Team Number : 22

World Wide Technology
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SHOOTING STARS FOUNDATION

All India Women Hackathon

Team Name: Tricore Coder

Komal Mhaisane [Team Leader]
Rutuja Shete [member]
Sanika Paste [member]

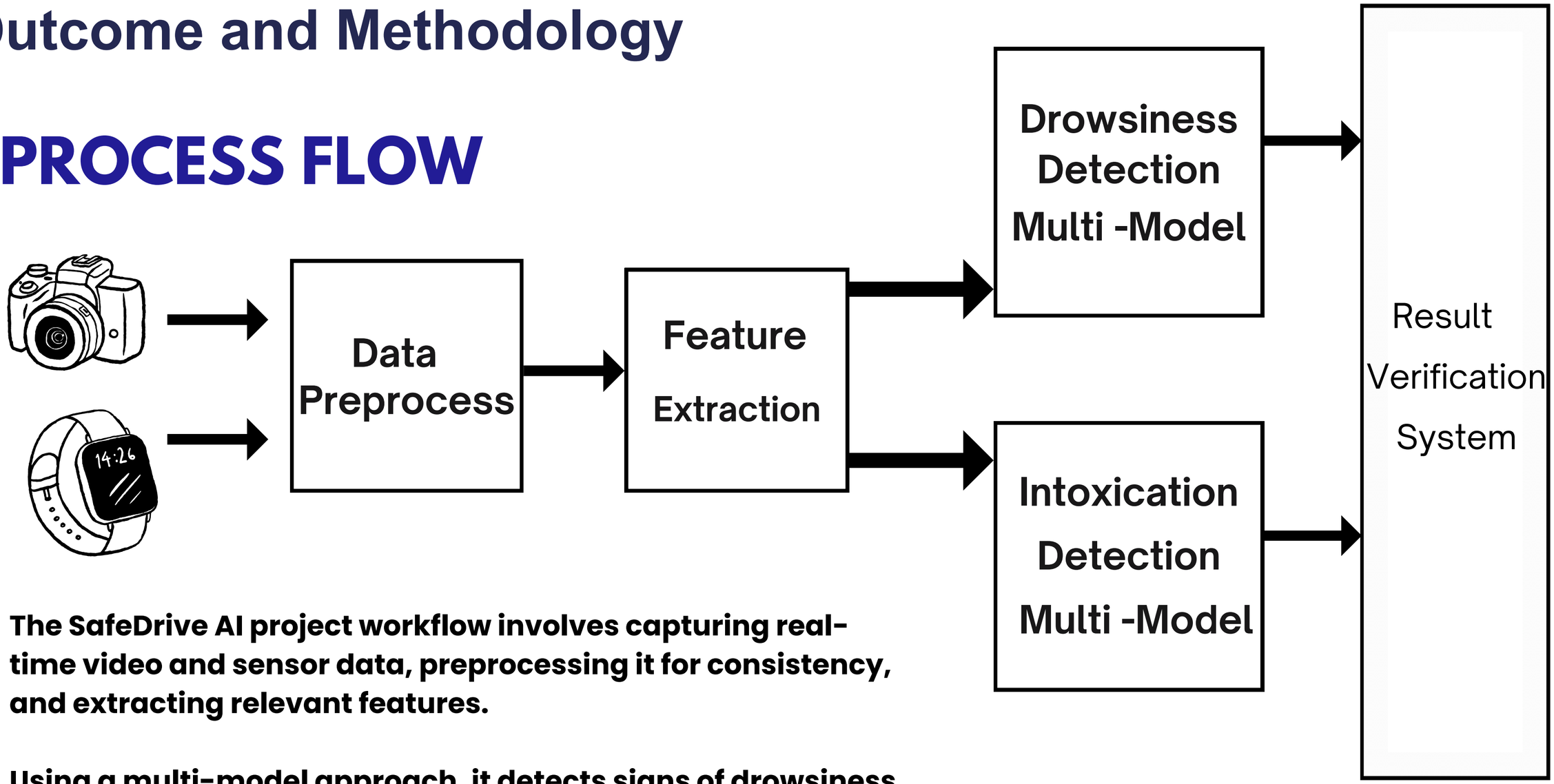
Executive Summary

SafeDrive: Revolutionizing Road Safety

- Enhance road safety and reduce accidents by implementing SafeDrive, a real-time driver monitoring system.
- We recommend implementing a real-time driver monitoring system using advanced machine learning algorithms and sensor integration to enable enhanced road safety and reduce accidents caused by driver fatigue and impairment.
- Our approach involves leveraging state-of-the-art machine learning models to process data also capturing facial expressions, eye movements, and physiological signals. By extracting relevant features and applying predictive algorithms, we achieve high accuracy in detecting signs of fatigue and impairment. The system's real-time alert mechanism ensures that drivers receive immediate feedback, enhancing safety and promoting positive driving behaviors.

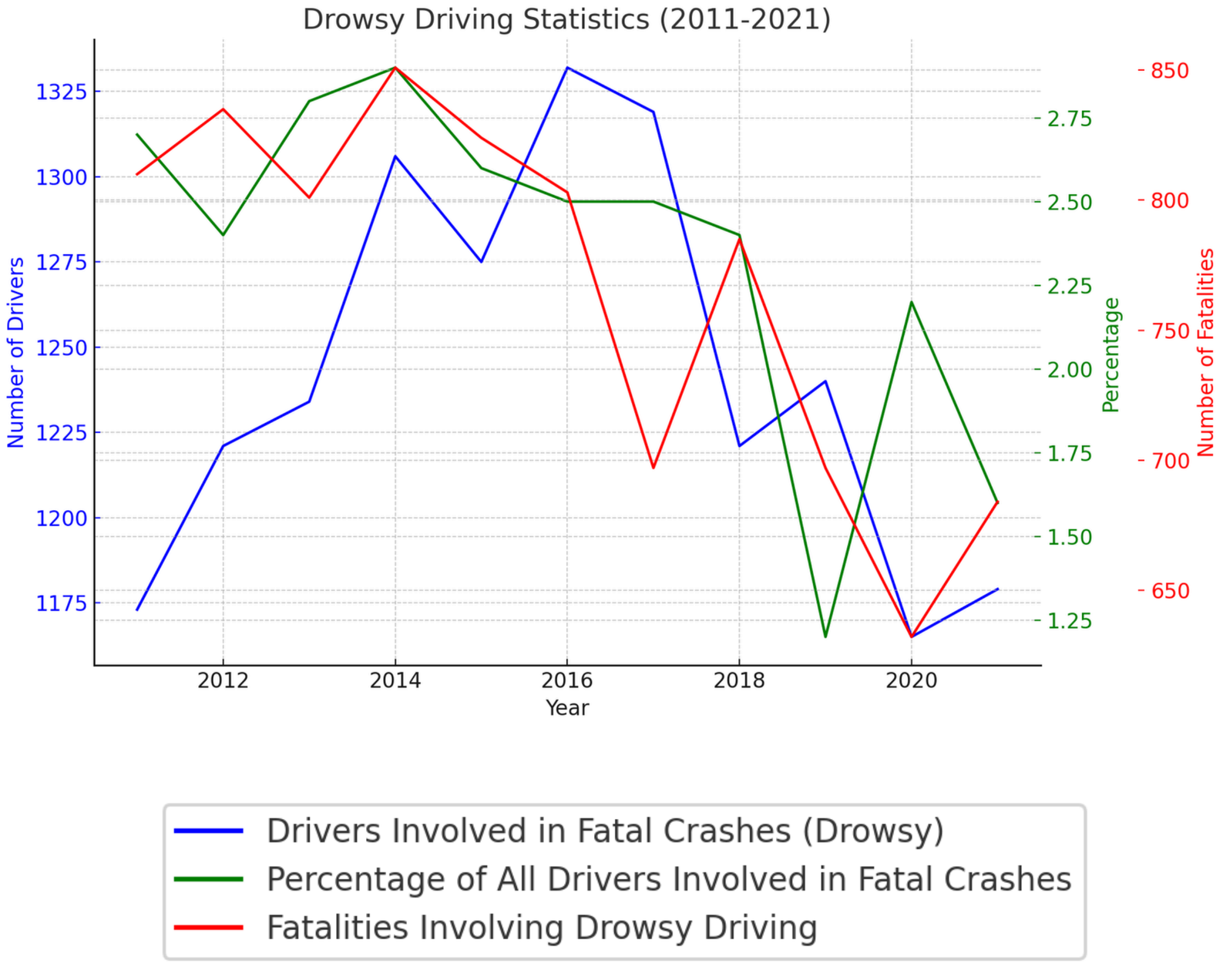
Outcome and Methodology

PROCESS FLOW



- **The SafeDrive AI project workflow involves capturing real-time video and sensor data, preprocessing it for consistency, and extracting relevant features.**

- **Using a multi-model approach, it detects signs of drowsiness and intoxication, verifies the results, and then alerts the driver and their relatives with the live location if any issues are detected.**



STATISTICS RELATED TO DROWSY DRIVING FROM 2011 TO 2021

Flow of working

- *The system captures video input from an uploaded video file.*
- Each video frame is resized to the input dimensions required by the CNN model .
- The frame is normalized to scale pixel values to the range [0, 1].
- The preprocessed frame is fed into the trained CNN model.
- The model outputs a prediction indicating whether the driver is drowsy or not.
- If the model predicts drowsiness with a high confidence, the system triggers an alert.

Business Value

Real-Time Monitoring

Continuously tracks driver alertness using advanced machine learning and real-time data analysis.

Fatigue Detection

Identifies signs of drowsiness or impairment through facial expressions, eye movements, and physiological signals.

Immediate Alerts

Sends instant notifications to the driver and their designated contacts if unsafe conditions are detected.

Enhanced Safety

Aims to prevent accidents and improve overall safety by proactively addressing signs of inattention or impairment.

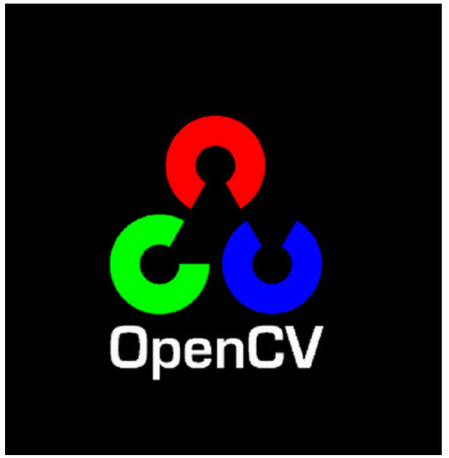
Deployment Plan and Integration

To ensure ease of use, SafeDrive AI features a Streamlit interface that provides a user-friendly, interactive dashboard for real-time alerts. This design allows drivers to easily monitor their status and receive notifications. The system also supports customization, enabling personalized alerts and adaptive learning to tailor responses to individual driving behaviors, ensuring that users receive relevant and timely feedback.

Tools and Technologies

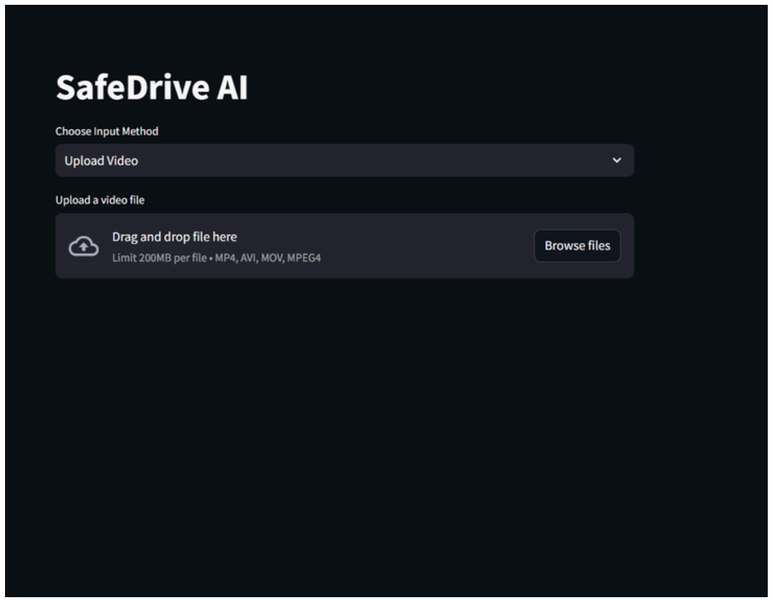
Streamlit: Utilized Streamlit for creating an interactive and user-friendly interface for real-time monitoring and alerts.

Keras and TensorFlow: Employed Keras and TensorFlow frameworks for designing and training the convolutional neural network (CNN) models.

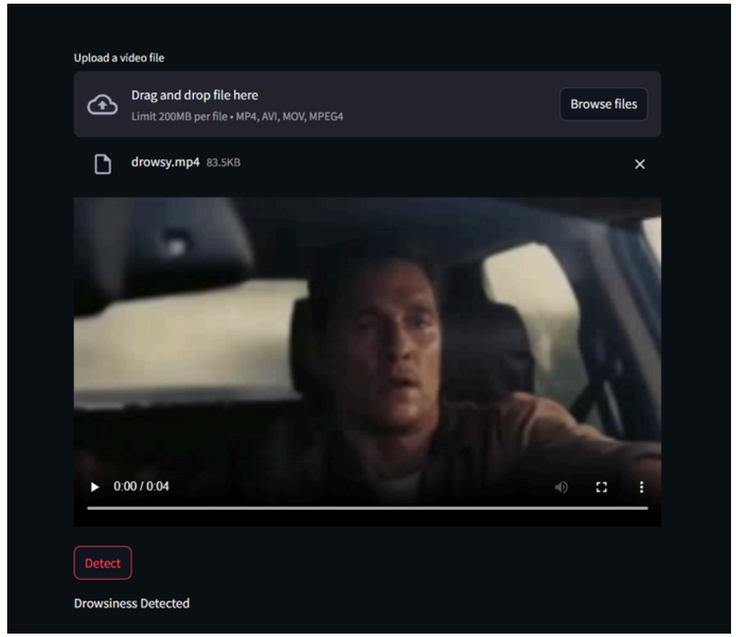


OpenCV: Leveraged OpenCV for image processing and feature extraction from camera data.

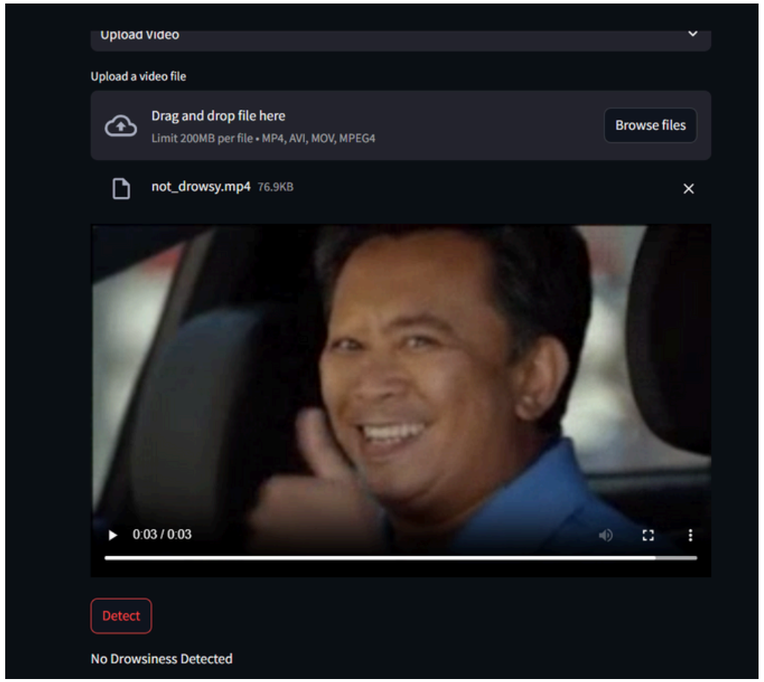
Outcomes



UI for SafeDrive AI



Detected Drowsy



Detected Not Drowsy

Recommendations and Next Steps

- Future advancements in driver drowsiness detection systems could include the integration of real-time health monitoring to provide comprehensive assessments of driver fitness and the development of more sophisticated detection algorithms using AI and machine learning to enhance accuracy.

- Additionally, integrating these systems with autonomous vehicle technology could ensure seamless transitions between manual and automated driving, further enhancing road safety.

Improved Detection Algorithms

Future advancements in machine learning and AI could lead to more sophisticated detection algorithms that further reduce false positives and negatives, enhancing system reliability.

Enhanced User Interfaces

Developing more intuitive and interactive user interfaces that provide drivers with detailed feedback and suggestions for maintaining alertness during long drives

Live Deployment of the system

We will try to deploy this model in real world and get teh accurate result so that the accidents rate will be avoid.

CONCLUSION

- In conclusion, driver drowsiness detection systems offer significant benefits by enhancing road safety, saving lives, and reducing economic costs.
- Despite challenges such as accuracy, driver acceptance, and cost, solutions like advanced algorithms, user-friendly designs, and robust privacy measures are paving the way for widespread adoption.
- Future enhancements, including improved detection algorithms, integration with autonomous vehicles, and real-time health monitoring, promise to further enhance the effectiveness of these systems.
- By continuing to innovate and address existing challenges, driver drowsiness detection systems will play a crucial role in creating safer roads for everyone.