EPSRC
Engineering and Physical Sciences Research Council

UNIVERSITY OF LEEDS

EPSRC CASE PhD Studentship

Closing Date: 22 January 2017 (23:59 UK time)
Start Date: 1st October 2017

Project Title

Human factors of vehicle automation: measuring and understanding driver state during automation

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Industrial Partner	Jaguar Land Rover		

Project Details

Background

In a bid to increase safety, reduce transport-related emissions and increase road capacity, there has been a steady and aggressive rise in the implementation of 'advanced driver assistance systems' and automated support systems in vehicles, during the past 5-10 years. The ultimate aim of many vehicle manufacturers and service providers is now to change the state of mobility in the future by providing fully 'driverless' or autonomous driving.

As the degree of automation in vehicles increases and the vehicle takes more tasks away from the human driver (keeping the car in the lane and controlling its speed and distance to other cars), the driver starts to engage in other tasks such as catching up on emails or watching TV, etc. The implications of such removal of driver attention from the main driving task are not currently well understood, but could have profound implications on road safety. Investigating whether drivers are still able to comprehend what is happening in the road and driving scene during automation is therefore one of the main concerns of psychologists and human factors specialists studying vehicle automation. It is also not currently clear whether and how drivers can safely and swiftly resume control of the driving task, if they are required to do so. However, research in our laboratories, using driving simulator studies, has shown that drivers are slower at responding to hazards when they are required to resume control from automation and they are also more likely to engage in other, non- driving related tasks during automated driving (Louw & Merat, 2017; Louw et al, 2016; Merat et al., 2014a, b; Carsten, et al., 2012).

Project Aim

The aim of this project is to use human psychophysiological measures such as eye and head tracking, seat and body position etc., to establish how vehicle automation affects participants' engagement in the driving task and to understand what drivers do when automation is engaged. As the automated systems advance in capability, there is less and less call for drivers to be involved in the driving task. However, should the system reach its limitations or the vehicle come to the end of a road where automation is no longer possible, the vehicle needs to ensure that the driver is in a safe and ready state to resume control from the vehicle and re-engage in manual driving. This transition of control back to the driver must be supported by a driver monitoring system which establishes whether the driver is alert and capable of resuming control. The proposed research programme will therefore establish what type of monitoring is successful in providing this information and also investigate methods for ensuring the driver is not able to completely disengage from control of the vehicle. Understanding how to keep the driver vigilant, yet not bored of monitoring automation, is also an important consideration of this project.

The project will primarily use the University of Leeds Driving Simulator, but as the development of automation in JLR vehicles progresses, the student will have opportunity to spend time with the Human Machine Interface team in Warwick to understand how research knowledge in the area is used in the development of interfaces for private vehicles.

Impact of Research

There is clearly high potential impact of this research since the student will be able to work directly with JLR for disseminating the results of their research in the development of future automated vehicles.

Training

In addition to attending the University of Leeds training programme for PhD students, the student would benefit from training on use of the driving simulator and also use of the eye tracker. The student will also have opportunity to work with the vehicle research team at JLR.

Entry Requirements/necessary background

The project is suitable for an individual with a background in the behavioural sciences and some knowledge of psychophysiological techniques such as eye trackers will be useful. Programming skills and knowledge of Matlab are desired.

Further information about entry requirements can be found here: http://www.its.leeds.ac.uk/courses/phd/apply/
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How to Apply: Please send a CV and a short 'statement of motivation' to Professor Natasha Merat (N.Merat@its.leeds.ac.uk). Further information will then be provided.

Funding

Funding is available for UK applicants and also for EU applicants who have been ordinarily resident in the UK for three years prior to the start of the studentship. Further information about eligibility and the residency requirements can be found here: https://www.epsrc.ac.uk/skills/students/help/eligibility/

Funding is available for 3.5 years. Funding covers academic fees at the UK/EU rate and an annual stipend of approximately £17,700 (exact figure to be confirmed). A Research Training Support Grant is also provided.

Partners and Collaborators

The project is supported in cash and in kind support by JLR. The project will be supervised by Professor Natasha Merat, leader of the Human Factors and Safety Group, at the Institute for Transport Studies, University of Leeds. The group has been studying driver interaction with new technologies for over 20 years and collaborates with a large number of research institutions and OEMs around the world.

References

Carsten, O. Lai, F., Barnard, Y., Jamson, H. & Merat, N. (2012) Control task substitution in semi-automated driving: Does it matter what aspects are automated? Human Factors: The Journal of the Human Factors and Ergonomics Society, 54: 747-761.

Louw, T.L., & Merat, N. (2017). Are you in the loop? Using gaze dispersion to understand driver visual attention during vehicle automation, Transportation Research Part C: Emerging Technologies.

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Please note that this is a Competition Funded PhD Project. It is in competition for funding with one or more other projects.

We welcome scholarship applications from all suitably-qualified candidates, but UK black and minority ethnic (BME) researchers are currently under-represented in our Postgraduate Research community, and we would therefore particularly encourage applications from UK BME candidates. All scholarships will be awarded on the basis of merit.