

## **BikeSAFE – Analysis of Safety-Critical Events from Naturalistic Cycling Data**

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### **Abstract**

Cycling is a risky activity responsible for a large number of injuries and deaths every year. For example, in Europe cycling claims about 2,000 lives each year. In the last decades, numerous research studies used accident databases to better understand the causal factors of bicycle–vehicle accidents in order to estimate the risk of these accidents (e.g., Karsch et al., 2012; Liu et al., 1995; Stone & Broughton, 2003; Wachtel & Lewiston, 1994; Wang & Nihan, 2004). However, so far very few studies (e.g., Gustafsson & Archer, 2012; Johnson et al., 2010) investigated cyclists' behavior using naturalistic cycling data. In addition, these studies only collected GPS and/or video information during cycling. The aim of the BikeSAFE project was to collect naturalistic cycling data from videos, GPS as well as inertial sensors and bicycle controls to 1) analyze cyclists' behavior and their interaction with other road users, 2) investigate safety-critical situations and 3) suggest new countermeasures to increase bicycle safety. Therefore, five equipped bicycles collected naturalistic cycling data in Gothenburg from 16 participants (8 female, 8 male;  $M = 39.1$  years,  $SD = 11.4$  years). Video recordings captured cyclists' perspective of the road while inertial sensors and GPS recorded kinematics and location information of the bicycles. In total, 114 hours and 332 trips were collected. In addition to cycling data, a trip diary and questionnaire with regard to the participants' cycling patterns were filled in. Preliminary results from BikeSAFE prove the potential of naturalistic cycling data to elucidate bicycle accident causation and cycling behavior including distraction and inattention.