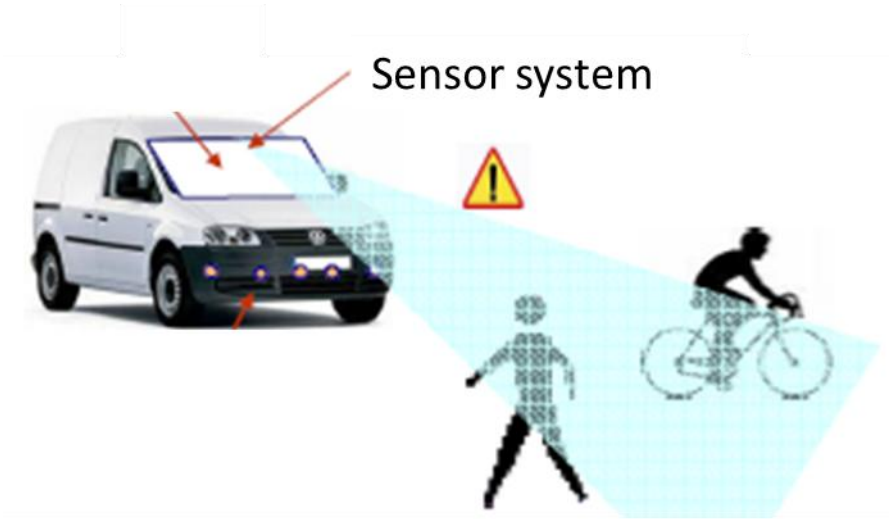
Field tests of protection systems (sensor part) for bicyclists and pedestrians in car collisions



Project within Vehicle and Traffic Safety

Rikard Fredriksson

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Content

FFI in short

FFI is a partnership between the Swedish government and automotive industry for joint funding of research, innovation and development concentrating on Climate & Environment and Safety. FFI has R&D activities worth approx. €100 million per year, of which half is governmental funding. The background to the investment is that development within road transportation and Swedish automotive industry has big impact for growth. FFI will contribute to the following main goals: Reducing the environmental impact of transport, reducing the number killed and injured in traffic and Strengthening international competitiveness. Currently there are five collaboration programs: **Vehicle Development, Transport Efficiency, Vehicle and Traffic Safety, Energy & Environment and Sustainable Production Technology.**

For more information: www.vinnova.se/ffi

1. Executive summary

This project aimed to develop a prototype of a sensor system for bicyclists and pedestrians. The systems is vision-based and can detect dangerous situations before the crash event. If such a situation is detected a final decision can be made to trigger an auto-brake system or together with a contact sensor a passive protection system. The sensor system was mounted on 5 cars in the Netherlands and data from interesting situations was collected on a hard disk.
The aim is to reach knowledge about trig-/non-trig situations for pre-crash-based sensor systems for bicyclists. The project succeeded in a large reduction of false positives.

2. Background

This project is part of a larger European project called SaveCAP (Save Cyclists and Pedestrians) together with the Dutch Transport Ministry, TNO, Achmea (Dutch Insurance Company), and the Dutch Cyclist Union. The aim of the larger project is to develop a prototype protection system for cyclist-to-car crashes.
Previous to this project accident data was collected in Sweden and Germany to understand the accident situation and what diffs between cyclist and pedestrian to car crashes.
Following this project, the third part of the larger project will focus on the crash event and test methods and a protection system to mitigate head injury in the car collision. This is a later FFI project.

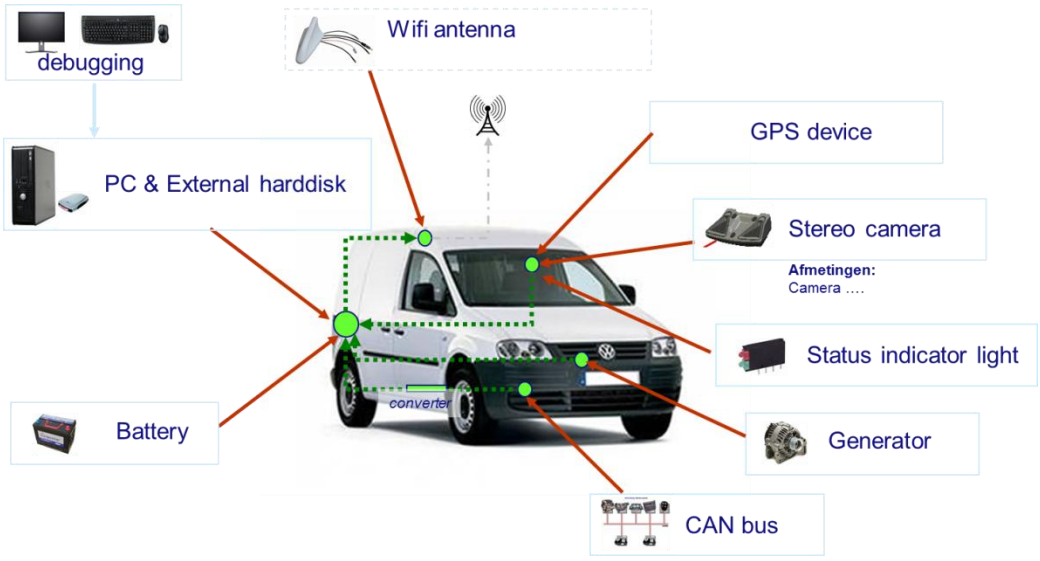
3. Objective

The aim of this project is to collect and analyse data of near-collision events and refine the sensor algorithms to minimize the false positive rate of these systems. It can also give specifications for a further possible continuation of the project with a larger sensor field test or field operational test.

4. Project realization

The system was installed in 5 identical cars, service cars for a Dutch internet broadband provider. They were driven during service work on 8 hour days, 5 days a week, primarily in dense city traffic in Holland. The cars drove in total 14590 km. The triggering level to

record data was set low to collect all possible interesting events. In total over 2700 film sequences were recorded and analysed, of which 83 cases with false positives were found for the initial algorithm. The algorithm was then updated during the project, but keeping the recording trigger level, resulting in the end of the project in 21 false positives, a reduction of 75%.



5. Results and deliverables

5.1 Delivery to FFI-goals

This project can lead to sensors able to detect bicyclists and pedestrians can be developed and produced in Sweden. These sensors could get a large market due to the introduction of AEB (Automatic Emergency Braking) for pedestrians which preliminarily will be introduced in 2014. These sensors can also be used to, together with contact sensors, to enhance the reliability of current pedestrian airbag systems.

6. Dissemination and publications

6.1 Knowledge and results dissemination

These results are important since these sensors are expected to be requested for auto-brake and airbag systems to reduce fatalities and severe injuries in pedestrian crashes. They could then be further developed to also protect in cyclist-to-car crashes.

6.2 Publications

No publications.

7. Conclusions and future research

The sensor system reached the project goal of reduced level of false positive rate, to an acceptable level for a prototype system. Next step is to reach a level acceptable for a production system and eventually a larger field test with a complete system in a larger car fleet.

8. Participating parties and contact person

Autoliv Development AB

Rikard Fredriksson
Tel 0322-6263676
rikard.fredriksson@autoliv.com