Using Gamification and Metaphor to Design a Mobility Platform for Commuters

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ABSTRACT

In this paper the authors explain the use of gamification as a way to optimize mobility patterns within a heavily congested European City. They explore this from two perspectives, first by outlining a gaming concept and secondly by explaining how the use of a mobility game that took place in two locations can be used to explore incentives and design issues.

Keywords: Commuter Congestion, Driver Behaviour, Gamification, Mobility Platform, Persuasive Gaming, Real Life Game, Traffic Congestion

INTRODUCTION

Traffic congestion and the associated economic and environmental damage are serious problems across the world and novel solutions are required to help reduce them. To date many approaches have been tried, for example car sharing with priority lanes for shared vehicles as found in Seattle, charges for driving in the city centre such as in London, introducing cycle lanes or improving public transportation options. However, in all these cases there are a number of problems which apply to all or some of these options, namely that they require large amounts of additional government spending, increase inconvenience on the commuter or require significant changes in the daily routine of drivers. They also largely ignore the complex social or personal motivations that people have when undertaking different journeys, for example shopping on the commute to work, dropping of passengers on the school run or the weekend excursion; some of which are possible as a ride share. Our work aims to complement the top down policy driven approaches by Governments and drivers’ existing behaviours. With these issues in mind we explore how particular motivations shape mobility decisions and how, through

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understanding these motivations, incentives can be provided that could help change driver behaviour. We believe this can be done best by relying on a game-like approach. As part of this we are exploring how location-aware game-like environments can be used to encourage changes in mobility behaviour.

We take the position that we must understand the motivations that people have for individual or groups of journeys, whether they are via car, bike, foot or public transport. In doing so we explore how incentives in the form of game-like aspects such as scores, collaboration, competition or via direct/indirect benefits can be used to change behaviour. As described more fully below, our position is largely derived from the idea that mobility in urban environments, particularly in respect to commuters who drive to work, can be viewed in a game-like context; even if the drivers themselves are not specifically aware of the game-like nature of their interaction. One of the key aspects of the current project is the use of contextual enquiry (Beyer & Holtzblatt, 1998; Holtzblatt, 2004) and game-like simulation as approaches in order to elicit requirements as well as to identify how incentives can be used to encourage small changes in behaviour.

The paper begins by exploring the underlying problem Luxembourg is facing, then provides an overview of the I-GEAR project (Incentives and Gaming Environments for Automobile Routing; a project run at SnT / University of Luxembourg and financed by Luxembourg FNR) and its underlying approach. The final part of the paper explains the use of gaming in two contexts, firstly in a pilot study and secondly in another game, which was played during the MobileHCI 2012 conference in San Francisco. Within these contexts we illustrate how mobility games that are played indoors can be used as a method to test game logic, observe mobility behaviour and the usage of incentives to change these.

BACKGROUND

The Problem

Our research is motivated by an immediate and pressing traffic congestion problem: the City of Luxembourg (population ca. 85,000) was in 2008 the 10th most congested city in Europe (TomTom, 2008) with approximately 120,000 daily intra-city commuters (PWC, 2006) resulting in increased journey times by nearly 21% (Inrix, 2010). The situation is also exacerbated by the 60% rise in road haulage traffic between 1999 and 2009; a trend which is set to continue as the Luxembourg Government seeks to make the country a European freight transport centre. Furthermore, many of these problems are not unique to Luxembourg and in Europe around 1% of GDP (or €105bn) is lost per year due to traffic congestion (Euractiv, 2007). The problem is also similar in the United States, in 2005 an estimated $90bn (Schrank, 2005) was lost due to traffic congestion.

Luxembourg also has the highest level of car ownership in Europe with 659 cars per 1000 people (European Commission, 2006). Additionally, the level of luxury car ownership indicates that it is not simply the act of owning a car, but likely an effect of social status and other social pressures. Indeed a qualitative study about the mobility behaviour of the younger (age 18-35) population and commuters in Luxembourg (Milmeister & Roob, 2010) asked about their preference between public transport and private car, and their motivations for these preferences; and from this study, we extracted potential reasons why people who live and/or work in Luxembourg choose to drive to work rather than take public transport or other transportation modalities. These include:

- Practicality;
- Time (quantity and quality);
- Cost;
- Public space / private space;
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