Planning Report

Exploring Cellular V2X Technology: Uncovering Challenges, Envisioning Future Advancements, and Addressing Security Considerations

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I. Introduction

Vehicle-to-everything (V2X) communication explains how a vehicle interracts with everything in its surrounding. This can happen in 2 ways: Cellular and Wifi communciation. Cellular Vehicle-to-everything (C-V2X) technology has emerged as a crucial component in the evolution of smart transportation systems, enabling vehicles to communicate with each other, infrastructure, pedestrians, and other road users. Today cars have sensors that tells the driver when an object is nearby when the person is reversing the car, but in the future with C-V2X there are much more possibilities regarding communication. One scenario, for example is to be able to anticipate a pedestrian or a motorcycle that is moving toward the car but not in the line of sight (LOS). Therefore, C-V2X will be our main focus where we delve into the multifaceted aspects of C-V2X technology. We will focus on the contemporary developments in C-V2X, assess its drawbacks and pitfalls, identify areas ripe for change and improvement. We will also try to comment on where it is headed in terms of the development of 6G communication.

II. Main objective

The main objective of this project is to explore and gain knowledge of C-V2X technology and its associated challenges. As students specializing in the field of communication technology, our goal is to conduct in-depth research to advance our skills within cellular communications, its current technological landscape within 5G and a quick look through on its evolution towards 6G and its future. The research question that will be addressed in this project is: "What are the key challenges and oppurtunities in the advancement of C-V2X technology within the context of evolving cellular communications?"
The likely outcome of this project is:

- A comprehensive understanding of C-V2X technology, including its underlying principles, current implementations and potential advancements.
- Identification and analysis of the main challenges that holds back the implementation of C-V2X technology today.
- Exploration of potential solutions to address these challenges, considering the evolution towards 6G networks and trends in cellular communications.
- Improve our skills in research writing, text analysis and critical thinking within the context of advanced communication technologies.

III. Scope

Parts that will be covered in this research report:

- Explore the historical evolution of C-V2X in a concise manner.
- Investigate the current pitfalls and challenges faced by C-V2X technology in its implementation and adoption.
- Explore and propose potential future enhancements and advances for C-V2X in the context of 6G networks.
- Examine the technical implications surrounding Vehicle-to-Vehicle (V2V) and Vehicle-to-Everything (V2X) communications, and address security concerns in these systems.

Due to the scope and limitations of our project, certain aspects will not be examined. These include:

- Other systems of vehicular communications besides C-V2X. While other systems may be briefly mentioned for context, our paper primarily focus on C-V2X systems.
- Given the technical focus of our paper on C-V2X technology, certain non-technical aspects, such as ethical considerations, will not be extensively explored. However, they might be mentioned as a part of broader discussions.

IV. Team and Organization

During this project, our team will not have a leader. Instead, we will work collaboratively and vote when we do not agree on a matter. All team members will contribute to all parts of the project, such as research, literature study, analysis of the findings, and writing the report.

V. Risk-Management

Risk	Likelihood of occurance	Management
Communication Gap	low	Try to have open and honest dialogue
Planning error	moderate	Follow the time chart as closely as possible and have constant communication with the team
Ethical Issues	low	Team members will make sure to check for plagiarism and maintain personal integrity.

VI. Time Chart

. Below is the time chart for our group project. Highlighted in green is the different stages of our work progress, while the black boxes points out important deadlines. Additionally, in yellow the easter break is represented. The weeks represent the total of 10 weeks that we will be working with the project.

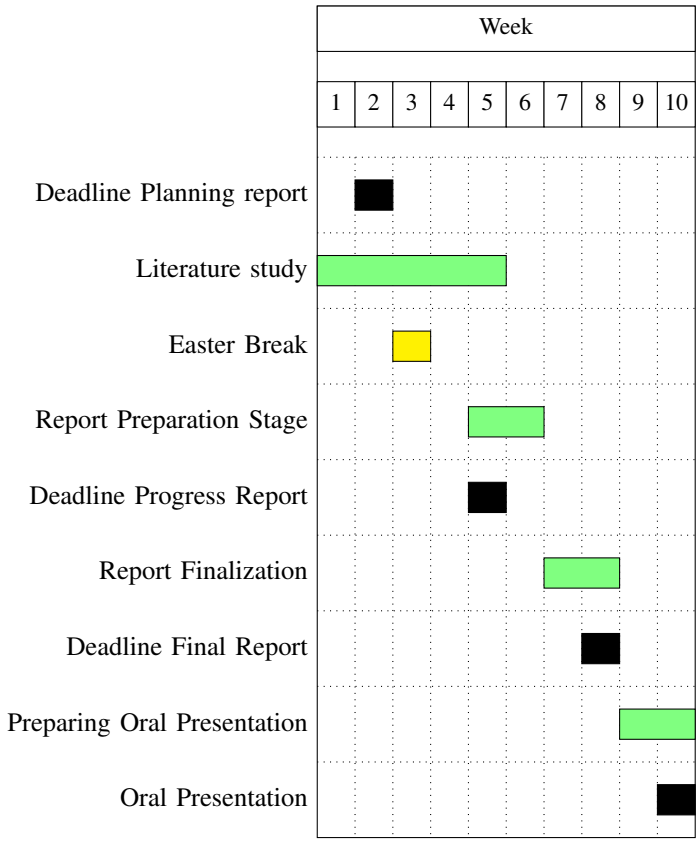

Table 1: A Ganttchart of the timeline within this project.