



How do drivers pass cyclists on European roads? Toward a common regulation for overtaking across Europe

¹Dozza, M.

*lead presenter

¹marco.dozza@chalmers.se, Chalmers University of Technology, Sweden

Background

Enhancing cycling safety is a pressing global issue, with approximately 2,000 cyclist fatalities occurring annually in Europe alone due to bicycle accidents. While urban areas witness the majority of crashes, rural roads often bear the brunt of severe collisions involving motorized vehicles. Presently, there is no unified European policy governing the interaction between drivers and cyclists, including minimum lateral clearance during overtaking. Instead, individual nations establish their own regulations. Considering the shared nature of this problem across countries and the growing mobility within Europe, adopting a common European policy appears logical. Such a policy could potentially garner greater acceptance and compliance among European citizens. Furthermore, it could serve as a guiding framework for the development of intelligent systems that facilitate driver adherence to regulations, such as providing adequate lateral clearance for overtaken cyclists, thereby fostering safer driving practices.

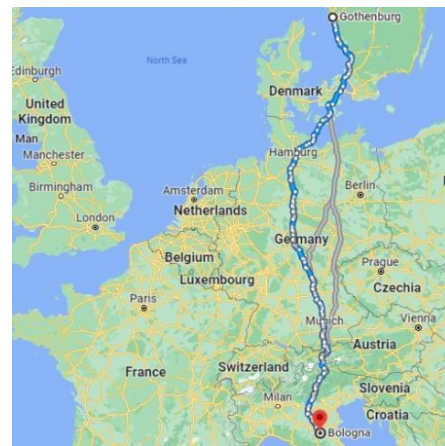


Figure 1 – Itinerary for data collection

The availability of data and analytical tools for cycling safety has increased, offering an opportunity to address intricate maneuvers like overtaking and establish reliable metrics for safety and acceptance. Although studies on this topic have originated from diverse continents and countries, their findings consistently align, suggesting that reinventing policies at the national level might be unnecessary. However, it is important to acknowledge that cultural disparities between continents and countries can influence transportation systems.

Aim

The objective of this project is to gather a large dataset of more than 5,000 overtaking maneuvers from five distinct European countries. By analyzing this data, we aim to assess the potential influence of nationality and infrastructure on driver behavior during cyclist overtaking throughout Europe. The findings of this study will provide valuable insights to inform the formulation of European legislation and the advancement of intelligent (cooperative) systems. These systems, including frontal collision warning and automated emergency braking, have the potential to enhance the safety of overtaking maneuvers.



Method

The collection of data will occur along a 1900 km route spanning from Sweden to Italy, as illustrated in Figure 1 and accessible on the website www.microsafety.eu.

An instrumented bicycle equipped with cameras, GPS, and inertial measurement sensors will be utilized to gather the data. These instruments will continuously record data, capturing the natural behaviors of drivers as they overtake the instrumented bicycle. In accordance with the General Data Protection Regulation in Europe, all data will undergo complete anonymization

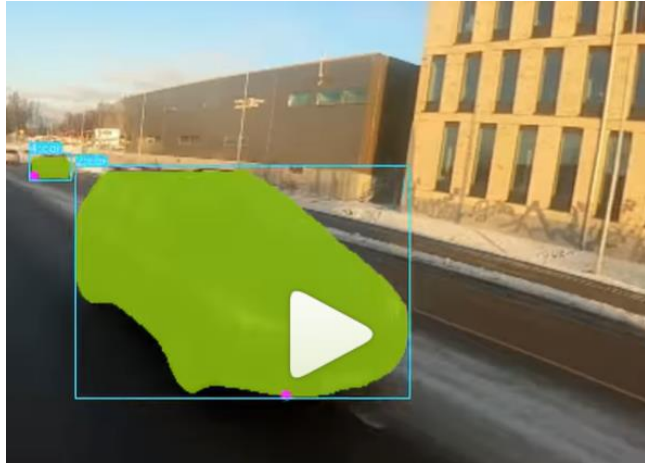


Figure 2 – Data classification, tracking, and anonymization

([demonstrated in the video](#); see Figure 2). By extracting distance and kinematics information from each vehicle in the video data and combining it with maps and video reduction techniques, we will analyze how various factors such as nationality, road geometry, and visibility influence the different stages of overtaking maneuvers in Europe.

Results

As of the current writing, data collection has not yet taken place across Europe; however, substantial preparations have been undertaken. The bureaucratic procedures involved demanded more effort than initially anticipated, including the preparation of a Data Protection Impact Assessment in collaboration with Chalmers lawyers, which received approval from the university. An application seeking ethical approval has been submitted to the Swedish national authority for ethics, and legal and ethical guidance has been sought for all remaining countries. A prototype bicycle is already in operation, collecting data to ensure the reliability of the equipment and satisfactory image processing for video anonymization and kinematics evaluation. The software responsible for processing the data and estimating distances and speeds from the video footage is still being developed. Nevertheless, some preliminary data is accessible on our social media platforms (e.g., [Instagram](#), [YouTube](#)) to track our progress. Depending on the success of the extensive data collection, our contribution to the conference could range from presenting statistically significant findings, including a hierarchy of the primary predictors for lateral clearance during cyclist overtaking in Europe, to showcasing a few case studies on specific critical events documented within the project.

Discussion and conclusions

While this project aims to gather 5,000 overtaking manoeuvres, it is important to acknowledge that this quantity may not comprehensively represent the behaviors of millions of individuals from various European countries. Moreover, the validation of our algorithms for distance and kinematics estimation is still pending. Nevertheless, this initiative marks a significant beginning and will offer valuable insights to guide future projects that seek to expand and enhance our endeavors.