

Collection of naturalistic bicycling data is now ongoing

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In the last 10 years, improved vehicle safety has successfully decreased the number of fatalities and severe injuries from vehicle accidents in Europe (CARE; European road accident database). However, the number of fatalities and severe injuries for vulnerable road users, and more specifically for bicyclists, did not show the same trend. For example, in Göteborg, while the number of injured drivers has decreased by approximately 30% in the last 5 years, the number of injured bicyclists has been constant.

Nowadays, large scale collection of naturalistic driving data is the most promising and credited method to understand accident causation and driver behavior. For example, analyses of naturalistic driving data have quantified the risk associated with engaging in secondary tasks while driving¹, supporting new legislation to improve vehicle safety. However, this method has not been developed to the same extent for bicycles. To date, only video collection from helmet-mounted cameras has been used to understand bicycle accident causation and bicyclist behavior.

The project preBikeSAFE leveraged on the experience at SAFER (Vehicle and Traffic Safety Center at Chalmers) from euroFOT² and MASCOT³ to adapt the naturalistic method to bicycles. preBikeSAFE developed a prototype bicycle able to collect data from a number of sensors, namely cameras, inertial measurement units, GPS, brake sensors, and speed sensors (see Figure below). Collection automatically starts when the cyclist begins to ride the bike and stops once the cyclist gets off. Further, data is wirelessly sent to a back office together with a state message detailing the quality and quantity of data collected in each trip.

The project preBikeSAFE successfully piloted the naturalistic bicycling method by collecting data over two weeks and performing preliminary analysis to check data quality and to show how this naturalistic data can improve bicycle safety. [Several videos](#) are now on Youtube and show how naturalistic bicycling data can help understand bicycle accident causation and bicyclist behavior. Further, a new tool based on the SAFER100Car⁴ and the FOTware⁵ software was developed for analysis of naturalistic bicycling data.

The new projects BikeSAFE, sponsored by Trafikverket, and BikeSAFER, sponsored by the Swedish funding agency Vinnova, will collect data from 15 bicyclists during the summer of 2012 and will provide the first extended dataset of naturalistic bicycling data.

1 - Olson, R.L., Hanowski, R.J., Hickman, J.S., Bocanegra, J., 2009. Driver distraction in commercial vehicle operations. Technical Report FMCSA-RRR-09-042 (Final Report).

2 - <http://www.eurofot-ip.eu/>

3 - Dozza M., Idegren M., Andersson T., "An Open Customizable Modular Platform for Analysis of Human Movement in Laboratory and Outdoors", Proc.VI Posture Symposium, Smolenice Castle, Slovak Republic, Sept 55-18, 2011.

4 - Dozza M. – "What factors influence drivers' reaction time for evasive maneuvers in real traffic?", Accident Analysis and Prevention, 2012,

5 - Dozza M., Moeschlin F., León Cano J., "FOTware: a modular, customizable software for analysis of multiple-source field-operational-test data", proceedings of the Second International Symposium on Naturalistic Driving Research, Blacksburg, August 31 - September 2, 2010.



- Camera
- GPS
- IMUs
- Pressure sensor
- Speed sensor
- Simple HMI
- Brake sensor
- Wireless Modem

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