The creation of a scalable and effective vehicle identification and counting system is urgently needed in order to precisely evaluate traffic patterns, offer real-time data insights, and support well-informed decision-making for infrastructure utilization and traffic management. Managing traffic congestion, optimizing infrastructure utilization, and improving road safety are difficult tasks for transportation authorities, city planners, and other stakeholders due to the limitations of current vehicle detection and counting solutions, which include high costs, limited scalability, and inaccurate data collection.

SEQUENCE AND FLOW MODEL



REQUIREMENTS

As a user I need :

1.Effective Vehicle Detection and Counting System

2.Comprehensive Data Collection like traffic counts, vehicle speed, and classification data to support various transportation projects.

3.Analysis of vehicle movements through camera pictures using computer vision algorithms.

4.Generation of reports detailing the total number of detected vehicles and traffic density

5.The user-friendly interface should provide intuitive navigation and visualization of vehicle detection results.

6.Provision of comprehensive manuals and documentation to guide users on system operation.

FEATURES

1.Utilize computer vision techniques to detect vehicles in real-time from video streams or recorded footage.

2. Implement algorithms to accurately count the number of vehicles passing through designated areas or lanes.

3. Classify vehicles based on size, type, or other relevant characteristics to provide detailed traffic data.

4. Collect and analyze traffic data including counts, speeds, and vehicle classifications for informed decision making in transportation projects.

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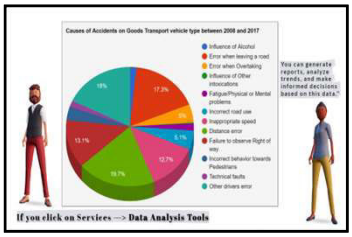
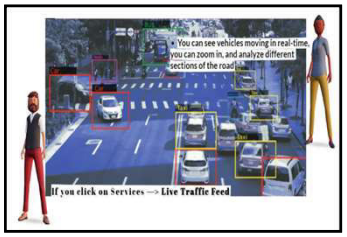
TASK ANALYSIS

Task	Parameters
Goal/Output	To develop and deploy a robust vehicle detection and counting system that accurately monitors traffic flow on roads and highways.
Inputs	High-quality video feeds from cameras. Computer vision algorithms.
Assumptions	Cameras are positioned to provide clear and unobstructed views of traffic lanes. The system operates effectively under normal weather conditions
Steps	1.Log in to the system. 2.Access the "Live Feed" or "Monitoring" section to view real-time video streams. 3.Monitor the video feed to observe vehicles passing through the detection zone. 4.Generate customized reports based on specific parameters such as date range, location, or vehicle type.
Time for Experts	Experts involved in system setup, configuration, and maintenance may require several hours to days.
Instructions for Users	Follow on-screen prompts to initialize the system and verify camera connections. Use zoom and pan features to focus on specific areas of interest.
Notes	Regular maintenance and system checks are essential to ensure continued functionality and accuracy.

RESULTS





CONCLUSION/ SUMMARY

In conclusion, the vehicle detection and counter project represents a significant advancement in the field of transportation management and urban infrastructure planning. By developing a robust system for accurately detecting and counting vehicles in real-time, the project aims to address the pressing need for reliable methods of monitoring traffic flow and optimizing road usage. Through the integration of cutting-edge computer vision algorithms with hardware components such as cameras or sensors, the system offers a scalable and cost-effective solution for capturing comprehensive data on vehicular movement. The insights provided by the system enable transportation authorities, city planners, and other stakeholders to make informed decisions regarding traffic management, infrastructure investments, and road safety measures.

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