TraffiQ

A Smart traffic analysis

OUR TEAM

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ABSTRACT

The AIDs Project is an AI-powered system designed to improve road safety through real-time video analysis. It detects helmet and seatbelt usage, estimates vehicle speed, and classifies vehicle types. A live dashboard visualizes key data, with optional features like license plate recognition and congestion tracking. The system supports smarter traffic monitoring and enhances enforcement capabilities.

INTRODUCTION

The AIDs Project (AI-based Intelligent Driving System) focuses on using computer vision and deep learning to improve traffic safety. By monitoring real-time video feeds, the system can detect safety violations such as missing helmets or seatbelts, track vehicle speed, and classify different types of vehicles. This project aims to support traffic authorities with smarter, faster, and more accurate surveillance and analytics.

Our Purpose

Mission

To develop an intelligent, real-time traffic monitoring system that enhances road safety, enforces traffic rules, and provides actionable insights using AI and computer vision.

Vision

To contribute to the creation of safer, smarter cities by leveraging advanced technology for efficient traffic management and accident prevention.

PROBLEM STATEMENT

Challenges in Traffic Management:
- Increasing road accidents due to non-compliance with safety measures.
- Lack of real-time data on traffic speed, vehicle type, and congestion.
- Difficulty in detecting and addressing safety violations.

Core Module

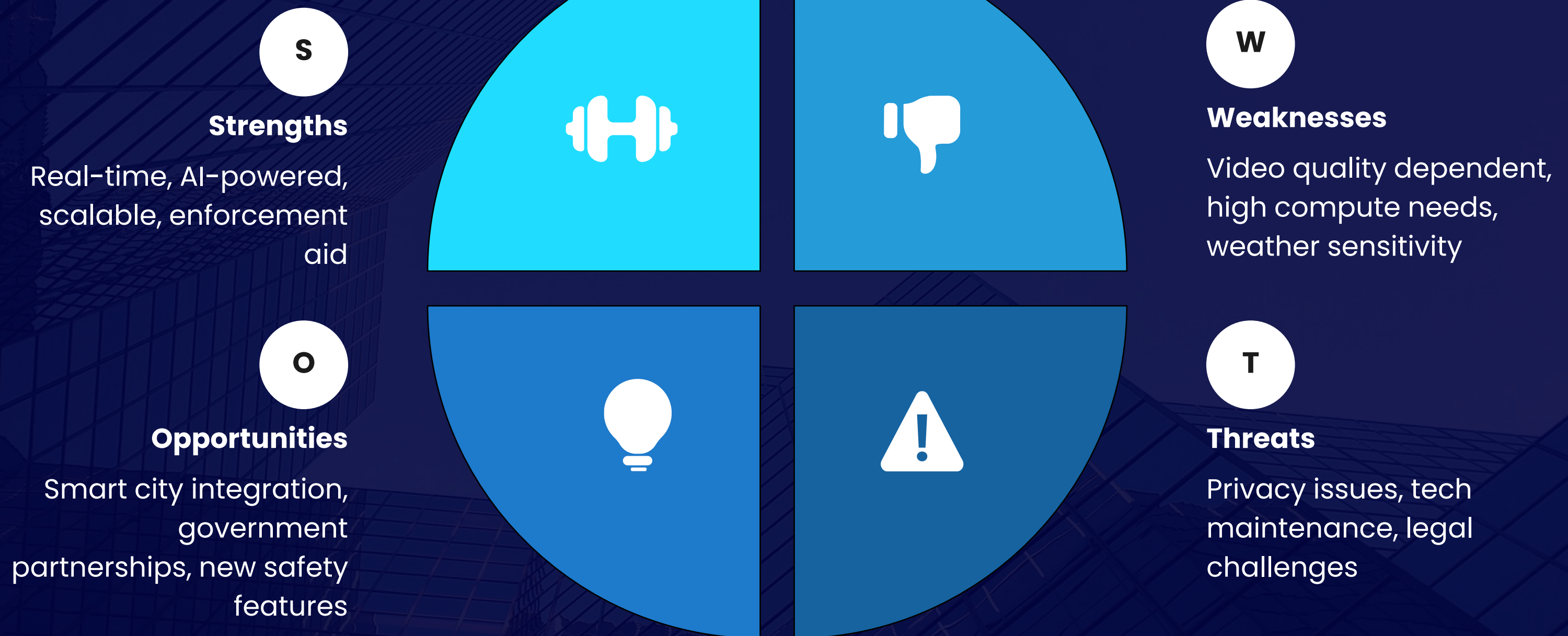**01** Helmet & Seatbelt Detection

02 Speed Estimation

03 Vehicle Classification

04 Live Dashboard with Visual Overlay

SWOT ANALYSIS

S

Strengths

Real-time, AI-powered, scalable, enforcement aid

O

Opportunities

Smart city integration, government partnerships, new safety features

W

Weaknesses

Video quality dependent, high compute needs, weather sensitivity

T

Threats

Privacy issues, tech maintenance, legal challenges

Our Roadmap to Success

Q1
Research & Dataset Collection

Q2–Q3
Model Development (Helmet, Seatbelt, Speed, Vehicle Classification) System Integration & Dashboard Design

Q4
Testing, Optimization & Deployment

Methodology

To achieve our goals, we've identified the following initiatives:

I — **Data Collection** : Gather traffic videos/images from open datasets and custom recordings.

II — **Preprocessing:** Clean, label, and annotate data for helmet, seatbelt, vehicle types, and motion tracking.

III — **Model Training:** Use deep learning models (e.g., YOLO for detection, CNNs for classification, DeepSORT for tracking).

IV — **Speed Estimation:** Apply object tracking and pixel-to-real-world calibration for speed measurement.
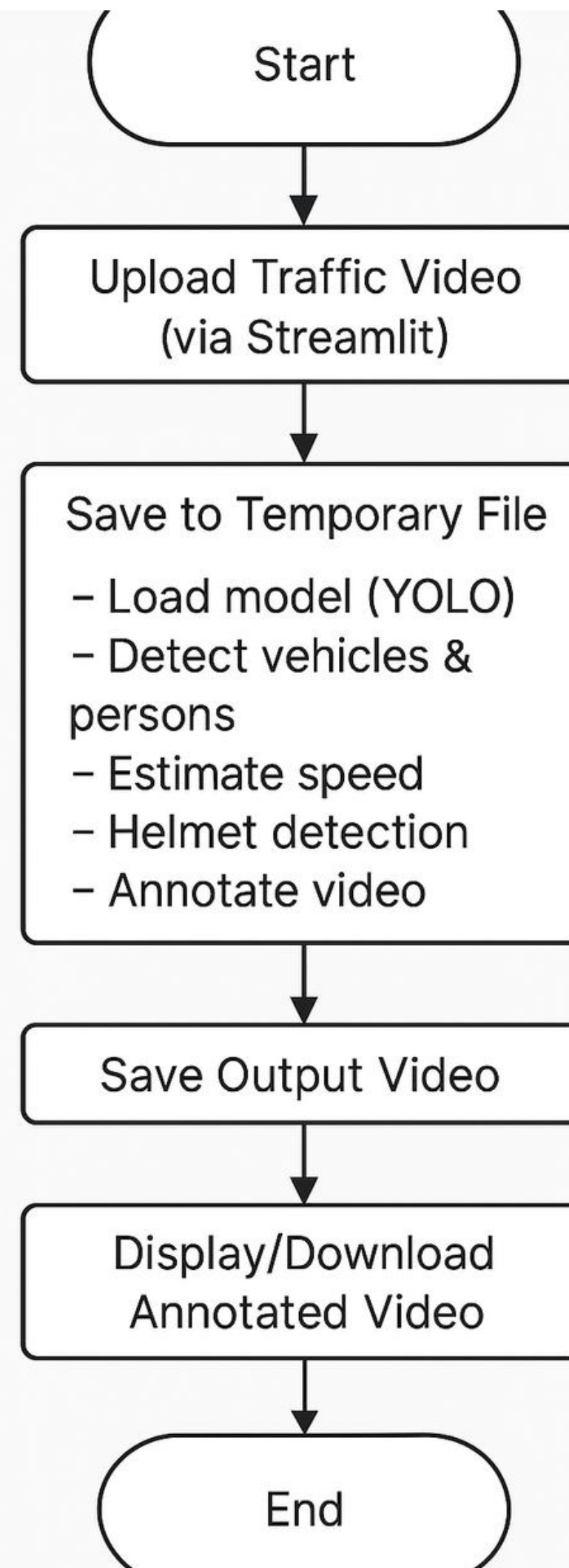
V — **System Integration:** Combine modules into a unified pipeline with real-time processing.

VI — **Dashboard Deployment:** Create an interactive interface to display live data, alerts, and analytics.

THS FLOWCHART

Start

Upload Traffic Video
(via Streamlit)

Save to Temporary File

- Load model (YOLO)
- Detect vehicles & persons
- Estimate speed
- Helmet detection
- Annotate video

Save Output Video

Display/Download Annotated Video

End

Output

TraffiQ - Smart Traffic Video Analysis

Detect vehicles, estimate speed, and monitor helmet usage from uploaded videos.

Upload a Traffic Video

Drag and drop file here
Limit 200MB per file • MP4, AVI, MOV, MPEG4

Browse files

sania.mp4 6.7MB ✕

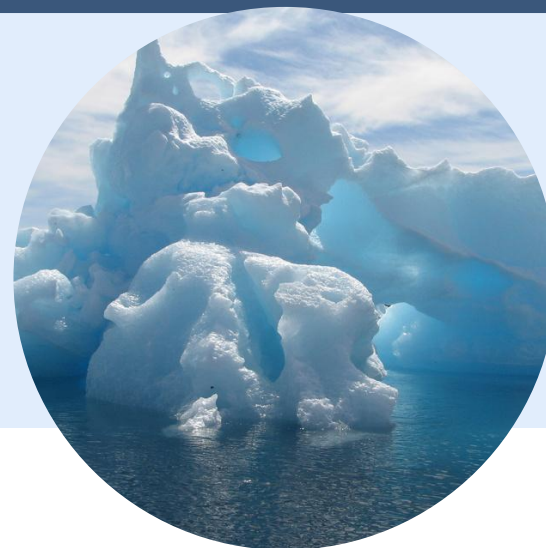☑ Analysis complete! Preview and download your results below.

Output

car 34.15 km/h

car 0.0 km/h

car 10.8

RESULT

Challenges

Environment Variability

- Low light / weather issues
- Occlusion problems
- Data augmentation

Real-Time Performance Bottlenecks

- High model load
- Frame drops
- Model optimization

Tracking Errors

- ID switching
- Overlapping vehicles
- DeepSORT upgrade

Future Improvement

01   AI Model Improvements
- Lightweight transformers
- Better occlusion handling
- Self-learning feedback loop

02   Expanded Use Cases
- Night vision adaptation
- Rural road compatibility
- Emergency vehicle detection

03   Scalability
- Multi-camera integration
- City-wide deployment
- Cloud-based inference

04   Privacy & Ethics
- Anonymized license OCR
- Data governance protocols
- Consent-aware systems

CONCLUSION

Traffiq is a comprehensive AI-powered system designed to enhance road safety and streamline traffic monitoring through real-time detection, speed estimation, and vehicle classification. By integrating helmet and seatbelt compliance checks with smart analytics and a live visual dashboard, Traffiq aims to reduce accidents and support more informed traffic management decisions. The system is scalable, efficient, and adaptable to various environments — setting the foundation for safer, smarter cities driven by data and technology.

★★★★★

THANK YOU

FOR YOUR ATTENTION

You can test Our Service here

🌐 https://huggingface.co/spaces/Sofiaakhtar/TraffiQ