

Frontiers of Robotics seminar

"Game theory for self-driving cars"

Fanta Camara, University of Leeds, and Visiting researcher, University of Lincoln

Time and place: Thu Feb 14, 13:00 in INB1102

Open to all in SoCS.

Host: Charles Fox

Abstract:

Experiments with "self-driving cars" are now appearing on public roads in several countries including the UK, and while their robotic localisation and mapping is regarded as mature technology, control of their interactions with other road users remains a largely open and urgent question.

This talk will show how we are using game theory based on the "game of chicken" to model and control interactions between autonomous vehicles and pedestrians. Game theory shows that the vehicle must maintain some "credible threat" of either actually hitting pedestrians or otherwise inflicting some other penalty on them, otherwise they will make little or no progress on the road. Game theory can also show why buying gas-guzzling SUVs is rational if it alters the game solution to encourage other vehicles to yield priority and reduce your own travel time, unless they are suitably taxed to counter this effect.

The model is informed by Leeds' on-road vehicle trials in France and Greece, mathematical modelling, CCTV street data analysis, and psychological lab studies. We may extend these experiments with virtual reality and real vehicle trials in Leeds and Lincoln.

The model has recently been used and cited in the UK Law Commission's consultation on autonomous vehicles, which may lead to changes in UK law in the area.

Documents:

Empirical game theory of pedestrian interaction for autonomous

vehicles: http://eprints.whiterose.ac.uk/129303/1/Camara2018MB_Manchester.pdf

Law commission consultation (see p174): https://s3-eu-west-2.amazonaws.com/lawcom-prod-storage-11jsxou24uy7q/uploads/2018/11/6.5066_LC_AV-Consultation-Paper-5-November_061118_WEB-1.pdf