Group 12

**Drowsy Driving Detection and Alert System**

**Problem Statement:**

Drowsy driving is feeling sleepy while operating a vehicle. This usually happens when a driver has not slept enough, had alcohol, is under certain medications or has sleep disorders. Research has found that meals that are high in fat, carbohydrates, or calories may increase sleepiness.

No one knows the exact moment when sleep will come over their body. Falling asleep at the wheel is clearly dangerous, but being sleepy also affects your ability to drive safely, even if you do not fall asleep. Drowsiness may:

* Makes you less attentive to surroundings.
* Slows your reaction time if need to steer suddenly or stop and Worsen decision making.
* **Vision and depth perception:** Along with slower reaction times, your vision can get blurry and sensitive to light when you are tired. It may be harder to tell how far away other cars are from you.

**Problem Importance:**

Drowsy driving is a major contributor to motor vehicle collisions. In a CDC survey, an estimated 1 in 25 adult drivers reported having fallen asleep while driving in the previous 30 days. According to the National Highway Traffic Safety Administration (NHTSA), in 2017 drowsy driving led to at least 91,000 crashes, resulting in roughly 50,000 injuries and 800 deaths. In 2020, there were 633 deaths based on police reports.3 However, these numbers are underestimated, and over 6,000 fatal crashes each year may involve a drowsy driver.

**Problem solution:**

We will be developing a safety product to identify the driver, capture car details, location and detect microsleep. The details will be stored in RDBMS database and once the microsleep is detected the system will generate notification and send the alter to driver. This product will help rideshare or vehicle rental companies to identify the sleep deprived drivers and can prevent the fatal accidents before it happens. Alert and notifications will allow them to track the driver details and location and time where the incident happened.

Generate alert & notifications

Monitor location & microsleep

Identify driver & capture car details

**Knowledge and technology for implementing the product:**

The product will be developed on python, technologies such as RDBMS database to store data, driver recognition and drowsiness will be implemented with help of OpenCV.

OpenCV is a Python library that allows us to perform image processing and computer vision tasks. With OpenCV we will use Shape predictors, also called landmark predictors, to predict key (x, y)-coordinates of a given eye shape. Using Euclidean distance on landmark of opposite side of eye we will calculate the aspect ratio to detect closing of eye lids.

The product will constantly monitor for drowsiness and drivers’ location and will send an alert to the driver and notification to the company once detected.

**Existing solution and attempts on this problem:**

OpenCV library in python is used to detect facial landmark and face recognition, we are implementing this product from scratch which will track the pattern, location, store the information and send alert once the driver is sleepy while driving.

**Data sources and ethical concern:**

To secure the data, the data will be recorded by user permission only without user permission no personal information will be stored in the database. Driver details such as name, age, picture, vehicle information will be stored in the database.

**References**:

Below are the references used:

<https://www.sleepfoundation.org/drowsy-driving>

<https://www.cdc.gov/sleep/features/drowsy-driving.html>

<https://docs.opencv.org/3.4/d2/d42/tutorial_face_landmark_detection_in_an_image.html>