

Optimising flow within mobility systems with AI

The Turing and Toyota Mobility Foundation collaborate to modernise city planning and traffic management

London, England (May 24, 2018) - The Alan Turing Institute and the Toyota Mobility Foundation are collaborating on a project to transform the way cities are planned and managed. The objective of this new project, 'Optimising flow within mobility systems with AI', part of the Turing's new [AI programme](#), is to transition complex traffic management from static systems into dynamic, optimized systems that are managed in real-time across many types of mobility.

The UN [predicts](#) that by 2030, urban areas are projected to house 60% of the world's population. In addition to increasing population in metropolitan areas, cities themselves are changing. There is an increase in ride sharing platforms, changes in mode choices such as cycling, and same-day delivery fleets, dramatically affecting traffic patterns. While environmental standards are improving, congestion in urban environments needs to be managed to maintain our health in cities.

Managing traffic and optimising traffic signals, both vehicular and pedestrian, within cities has long relied on traditional modelling and forecasting. Real-time events, changing conditions, and evolving mobility patterns mean existing systems can no longer keep pace and adapt to new needs in urban environments.

Thanks to cutting-edge data science techniques and by working with real-time data and communications, city planners now have new tools. This creates the potential to dramatically improve the way our cities are run. Spanning 18 months, the new collaboration brings together researchers and software engineers with expertise across mathematics and data interaction, from the Turing and the Universities of Cambridge and Manchester, and mobility expertise from the Toyota Mobility Foundation. They will be working with data providers, and government managers underpinning future cities, as well as drawing upon expertise from the Turing and partner universities' ongoing work in the area with the Greater London Authority.

Potential outcomes include:

- integrating an AI system for traffic lights (signal) control
- building a platform for interactive data manipulation to monitor and predict traffic behaviour, and to test out planning scenarios
- finding mechanisms for fleet operators and cities to work together, for example by sharing data about congestion or pollution hotspots, and rerouting around the problem before it becomes serious

By combining real-time operations with periodic monitoring and long-term planning, the outcomes of the project will be useful to urban planners managing current conditions in cities as well as preparing them for the future. A data-driven traffic management system should help optimise air quality, reduce energy consumption, and improve system capacity and resilience.

Alan Wilson, CEO of The Alan Turing Institute and lead researcher said:

‘Our vision is that city planners and operators should have a system that shows them real-time data feeds, lets them analyse how the city is working, integrates mathematical and computer modelling as well as machine learning models so that they can test out scenarios, and gives them insight into when behaviour patterns are changing. Because of data and new technology, transport patterns can now change dramatically in a short time. We hope that this will lead to improvements in health and mobility for city populations as well as safety and efficiency in traffic management.’

The UK government’s AI Sector Deal and Grand Challenge will help sectors boost their productivity through new technologies, helping people develop the skills they need and lead the world in the safe, ethical use of data. Business Secretary Greg Clark said:

‘This new project will help develop the smart cities of the future while improving communities’ lives by tackling issues such as congestion and pollution.

‘Through our modern Industrial Strategy, AI Sector Deal and Grand Challenge, this is exactly the type of project we want to see developed in the UK. By developing and embedding these technologies into our everyday lives, we will help build a Britain fit for the future.’

Ryan Klem, Director of Programs for the Toyota Mobility Foundation added:

‘While there has been significant focus on AI inside the vehicle, we are excited for the opportunity to work with the Turing to bring data science and AI to a complementing facet of mobility: Infrastructure. We believe mobility is critical to promoting societal progress and improving lives around the world, and this project represents an important step to improve the social good and help achieve harmony in mobility across all modes for all citizens.’

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Note to editors

1. The Industrial Strategy sets out a long term plan to boost the productivity and earning power of people throughout the UK. It sets out how we are building a Britain fit for the future – how we will help businesses create better, higher-paying jobs in every part of the UK with investment in skills, industries and infrastructure.

About the Toyota Mobility Foundation

The [Toyota Mobility Foundation](#) was established in August 2014 to support the development of a better mobile society. The Foundation aims to support strong mobility systems while eliminating disparities in mobility. It utilizes Toyota's expertise in technology, safety, and the environment working in partnership with universities, governments, non-profit organization, research institutions and other organizations to address mobility issues around the world. Programs include resolving urban transportation problems, expanding the utilization of personal mobility, and developing solutions for next generation mobility.

About The Alan Turing Institute

The Alan Turing Institute is the UK's national institute for data science and artificial intelligence. The Institute is named in honour of Alan Turing, whose pioneering work in theoretical and applied mathematics, engineering and computing is considered to have laid the foundations for modern-day data science and artificial intelligence. The Institute's goals are to undertake world-class research in data science and artificial intelligence, apply its research to real-world problems, drive economic impact and societal good, lead the training of a new generation of scientists, and shape the public conversation around data. turing.ac.uk