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The Department of Automatic Control & Systems Engineering
is pleased to announce the following seminar:

Driven Learning for Driving: Why Autonomous Cars Need Introspection

Dr Ingmar Posner

*Mobile Robotics Group, Department of Engineering Science,
University of Oxford*

Wednesday, 6th November 2013 at 14:00

LT02, Sir Henry Stephenson Building

Abstract

Classification precision and recall have been widely adopted by roboticists as canonical metrics to quantify the performance of learning algorithms. This talk advocates that for robotics applications, which often involve mission critical decision making, good performance according to these standard metrics is desirable but insufficient to appropriately characterise system performance. Against the backdrop of an autonomous driving application - the Oxford RobotCar Project (<http://mrg.robots.ox.ac.uk/robotcar/>) - we will introduce and motivate the importance of a classifier's introspective capacity: the ability to mitigate potentially overconfident classifications by an appropriate assessment of how qualified the system is to make a judgement on the current test datum. The talk will provide an intuition as to how this introspective capacity can be achieved and systematically investigates it in a selection of classification frameworks commonly used in robotics. The benefits of introspective classification are then demonstrated in an active learning framework designed to provide efficient and scalable semantic mapping of large-scale robot workspaces.

Biography

Ingmar Posner is a University Lecturer in Engineering Science at the University of Oxford and co-lead of the Mobile Robotics Group (MRG). His expertise lies in the design and implementation of information engineering techniques that enable an autonomous agent to interpret complex, dynamic environments in a way which permits robust decision-making, planning and exploration online and in real-time. His research tackles questions such as what semantic information can be inferred about the environment the robot has traversed (e.g. what type of structures, what objects can be found? What type of terrain is it travelling on?) and how this knowledge can feed into the decision-making process of an autonomous agent such as a self-driving car? His research track record includes award winning work on semantic mapping, active perception and 3D reconstruction. Building on his successes to date, Posner's current research focus lies on closing the action-perception loop in semantic mapping to enable robust robot decision-making and online planning and exploration in the context of, amongst others, autonomous transport.