ECE 579 Intelligent Systems, Winter 2024

Project Initiative Report

**Project title: Facial Expression Recognition System for Personalized Vehicle 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 expression recognition system by adapting and integrating a pre-trained MobileNet model using TensorFlow in Google Colab. Our system will recognize user expressions and mood before he/she enters his/her vehicle and determine if the vehicle can cause an accident by driving over speed limit. Depending on the recognized expression, the system will adjust the maximum speed limit parameter by sending a custom CAN message and notify the user’s emergency contacts.

**Data Description:**

Our project will use the FER2013 database as its data set. The model will be implemented in Python and its User Interface will be developed in NI LabVIEW. For CAN communication the system will use an NI USB-8506 and the simulated vehicle network will be done using Vector CANoe.

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 type of expressions that the system will identify are Sadness and Angriness.

**Activities by group member:**

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

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