SmartCityX: The AIoT Hackathon

Prototype Phase Report

Project name: 24. Drowsiness Detector- 2D- Infra
Team name: TechBrigade

Team Lead:

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Team Members:

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Theme: Urban Infrastructure

Track: 2D Model

Idea Brief:

The main goal of this project is to create a drowsiness detection system using ESP32-CAM and ESP32-DevKit which monitors a user's head movements and eye blinking. The eye blinking and head monitoring are monitored by ESP32-CAM using ML models from Edge Impulse. It detects whether the eyes are closed for more than 2s and checks whether the head is tilted by a specified angle (45 degrees). The data is processed by the ESP32 boards and the buzzer is alerted if any of the conditions are satisfied. There is still scope for further changes/improvements if necessary.

Software Requirements:

- Edge Impulse (for training the ML model on eye blinking and head nodding)
- Blynk (for IoT-based remote alerting)
- Arduino IDE (for code development)
- Wokwi (for simulation and prototyping)

Website Tech Stack: MERN
App Tech Stack: (either mobile app/website is required for all projects)
AI/ML model: Edge Impulse
Dataset: https://studio.edgeimpulse.com/public/168098/latest
Wokwi link: https://wokwi.com/projects/437271120295952385
Cloud Platform: Blynk

Feasibility:
This is useful for drivers, especially those driving at night as they can be alerted by the buzzer if their eyes remain close for unusually long periods or their heads start lolling. This can prevent potentially fatal accidents, saving both the vehicle occupants and pedestrians (if nearby). An improved version can be implemented into the dashboard with the camera facing the driver or on the roof near the visor to monitor their movements.

Budget:

S. No.	Name	Count	Purchase link/Offline store	Status	Price
1.	ESP32-DevKit	1	https://robu.in/product/esp32-38pin-development-board-wifibluetooth-ultra-low-power-consumption-dual-core/	Available	343
2.	ESP32-CAM	1	https://robu.in/product/esp32-cam-wifi-module-bluetooth-with-ov2640-camera-module-2mp/	Available	649
3.	Push Button	1	Offline	Available	10
4.	Buzzer	1	Offline	Available	10
5.	5V Rechargeable Battery	1	https://sharvielectronics.com/product/5v1800h-1s2p-5v-1800mah-lithium-ion-rechargeable-battery-with-5-5x2-1-male-and-jst-sm/	Yet to order	356
6.	TP4056 Charging Module	1	https://robu.in/product/tp4056-1a-li-ion-lithium-battery-charging-module-mini-usb/	Yet to order	17
				Total required	373
				Total Available	1012
				Total Budget	1385