

people



Miss Hannah Bryan
 Reader in Transport
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qualifications

First Class Civil Engineering, 1st Class

memberships

Institute of Engineering and Technology

honours and awards

Won the ITS UK and TBC Magazine Student Essay Competition, April 2007
 Won the ICE Wales Annual Papers Competition, April 2007

main expertise/research interests

Hannah's main areas of interest are in the creation of effective, efficient and sustainable transport and public transport networks. She is particularly interested in the role of Intelligent Transport Systems in achieving this and mitigating climate change.

She is predominantly working on smartcard related projects, in particular spatially analysing data, privacy concerns, academic evaluation and future technologies.

other expertise

Hannah is also supporting research in several ITS areas including future ITS platforms, Road User Charging and the use of Black Box Insurance schemes for dynamic data collection.

current work

- Yorcard
- Smartcard data analysis
- ASK-IT
- TRACKS
- MESSAGE
- EMMA

external indicators

Chair at Carfax 3 days at Transport Conference, Paris, October 2008
 Chair at Intelligent Transport Systems World Congress, Beijing, October 2007

sample publications

- H. Bryan, P. Blythe. *Understanding behaviour through smartcard data analysis*. *Proceedings of the Institution of Civil Engineers - Transport* 2007, **100**(TR4), 173-177.
- Simon Edwards, Hannah Bryan, Jürgen Wagner, Phil Blythe. *An Environmental Sensor System for Road Networks: MESSAGE Project*. In: *14th ITS World Congress, Beijing 2007*
- Bryan H.R. *Improving Transport with Smartcards: the Next 10 years*. *Traffic Engineering and Control* 2007, **48**(5), 180-181.
- Bryan H.R. and Blythe P.T. *Data Privacy*. In: *Moving On 2007*, Cardiff
- Bryan, H.R. and Blythe, P.T. *Improving the Business Case for Smartcards through Data Analysis*. In: *Smart Moving 2007*, Birmingham
- Blythe, P.T. and Bryan, H.R. *Challenges for harnessing new developments in smartcard and RFID technology for Transport in the UK*. In: *Proc. 13th World Congress on Intelligent Transport Systems and Services 2006*, London
- Bryan, H.R. *Mapping the Travellers*. *Surveyor Magazine*, 2006.
- Bryan, H.R. and Blythe, P.T. *Public Transport Smartcard Data Analysis - A tool for meeting customer needs*. In: *ITS Europe Conference 2007*, Aalborg, Denmark
- Bryan, H.R. *Smart Cards Enabling User-Oriented Public Transport*. *Smart Card News*, 2005.
- Bryan, H.R. *Smartcards Enabling User-Oriented Public Transport*. *ITSO News*, 2005.

title

Improving Transport with Smartcards: the Next 10 years

authors

Bryan H.R.

journal

Traffic Engineering and Control

publication year

2007

abstract

The use of smartcards as a new media for ticketing for transport services is becoming commonplace in many countries, including in parts of the UK. However for a technology that has been in effective use for almost two decades, the take up of such systems is probably not as widespread as one would expect when considering the benefits that smartcard-based systems seem to apparently offer. Smartcards are developing continuously. The technology is likely to continue getting smaller and cheaper, and a natural progression will lead to changes in the device appearance and applications. The purpose of this paper is to consider how smartcards and the forthcoming developments could improve transport in the next five to ten years.

title

Understanding behaviour through smartcard data analysis

authors

H Bryan, P Blythe

journal

Proceedings of the Institution of Civil Engineers - Transport

publication year

2007

abstract

A feature of public transport smartcard systems that could greatly improve the business case for smartcard investment and deployment is the vast amount of data gathered during operation. Each time the card is used a transaction is recorded. The transaction is essentially a snapshot of the cardholder's behaviour, such as the boarding location and time. If this information were collected and analysed, the potential would be to generate a dynamic passenger profile, which could continuously update itself as the data is produced. This provides the possibility for a much more coherent and in-depth understanding of user demand. The purpose of this paper is to question whether it is possible to create a service that is responsive and relevant to user needs, using additional knowledge of how travellers use public transport (captured from smartcard data analysis). Creating a service based upon meeting user demands could enhance the appeal of public transport and if this results in increased ridership, it would create a much more healthy business case for smartcards. It could also encourage and facilitate the modal shift that is required for the sustainable development of the transport industry.

DOI link




Mobile Environmental Sensing System Across Grid Environments
 Project Director – Professor John Polak (j.polak@imperial.ac.uk)
 Project Co-ordinator – Professor Neil Hoose (n.oose@imperial.ac.uk)
 Project Website – www.message-project.org

MOTIVATION
 Understanding the generation, distribution and impacts of urban and regional air pollution is a major scientific challenge. The transportation sector is a significant source of air pollution and consequently air quality considerations feature heavily in transport policy (e.g. London Low Emissions Zone). However, both academic and practical work is limited by a lack of data of adequate temporal and spatial granularity. Current trends in sensor, communications and computing technologies open up enormous opportunities for pervasive, high-resolution data capture from portable devices. The MESSAGE consortium, lead by Imperial College London, brings together internationally leading (E' and S') specialist research groups in the fields of eScience, transport, sensors and communications technologies from Imperial, Cambridge, Leeds, Newcastle and Southampton. In partnership with our non-academic collaborators we will address the challenge of how to most effectively capitalise on this simultaneous improvement in both the quality and availability of data.

A MOBILE WIRELESS SENSOR NETWORK
 The project will develop and demonstrate the potential of diverse, low cost sensors to provide data for the planning, management and control of the environmental impacts of transport activity at urban, regional and national level. This includes their implementation on vehicles and people to act as mobile, real-time environmental probes, sensing transport and non-transport related pollutants and hazards.
 Three sensor platforms will be developed as part of the project. Cambridge will investigate the potential for personal devices (mobile phones) to support a sensing system. Newcastle will develop a "smart-dust" network using Zigbee (IEEE 802.15.4) nodes, while Imperial will devise a network that utilises WiFi (IEEE 802.11.g) and WiMax (IEEE 802.16) technologies for communications and positioning, and a set of novel sensor designs. All platforms will integrate with a common data processing system (see right).



FIGURE 1 Vehicle-based Ad hoc mobile Network (VANET)

FIELD TRIALS
 Field trials will take place throughout the project to aid in the development of the system and to investigate specific areas of interest to both academic and non-academic project participants. The table below summarises the characteristics of the major sensor deployments:

	London	Gateshead	Leicester	Cambridge
Mobile Sensors	Guato (5-10) & Motos (<10)	Motos (100) with GPS	Motos (<100) with GPS	Mobile phone with sensor payload (25)
Static Sensors	AQH (~90)	Motos (200)	Motos (200)	AQH (5)
Main objectives:	RT sensing & control Dynamic Env. Modelling Information & Traffic control	RT pervasive sensing & control Integrate data-bases/models Smart market demand mgt.	RT pervasive sensing & control Integrate with Leicester UTC Real-Time control	RT Pervasive sensing & control Integrate with TIME-GACH Mobile phone network
Candidate Parameters	CO, CO2, NOx, SO2, noise, °C	CO, CO2, NO2, SO2, noise, °C, humidity/pressure	CO, CO2, NO2, SO2, noise, °C, humidity/pressure	CO, CO2, NO2, SO2

TABLE 1 Overview of field trial characteristics

eSCIENCE & DISTRIBUTED GRID COMPUTING
 The project will develop a single eScience infrastructure to support a wide range of scientific, policy-related and commercial uses and applications for the sensor data. This will be used to demonstrate the operation and utility of this infrastructure in selected case study applications as identified during requirements capture. This will include integration with a variety of external data sources and use of a grid computing architecture (see Figure 2). Specific research objectives will include the investigation of techniques for in-network data mining, distributed processing of real-time environmental models and the development of workflows to support specific analyses (see Figures 3 and 4).



FIGURE 2 MESSAGE eScience architecture

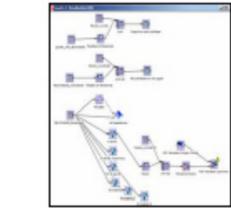


FIGURE 3 Workflow structure

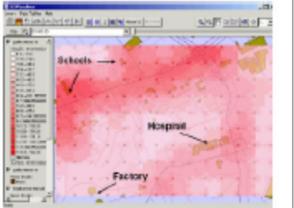


FIGURE 4 Visualisation of simulated data

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