EPSRC DTP PhD Research Project

Project Title: Combating Driver Distraction in Smartphone-based Insurance Telematics

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Department: Computer Science

Location: Innovation Centre, Streatham Campus

PhD Programme: PhD in Computer Science

Project Description:

Over the past century, many industrialised nations, including the UK, have witnessed a consistent decline in traffic fatalities per passenger mile. However, in recent years, this downward trend has stagnated or, in some cases, even reversed. One contributing factor is the increasing number of fatalities resulting from driver distraction, particularly due to mobile phone use. In the UK, more than 269 road fatalities were attributed to impairment or distraction between 2013 and 2022 [DFT2022]. Similarly, in the US, distracted driving due to mobile phone use increased by over 20% between 2020 and 2022, with the worst offenders being over 240% more likely to crash than the safest drivers [CMT2023]. To further put this into context, note that there are several indications of that mobile phone use while driving is severally underreported as a factor in car accidents [IGE2016], and that increasing penalties for mobile phone use while driving has not been effective in reducing the number of serious or fatal crashes in the UK [FRY2023]. In summary, combating distracted driving is a key public health issue in the UK, and aligns perfectly with the University of Exeter's strategic priority of "[Making] key breakthroughs to transform human health and wellbeing."

In parallel with the rise in driver distraction there has been a notable surge in the adoption of insurance telematics. This entails using driving behaviour data to provide adjustable premiums based on individual risk. Using insurance telematics, insurers can provide real-time driver feedback and encourage safer driving through lower insurance costs. Insurance telematics is a sizable market estimated at US$100B in 2022 and projected to grow about 20% per year over the next decade, with most of that growth coming from smartphone-based solutions [STR2023].

This project will investigate the detection, analysis, and prevention of distracted driving within a smartphone-based insurance telematics framework. A comprehensive approach will be employed, drawing on methodologies from human activity recognition, vehicle navigation, sensor fusion, and machine learning. The primary data sources will include sensor measurements from smartphone-embedded GNSS receivers, accelerometers, gyroscopes, and magnetometers. Using machine learning, the project will study how driving behaviour correlates with smartphone distraction, while using historical insurance claims data to develop driving metrics that are associated with safe driving.

The project will benefit from its close collaboration with Arity, a world-leading telematics company founded by Allstate Insurance in 2016. Arity leverages insurance and driving data to pioneer data science services within the telematics sector. Arity's unique position for supporting this project can be attributed to two factors. First, Arity has access to one of few large-scale datasets in the world that connect telematics driving data and claims data. Second, thanks to Allstate's long history in the telematics sector, Arity brings a wealth of expertise and insights to the table, underpinned by a proven track record. Their contributions to this project will include providing access to their telematics dataset, mobilising their specialised data collection team for additional data acquisition when needed, and offering insights on commercialisations.

[DFT2022] "RAS0701: Reported road collisions and casualties by severity, contributory factors and road user type, Great Britain, 10 years up to 2022", Department for Transport, 2022

[CMT2023] "The State of Distracted Driving in 2023 & the Future of Road Safety", 4th Ed., Cambridge Mobile Telematics, 2023.

[IGE2016] Janet Ige, Amrit Banstola, Paul Pilkington, "Mobile phone use while driving: Underestimation of a global threat", Journal of Transport & Health, Volume 3, Issue 1, Pages 4-8, 2016.

[STR2023] David Straughan, "What are insurance companies doing with all that telematics data?", Automoblog, URL: https://www.automoblog.net/telematics-data/, 2023.

[FRY2023] Jane M. Fry, "Mobile phone penalties and road crashes: Are changes in sanctions effective?", Journal of Safety Research, Volume 84, Pages 384-392, 2023.

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