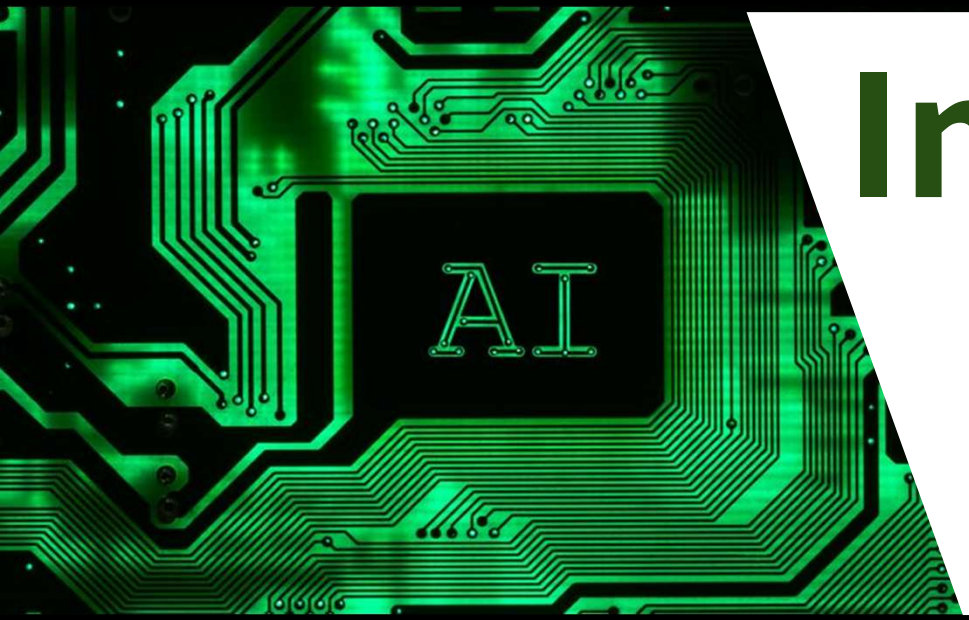
IFS DriverAlert



Intelligent Focus System

Feras Aljoudi Ihab Mohamad Seonyu Park

What

We are building a driver detection system that monitors eye closures and sounds an alert to prevent accidents.

How

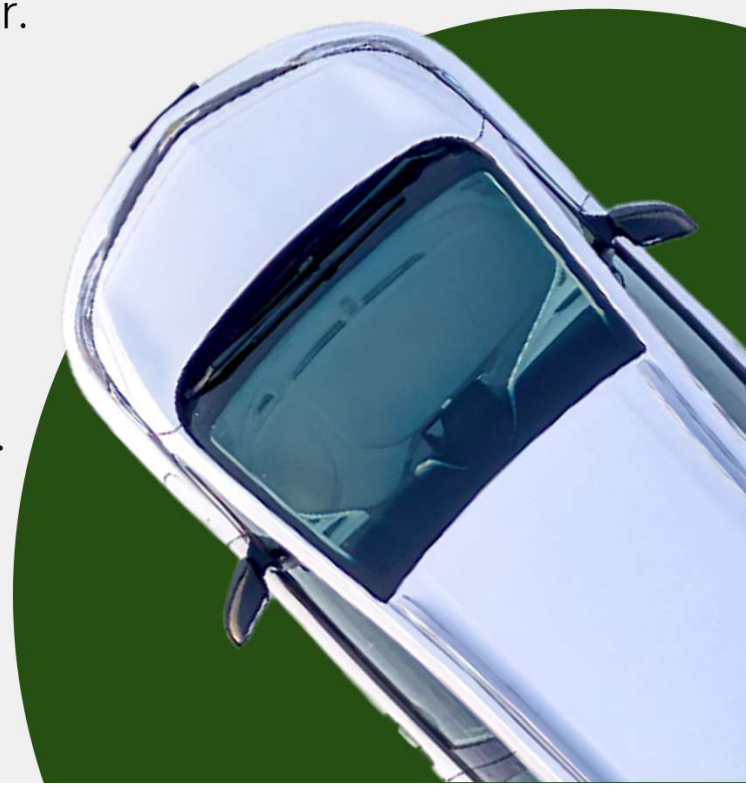
The system use a camera and ML model deployed on a Raspberry Pi 5 to detect eye closure and loss of focus in real-time.

Why

To enhance road safety by providing an affordable, offline solution for everyday drivers, reducing accidents caused by drowsiness.

Problem Scope

- Drowsy driving is a major cause of accidents, resulting in thousands of injuries and deaths every year.
- High-end car manufacturers like **Tesla** already offer drowsiness detection systems, but these are often expensive and built into premium models.
- We aim to create an **affordable, standalone solution** that does not require purchasing an expensive vehicle. Our system will work **offline**, without relying on internet connectivity, making it accessible to more people.



Proposed Solution

What specific features will be implemented?

Our solution involves using a camera with RPi 5 to monitor the driver's eyes in real-time. We will implement a ML model likely a Convolutional Neural Network (CNN), for accurate eye closure detection, leveraging OpenCV for image processing. The system will sound a buzzer when drowsiness is detected.

What sets our approach apart from competitors?

Unlike existing systems in luxury vehicles, our approach is affordable, works offline, and can be installed in any vehicle. This makes it more accessible to everyday drivers.

Who are we trying to serve?

We aim to serve drivers looking for a cost-effective way to improve road safety without needing high-end features found in premium cars.

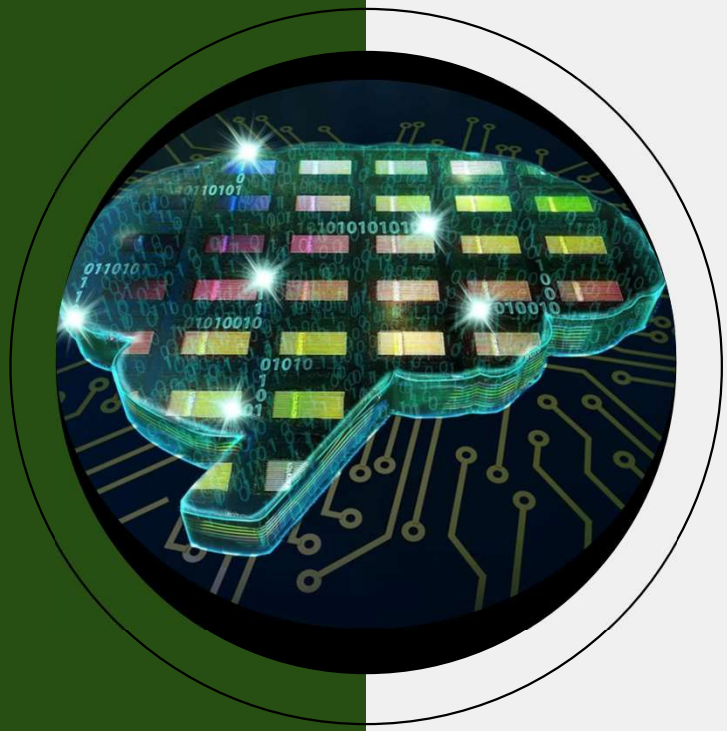
Team

Ihab Mohammad
Works on model development and final real-world testing

Seonyu Park
Focuses on data collection, model training, and testing.

Feras Aljoudi

Manages hardware integration and system optimization for real-time performance.



Ihab Mohammad

- Software Testing.
- ML model to detect drowsiness for static images.
- Projects using STM32

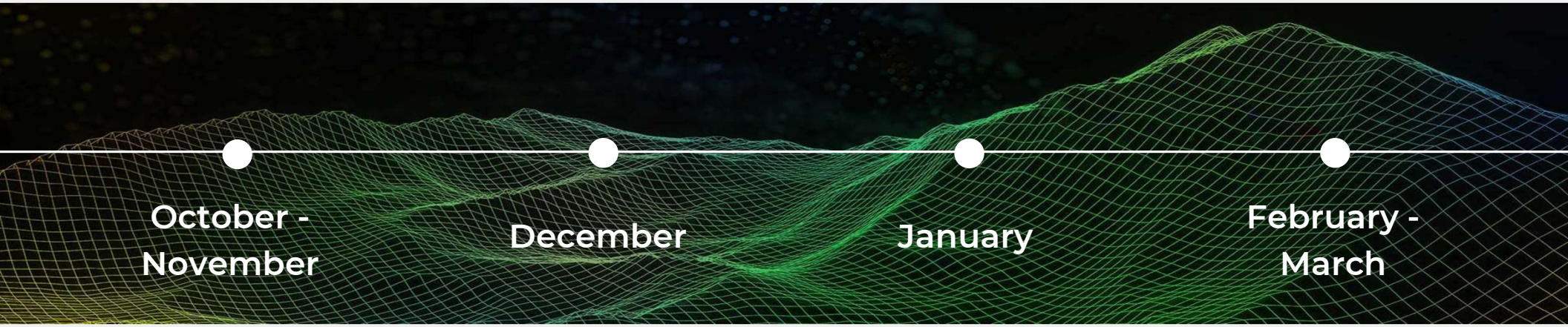
Seonyu Park

- Software Testing.
- Data manipulation.

Feras Aljoudi

- Configured a Raspberry Pi 5 as a server.
- ML model to detect drowsiness for static images.
- A game & Parking System on STM32.

Timeline



- Data collection
- Training eye closure detection model

- Hardware integration
- System setup on Raspberry Pi

- Testing and refinement in various condition

- Final testing
- User feedback
- Prepare for deployment

Obstacles

Ensuring accurate detection in various lighting conditions

Optimizing the CNN model to run efficiently on the Raspberry Pi 5

Managing power stability for Raspberry Pi when used in a car

Handling false positive or false negative in the model, which could impact the user experience

Thank you