1   Introduction

This report highlights our project's initial activities, current progress, and key details. Our primary focus has been on advanced software development, including the creation of algorithms for accurate lane detection, tracking, and traffic sign identification. Driven by enthusiasm, our team has maintained seamless collaboration, both remotely and in the lab, while effectively managing time constraints. This document reviews our achievements thus far and lays the groundwork for the tasks ahead.

2   Planned activities

The activities planned are as follows:

- Architecture
- Project plan
- Lane detection and tracking
- Sign detection and classification
- Traffic light Classification

- **Architecture**
  *Status***:** Completed

  *Implementation***:** Our team has successfully designed an architecture leveraging our collaborative efforts and shared expertise

  Difficulties: A significant challenge in real-time development was the uncertainty surrounding potential add-ons before project initiation. Determining additional features and functionalities required careful evaluation and consensus-building among team members, making the process both intricate and collaborative.

- **Project plan**
  *Status***:** Completed

  *Implementation***:** Aligned project development with the established architectureand planned activities based on the allocated time.

  Difficulties: The real-time challenge was adapting the project plan to include unforeseen complexities. Decisions on resource allocation and timelines required continual adjustment.

- **Lane detection and tracking**
  Status: ongoing

  Implementation: The assignment was to create a program that tracks the lane usingvideo input of a track present in BFMC and detects lane.

  Difficulties: The developed program can identify lanes in a straight line, but implementing it in a curved path appeared to be challenging. Higher ambient light intensity causes some lane tracking to be inefficient, which is difficult to fix.

- **Traffic Sign detection and classification**

  Status: ongoing

  Implementation: Collected dataset and added data to the existing one under various lighting conditions, trained the model and got accuracy of 96%while testing the model, if the mode is changed from manual to auto the vehicle starts running when the stop sign is detected the vehicle is being stopped

  Difficulties:
  Intergrating the real time video footage for object detection was complex and working on it

- **Traffic Light Classification**
  Status: ongoing

  Implementation: Collected data for new environment and currently in the processof training the model.

  Difficulties: Classification on the traffic light on which it differentiate is really complex and working on it

3 General status of the project

The project has made significant strides since the completion of the project plan, architecture definition and controlling the vehicle in manual mode. Real-time challenges persist in making crucial decisions on addons and improvements that can elevate the project's performance, especially in a high-end competition setting. We are currently working on lane dectection on straight pathways and traffic sign detection on with real-time challenges revolving around decisions on strategic add on to enhance adaptability to curved paths and dynamic lighting conditions.

4 Upcoming activities

1. Perform real-time lane detection and tracking, focusing on improving efficiency on curved pathways.
2. Continue real-time implementation of traffic sign detection and classification with enhanced stability and accuracy.
3. Initiate the development of a real-time intersection detection module.
4. Begin implementing a real-time traffic light detection system.