AN IMPROVED DRIVER SAFETY MECHANISM USING IOT

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Highlights of Proposed Model

To develop an intelligent driver safety assistance model that

- Detects the level of alcohol presence in the breathe.
- Recognizes and controls the light beam.
- Detects and provides information regarding the sign boards.
- Detects the drowsiness and deliver alert warnings.
- Notify to responsible authority when accident is detected.

Challenges during implementation

- To begin with, the goal of this experiment was to identify alcohol use by a percentage more than 30, but we were unable to do so because the ol-components were mostly located in the air. As a result, we move on to the idea of various computations.
- Second, we utilised the beam sensor to try to regulate the light beam in the automobile that the sensors were monitoring. However, the sensor's success rate will be determined only if this function is implemented on both cars.
- Third, a disadvantage of sign detection is the usage of Google Maps, as numerous trips to a spot might lessen reliance on the map, and not all users / drivers are aware of this. Vehicles will move based on the map. Furthermore, utilising Google Maps necessitates obtaining Google's approval, which takes time.

Proposed Model

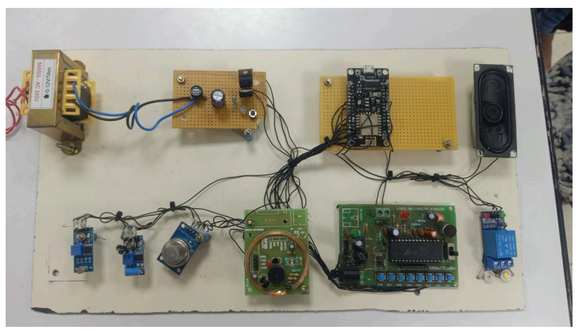

Figure 1. DEVELOPED DRIVER ASSISTANCE SYSTEM

Module Split Up

1. **Alcohol Detection and Processing:** Alcohol sensors are used to detect alcohol consumption. It is acceptable for vehicle drivers to drink to a certain extent while driving. The threshold is set at a certain amount. When the threshold reaches a sufficient value, the vehicle's ignition system is switched off.
2. **Light Beam Controlling:** LDR sensors are used to amplify the beam of oncoming vehicles. Based on this sensor, both high and low beams are implemented to ensure a clear view of the road.
3. **Sign Board Detection:** The RF Transmitter and Receiver Module is used to display signs/traffic signs on congested roads, this sensor transmits a TX signal from the sign and receives the signal through a receiver to the vehicle.
4. **Drowsiness Detection:** Image processing methods are used to detect drowsy drivers. With this method, the driver's face will be recognized and a warning message will be generated as an alert if the sensor detects that the eyes are closed for more than 5 seconds.
5. **Accident Detection:** Vibration sensor is implemented in this system for accident detection. It uses GPS location to relay accident information to the passenger's guardian and the nearest emergency services.

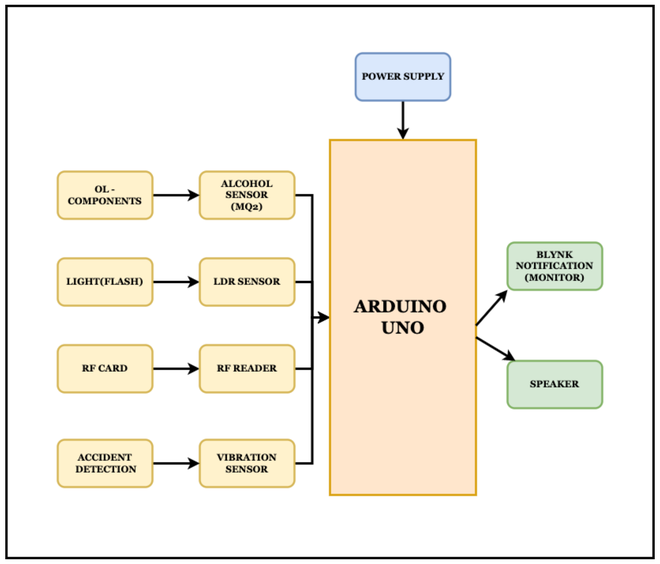

Figure 2. ARCHITECTURE DIAGRAM FOR THE PROPOSED MODEL

Drowsiness Detection using OpenCV

1. **Image Processing:** Pre-processing of the picture is done in Image Processing. The camera transmits a live video recording. After that, the visuals from the video are extracted. The number of frames to be taken per second is limited by a defined threshold.
2. **Drowsiness Detection:** The flowchart of the designed system is represented in Figure 3. THr refers to a fixed threshold. The main steps involved in detection of drowsiness are Face detection , Eye localization , Eye Closure Duration.
3. **Alert Generation:** The length of time when the eyes are closed is measured. For eye closure ratio, a certain threshold value has been set. The eye is deemed closed if the aspect ratio is less than the threshold value.The driver is regarded to be sleepy if his or her eye is closed for a specified number of frames, such as five.To wake up the drowsy motorist, an alarm is produced.

Drowsiness Detection Algorithm

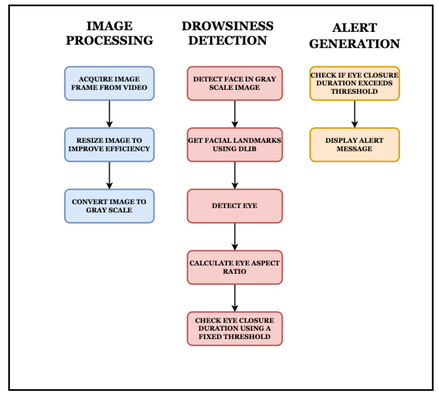

Figure 3. Drowsiness detection - Algorithm

Inferences

- The engine will automatically stop if the driver's breath alcohol concentration exceeds a specified threshold, and the car will only start if the sensor does not report the maximum alcohol amount.
- It employs an LDR sensor to detect a vehicle's high beam and lower it to a low beam for driver safety. Only when both methods are used does this strategy yield a success rate.
- In order to identify a signboard, we must first read input from an RF card using an RF Reader, after which distinct zones will be identified and presented on the monitor.
- We use a webcam to capture real-time videos in order to detect drowsiness.The videos are processed with OpenCV.This is where the real-time videos are processed.
- If a person's ocular movement is not identified for 5 seconds or longer in the data provided, an alert/warning message will be sent.

References

- Uzairue, S., Ighalo, J., Matthews, V. O., Nwukor, F., Popoola, S. I. (2018, May). IoT-Enabled Alcohol Detection System for Road Transportation Safety in Smart City. In International Conference on Computational Science and Its Applications (pp. 695-704). Springer, Cham.
- Nayak, R., Chandra, D. (2017). RF Based Sign Board Detection and Collision Avoidance System. Journal of Advance Research in Electrical Electronics Engineering, 4(7),(pp. 01-05).
- Gupta, S., Garima, E. (2014). Road Accident Prevention System Using Driver's Drowsiness Detection by Combining Eye Closure and Yawning. International Journal of Research, 1, (pp. 839-842).