**Problem Definition**

The goal of this project is to investigate the effect of emotion on the driving style. We aim to develop behavior profiles which represent patterns of driving style influenced by certain emotions. These patterns are then used to classify the emotional state based on the driver behavior. For instance, stressed drivers tend to pay less attention to the traffic and environment [1, 2]. However, in the field of emotion recognition, using the modality of behavior is a relatively neglected research field compared to the modality of facial expression. Therefore, we started this project in the hopes that there are such patterns, which methods based on machine learning will be able to detect. As the result of our survey show, there are various commonly agreed behavior profiles.

**Definition of in-cabin Behavior**

We define behavior as the typical range of actions by occupants in conjunction with themselves or with the vehicle, which includes the environment around the vehicle. It is the response to various stimuli, whether internal or external, conscious or subconscious, overt or covert, and voluntary or involuntary. Our research aims to understand what the effect of the emotions on the in-cabin response is.

**Input Data – Behavioral Actions**

We limit the input stream to five variables of which we assume that they provide the most relevant information to model behavior [1, 4]. These variables are acceleration, steering wheel usage, hand movements and placements, head movements and directions, and eye movements. Figure 1 visualizes how behavioral information is collected. We track the in-cabin actions of occupants. Every behavioral action is represented by a feature vector which is split into three parts: actor, operation, and interaction with car component. Subjects are monitored over a time frame (it defines a point in time) to measure the typical velocity of movements or interactions with the car. As depicted Figure 1, this data is collected as vectors for each input variable which can be used to detect behavioral profiles in order to classify the emotional state of subjects.

**Output Classes – Emotions**

The modality of driver behavior can indicate specific emotions with certainty [2,3]. Hence, the target emotions in this modality are anger, fatigue, stress, confusion, sadness as main negative emotions and happy, and neutral as positive factors. Furthermore, the final method that we use is a multimodal approach. This means that each emotion is classified with a score. These scores are merged into a combination of valence and arousal. This is a common output format in the field of automated emotion recognition [3, 4, 5].

**Objective**

Investigate the effects of emotion on driver behavior and develop driver behavior profiles for automated emotion classification.