V2X - feature development

Tedd Ahlberg,Erik Benjaminsson,Filip Kaiser
Shahad Naji, Fressia Merino, David Olofsson

November 2018

Abstract

test

Contents

1 Introduction

1.1 Det här är en underrubrik? :)

Backgroud - Vehicle-to-everything (V2X) communication is the passing of information from a vehicle to any entity that may affect the vehicle, and vice versa. It is a vehicular communication system that incorporates other more specific types of communication as V2I (Vehicle to Infrastructure), V2N (Vehicle-to-network), V2V (Vehicle-to-vehicle), V2P (Vehicle-to-Pedestrian), V2D (Vehicle-to-device) and V2G (Vehicle-to-grid)

Introduktion till ITS-G5, varför använda ?, var används den? vilken MHz(mer theory) Tanken med V2X är att man skall få snabbare responstid än med cloud

V2X utvecklas för att minska olyckor i trafiken, det finns olika typer av V2X

V2X is short for vehicle-to-everything, it is meant to make traffic safer by letting the car communicate with surroundings and make the driver aware. There is different types of communication such as V2I (vehicle to infrastructure), V2G (vehicle to grid), V2D (vehicle to device),

2 Background

The background for this project is that a safer travelling system is wanted for all actors on the market. By bike, by feet or by car does not matter since the vision is that 0 persons should die in a traffic accident.

Therefore a system that communicates with cars, infrastructures or other vehicles to lower the percentage of fatal accidents are very sought after, and vehicle manufacturers have been developing this technology for a long time the problem they have now are latency since the existing system depends on a cloud service which has too long latency in some situations where a microsecond could make a big difference.

3 Theory

3.1 Det här är också en underrubrik

3.1.1 Det här är underrubrikens rubrik

In today's automotive companies huge resources are put in optimising and developing efficient processes that are in favour of the environmental, safety on the roads and antonyms cars. In this cluster of new technology is something called "V2V" *(Vehicle-to-vehicle communication).* V2V is a wireless transmission system between cars on the road. The reason and idea behind this technology is to get cars around each other to communicate with each other to reduce the risk of both collision and more energy effective driving. The information that is sent between the cars are their speed, position and direction.

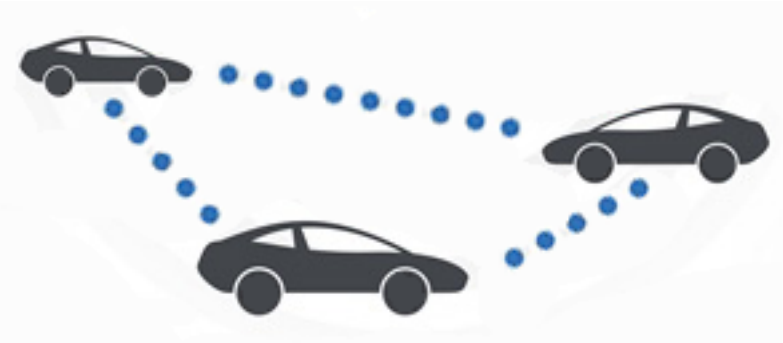

Figure 1: LAN network

This information is sent over an AD-HOC [reference] network. AD-HOC is a local area network (LAN) that's used in close area networking. This is used instead of a global network "cloud network".

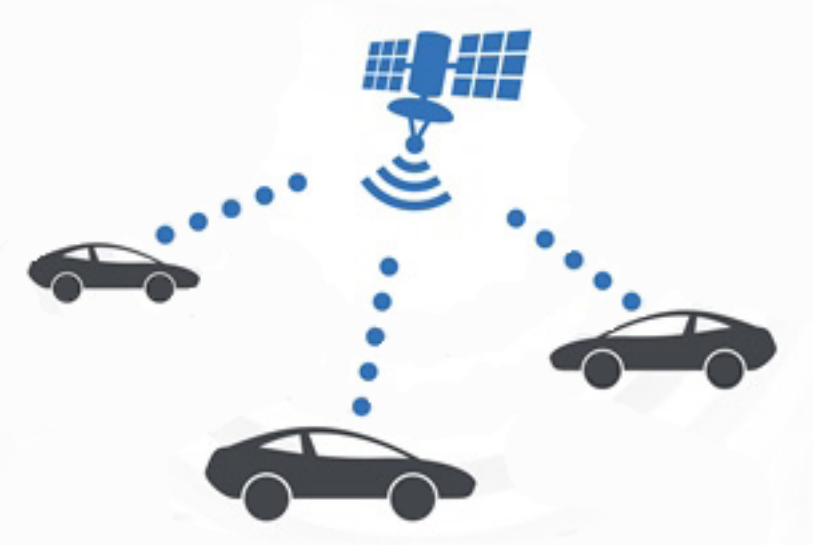

Figure 2: Cloud network

AD-HOC is used for many reasons but mostly because a global network can have delay between the server and the cars and is hard to use in areas with bad connection

to the grid. By using AD-HOC the delay in the signals between the vehicles are reduced and in traffic a shorter delay can save lives.

The goal of V2V is to reduce the total of cars crashes and especially in the future when cars are becoming completely autonomous and driving by themselves. This is where the V2X project enters the picture, *"Because if cars are to communicate with each other, why not let the cars communicate with everything on the road like bikes, traffic lights and pedestrian crossings. Is that possible?"* It had reduced the risk of collision even more.

The technology used is called "Cooperative Intelligent Transport Systems" (C-ITS). “ITS-G5” is a broadcast technology based on an evolution of the wireless standard 802.11p. It is the only validated and available technology on the market and capable of delivering secure AD-HOC direct vehicle-to-vehicle and/or vehicle-to-infrastructure communication. ITS-G5 is running in the designated 5.9 GHz frequency band that is foreseen for road safety. We emphasise that all technologies that run in this frequency band should not cause interference with each other and be interoperable.C-ITS should be able to demonstrate its capability to co-exist with electronic road charging, the enforcement of drive and rest times and weights and dimensions on the adjacent 5.8 GHz frequency band. [reference]

4 Methods

4.1 Det här är också en underrubrik

4.1.1 Det här är underrubrikens rubrik

Arbetsfördelning, använde program (Trello, Slack) Gemensam databas så att alla kan jobba med allt samtidigt, eller när det passar. Enligt kursen bestämde vi olika projektledare per vecka för hela projektet. Varje vecka har vi möte för att bestämma planering och sätta upp uppgifter/mål. Slutet av veckan har vi antingen haft möte själva eller med Cybercom(Jens) för att höra hur arbetet går.

The project was started by creating a common database to make working together easier for all group members. It was decided that the group would have a minimum of two meetings a week, at the beginning and the end of each week to review and discuss the work done so far and to put up goals/ tasks for the upcoming week. At the end of each week, the group would have a meeting with the supervisor at Cybercom, where he would check how the project is going, answer questions from the group members and give advise or help with the program software. Slack was used as a professional source of communication between all group members and so far it has made internal daily group contact simple and efficient. To organise the work and distribute the workload in a clear way between group members the Trello application together with the (with an influence of scrum)Scrum method to solve the tasks.. The group decided a case scenario to solve and with that the help of Scrum the scenario was broken into smaller tasks.

In Trello the case scenario was documented together with the user cases in a backlog, and from there these user cases were broken down into smaller more concrete problems to solve. For each week the group *organized?* tasks which would be distributed to all group members with *avseende på* workload, and time required to solve.

5 Results

Coming in a few weeks (aiming for week 49/50)

6 Discussion

Coming in a few weeks (aiming for week 49/50)

7 Conclusion

Coming in a few weeks (aiming for week 49/50)

8 Appendix