ECE 579 Intelligent Systems, Winter 2024

Project Initiative Report

**Project title: Facial Recognition System for Personalized Vehicle Interior Settings.**

**Students in the project group: Julio Murillo Amezcua and Luis Castaneda-Trejo**

**Project Description**: In this project, we will design and develop a facial recognition system by adapting and integrating a pre-trained MobileNet model using TensorFlow in Google Colab. Our system will recognize users before they enter their vehicles and then communicate with the vehicle's CAN bus to adjust interior settings (such as seat position, cabin temperature, and steering wheel position) according to the recognized user's preferences.

**Data Description:**

Our project will use a custom dataset consisting of photos of people’s faces that will represent the users of the car; the data set will be generated through the following process:

1. We will capture a series of high-resolution images of various individuals using a digital camera (500 images per individual).
2. The images will be taken under different lighting conditions and from multiple angles.
3. The format of the images will be JPEG.
4. We will use Keras’s ImageDataGenerator to create variations to complete our database.
5. The number of unique car users will directly determine the number of classes in our facial recognition model. Each user will represent a distinct class, as the system needs to recognize and differentiate everyone to personalize the vehicle's settings.

The images will be organized in a database, categorized by individuals, and labels assigned to the images. The database will pass through cleaning and image preprocessing, including cropping, resizing, and normalizing. These images will be the input for fine-tuning the pre-trained model.

**Activities by group member:**

|  |  |  |  |
| --- | --- | --- | --- |
| Group Member | Task | Completion Date | Deliverable |
| LCastaneda | User Interface for I/O controls. | 2/8/2024 |  |
| LCastaneda | CAN msg handling. | 2/29/2024 |  |
| JAmezcua | Model training. | 3/15/2024 |  |
| JAmezcua | Model integration. | 3/29/2024 |  |
| All | Testing. | 4/10/2024 |  |