PO Box 8077, SE-402 78 Göteborg, Sweden. Visitors: Lindholmspiren 3. Phone: +46 31 772 3655. E-mail: safer@chalmers.se www.saferresearch.com

Reference	*CP51*
Project Title	Hövding data for risk assessment
Coordinator	*RISE*
Project Manager	*Viveca Wallqvist viveca.wallqvist@ri.se*
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Summary

The pre-study has investigated how Hövding data can be made available in RoDL. Since the project coincided with a process around business model for data at the company has no model for general data sharing could be developed, but the data used in the project has been individual withdrawal for this specific research purpose. The pre-study has been presented at SAFER Thursday webinar.

Hövding data for risk assessment

1. Background

In 2013, approx. 23,000 cyclists were injured so badly that they needed to seek medical attention. Of these, 3,500 needed inpatient care. In 2020, the number of inpatient cyclists had increased to 4100. It has been estimated that over 80% of cyclist accidents are single vehicle accidents and that approx. 60% of all serious single-vehicle accidents are related to road-related reasons such as slippery or deficient conditions surfaces.

The available data on accidents related to transport infrastructure is even more limited and the Hövding data would make an interesting contribution to the understanding of these relations. Interesting studies have been performed where different data sources are being combined into a better picture, e.g., Trivector (2020). Other studies have shown that the Hövding data is interesting for the purpose but needs some filtering before it can be used productively (Lindqvist & Roos, 2020).

2. Project set up

2.3 Purpose

The goal of this pre-study has been to show how Hövding as a security system can contribute to future safe traffic environments and demonstrate how large data sets can be combined and made available through public databases. Furthermore, the project has spread knowledge about these new possibilities with data streams and databases and unite actors in different fields towards future research projects and traffic benefits.

2.4 Objectives

The project's aim was to explore how Hövding data can be used to risk assessment, identify research questions related to the data and make the data available through the RoDL platform. Since the project coincided with a process around business model for data at the company no model for general data sharing could be developed, but the data used in the project has been individual withdrawal for this specific research purpose. This work has been combined with further studies of literature to be able to understand how to proceed when data sharing would be probable again.

2.5 Project period

2021-04-05 – 2022-12-31

2.6 Partners

RISE/RoDL and Hövding.

3. Method and activities

The project has been investigating principles of data sharing in data lab using RoDL as pilot. Donated data is made available via AI Sweden as part of the Road Data Lab. This investigation has also used literature data to further develop the ideas of the project.

4. Results and Deliverables

4.1 Hövding data

Hövding Sverige AB (publ) is a Swedish company that develops, markets and sells Hövding, an airbag for urban cyclists. Hövding is equipped with sensors in the form of an accelerometer and gyroscope sensors that register acceleration and rotation around the cyclist's neck. The switch registers the Hövding cyclist's movements 200 times per second and is processed by an algorithm that is implemented in Hövding 3. In the event of an accident, the cyclist's abnormalities are detected movement and the airbag inflates. Hövding's algorithm is a so-called Artificial Intelligence, based on machine learning. Collected movement patterns are used as a basis for this. To Hövding 3 was made the biggest investment ever in terms of data collection of bicycle movements and accidents. Over 3,000 accidents have been staged with stuntmen and thousands of hours regular cycling has been done. This data collection forms the basis of the algorithm in Hövding 3. A "connected" Hövding can contribute valuable cycling data and in that way be involved and influence so that bicycle traffic and infrastructure development become safer. With approval from cyclists, Hövding can share information about where in a city many cyclists ride, where accidents often occur and where cycling infrastructure should be developed.

Hövding has donated data from October 2019 to July 2022. Data is collected in Malmö, Lund, Gothenburg, and Stockholm. The dataset consists of 470,296 trips. A trip is defined as from the time when the cyclist activated the helmet - i.e., has it on and that it triggers in the event of a fall -until it is deactivated again. The data is anonymized. Firstly, all information is connected to the user removed - such as user ID and phone type. Also, one is random length removed at the beginning and end of the trip to avoid that based on the position should be able to identify who completed the journey.

4.2 Road Data Lab

There are many advantages and opportunities for innovation if data from different sources are combined and made available to others, for example, more accurate planning of road maintenance, better understanding of traffic flows, improved security, etc. To integrate and bring together data from different stakeholders, however, is complex and time-consuming - sometimes even legally difficult. Road Data Lab (RoDL) is a collaboration platform that provides a technical infrastructure that enables innovation and learning, a legal framework that supports different licenses and a knowledge base for how to work with different data sources related to roads. Donated data is made available via AI Sweden as part of the Road Data Lab.

5. Conclusions, Lessons Learnt and Next Steps

The pre-study has investigated how Hövding data can be made available in RoDL. Since the project coincided with a process around business model for data at the company has no model for general data sharing could be developed, but the data used in the project has been individual withdrawal for this specific research purpose.

By combining data from Hövding helmets with other data sources, for example information about the design and condition of the road, traffic situation, weather and air quality, conclusions can be drawn about what affects the movement pattern of the helmets is drawn. In the case of targeted studies, cycling can test subjects in addition to Hövding helmets also equipped, for example, with eye tracking and/or instrumented cycle. To document the interaction between attention, movement patterns and the maneuvering of the bicycle, e.g., steering angle, pedal force, and wheel speed. Further an instrumented bicycle can be equipped for dynamic measurement of road surface topography.

The importance of adding more knowledge and understanding to where the focus on improving transport infrastructure related to accidents with bicyclists involved is still striking and using Hövding data for this purpose is still, according to this project, of considerable importance.

6. Dissemination and Publications

The feasibility study has been presented at SAFER Thursday webinar, and tough this report.

7. References

Trivector (2020) Var är det farligt att cykla? Metod för systematisk och effektiv planering för säker cykling, Trivector 2020:88

Lindqvist & Roos (2020) Identifiering av områden med förhöjd olycksrisk för cyklister baserad på cykelhjälmsdata, examensarbete, Malmö Universitet