1 Introduction

This report outlines the initial phase of the project focused on familiarizing the team with the codebase and establishing a clear understanding of the tasks ahead. During this period, the main objective was to research and organize the work required for upcoming development stages. The team spent time learning the code structure, reviewing documentation, and discussing the project's core components. Team collaboration was strong, and regular discussions helped clarify the direction for future work.

2 Planned activities

At the beginning of the reported period, the following activities were planned:

1) **Familiarizing with the code base**
- Understand how different components of the code interact and identify any potential areas for improvement.
- The entire team, but Andrei is going to look in depth into the code base.

2) **Research on image processing techniques for lane detection**
- Study various image processing methods for lane detection relevant to the project.
- The entire team should have some knowledge, but Filip and Rafael are responsible for this part.

3) **Learning multithreading concepts**
- Understand how to use multithreading to improve the performance and real-time processing of the system.
- The entire team should be aware of the concept, but Sorana is in charge.

4) **Team discussion and planning**
- Discuss ideas, ask questions, and clarify any uncertainties. Plan the next steps based on research findings.
- The entire team.

5) **Testing the car**
- Make sure that the components are working properly and calibrate the steering and speed.
- Rafael is going to take the first steps, since he has the car for now.

3 Status of planned activities

1) **Familiarizing with the codebase**
- Status: Completed
- Implementation: The team reviewed and understood the structure and components of the existing codebase, including how the image processing module interacts with the vehicle control system.
- Difficulties: No major difficulties were encountered, but a few areas of the code required clarification, which was resolved through team discussions and code sessions.

2) **Research on image processing techniques for lane detection**

- Status**:** Ongoing (80% completed)

- Implementation**:** The team has reviewed several image processing techniques like Canny edge detection, Hough transform, and for lane detection. The research is still ongoing to finalize the most appropriate method for integration.
- Difficulties: We should spend more time to understand the math behind it more clearly. Moreover, we still need to find the optimal threshold for the algorithm to classify correctly the lines as edges.

3) Learning multithreading concepts

- Status**:** Completed
- Implementation: Basic multithreading principles were learned, such as handling simultaneous data streams (for example camera feed and data from the server).
- Difficulties: There were initial challenges with understanding how to manage shared resources between threads, but this has been clarified through additional learning and examples.

4) Team discussion and planning

- Status: Ongoing
- Implementation: Regular meetings were held to ensure everyone is on the same page. The team discussed the current progress, identified any roadblocks, and outlined the steps for the next phase.
- Difficulties: No significant difficulties, but some delays occurred due to the need for further research on image processing techniques.

5) **Testing the car**

- Status: Completed
- Implementation: The documentation provided helped Rafael to properly start and control the car, via the interface.
- Difficulties: The charging cable and the battery cable don’t match and the servo was disconnected from the steering mechanism.

4 General status of the project

The project is currently in its initial phase, focused on understanding the existing codebase and researching necessary technologies. So far, the following aspects are complete or progressing well:

- The team has familiarized themselves with the code structure and is now comfortable with its components.
- Research on image processing techniques for lane detection is nearing completion.
- Multithreading concepts have been grasped and are ready to be implemented once development begins.

However, there are still outstanding tasks in terms of finalizing the image processing technique and preparing for the next stages of development. Once the research is complete, the next step will be the actual implementation of lane detection and vehicle movement algorithms.

5 Upcoming activities

- Finalize image processing technique for lane detection
- Start development of basic movement and lane keeping algorithms
- Initial testing and integration of lane detection with movement algorithms

- Continue team discussions and planning for the next steps