Promoting Walking and Cycling through a Dashboard Interface

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Abstract

The Active Travel Dashboard (ATD) integrates open data into a GIS-based platform with a view to encouraging active travel (cycling and walking). A key advantage of promoting walking and cycling routes in this way is that levels of use can be monitored, allowing understanding of success in encouraging healthier and cleaner modes. This poster paper describes the motivation, development and future directions of the ATD project.
Keywords: GIS, open data, mobility, cycling, walking

1 Background

Many organisations operate over multiple sites. While cycling and walking have health and flexibility advantages for people travelling between sites (Gilson et al., 2007), they often resort to driving, using provided transport (such as designated hopper buses) or limiting their travel. Critical to encouraging 'active travel' is demonstrating to travellers the best options and supporting information for the modes chosen (Forman et al., 2008). Many people do not cycle because they feel it is not safe, or because of the perceived inconvenience or effort. Bike hire schemes offer a useful addition, but these services must be clearly communicated (e.g. the availability of bike lock ups and parking docks) (Shannon et al,2006). Finally, operational staffs, such as travel planners or local authorities, need to know the best routes to support, and where additional information or supporting infrastructure can be cost effectively used to support active travel.

Whilst many open data sources exist, and multimodal journey planners are improving, they are rarely integrated together or presented with sufficient local granularity to offer the specific information and support that both end users and operational staff require. This is vital given the importance of microenvironment in shaping perceptions of active travel (Adkins et al, 2012). The Active Travel Dashboard (ATD) project has attempted to address this issue by delivering a technology that integrates multiple forms of information from diverse sources that, together, can support active travel. This information is presented in a flexible web format that can be adapted for specific user needs, routes, and modes. ATD was implemented as proof of concept for a demonstrator location – between two campuses of the University of Nottingham which are subject to very high numbers of movements across two major arterial roads. The project has also involved close consultation with Nottingham City Council to understand both the opportunity and capability of smart city open data, and to understand the council's needs as a provider and promoter of sustainable transport policy.

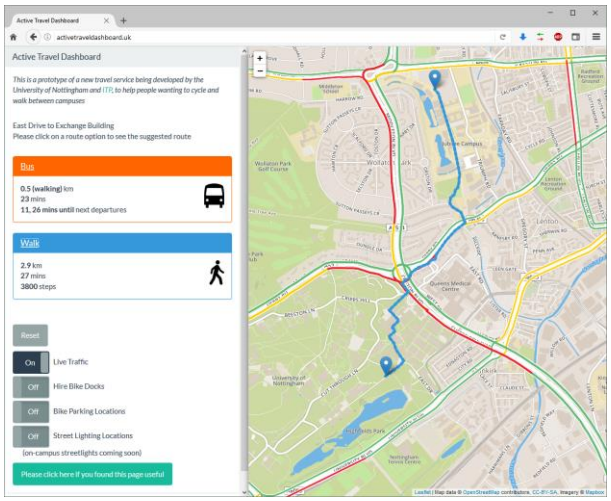

Figure 1 – Active Travel Dashboard prototype

2 Implementation

The technical implementation of the Active Travel Dashboard is based around a JavaScript prototype which provides a framework for delivering the key data types (see Table 1) to potential users. Interactive web mapping is incorporated using Leaflet[1] and Mapbox. The ATD web interface is shown in Figure 1.

Routes are currently uploaded as GeoJSON, having been manually digitised using a desktop GIS package. In future iterations of the tool, operational users will interactively be

[1] http://leafletjs.com

able to adjust routes using a web interface, removing the need for GIS knowledge and improving usability.

A key advantage of the Active Travel Dashboard tool is measurement of impact. Other methods of providing walking and cycling information, such as promotional printed cycling maps or improved signage, are hard to monitor in terms of user engagement. This can mean that measuring impact of walking and cycling relies upon costly surveys (Sustrans, 2014). The ATD prototype is tracked using a number of site tools, including Google Analytics, helping to quantify the volume of users that are being reached with walking and cycling information. The ATD and its site tracking therefore allows much simpler quantification of the number of users accessing walking and cycling information, integrated with the delivery of information.

Table 1 – Data types

Data	Demonstrator
Asset data	Streetlights; bike lock up; bike hire
Geographical representation	OpenStreetMap
Timetable data	Hopper bus
Real time data	Real time traffic; cycle availability
Route data	Route, distance, duration

Data related to the local area, but not directly pertinent to specific routes, is displayed in a number of user-toggleable layers on the ATD interface. These relate to the 'mapping' data described in the left area of the interface shown in Figure 1 above.

Toggles allow the user to hide or display each of these layers as required, whilst also viewing the suggested routes:

- Road traffic mapping data from HERE Mapping[2] was used to display real-time traffic volumes across local roads, providing an intuitive visualisation of levels of congestion in the vicinity of the University.
- Hire bike docks are displayed having been taken from online city hire data[3], which includes live usage information of numbers of free bicycles and free spaces. The different cycle hire schemes available in Nottingham and at the University are currently under review; the ATD will aim to incorporate new systems if implemented.
- Following focus group discussion, cycle parking locations (for users' own bicycles) were requested as a potential data layer. Existing data of the exact sites of these were not immediately available, however, for the ATD prototype. A simulated dataset was therefore digitised which captured some of the largest and most well-known cycle parking sites for this proof-of-concept
- Finally, focus group users identified that for personal safety remained a concern when travelling between campuses. Street lighting locations for off-campus areas were added as an extra layer based upon data from Open Data Nottingham[4] (on-campus lighting was available but was only in a CAD format which would require time-consuming conversion to GIS).

3 Summary

The proof-of-concept implementation of ATD demonstrates the feasibility of integrating multiple data sources to support active travel modes. Evaluation exercises have indicated the utility of the ATD to support active travel including feedback from potential active travellers that routes and information would encourage uptake for non-active travellers, and for current active travellers to attempt different routes.

The next planned phase of work for ATD encompasses:

- Expand the number of integrated open ***data*** sets (eg air quality, new bike hire schemes) and enhance flexibility for future data integration.
- Expand the ***platform***, to provide separate user-centred visualisations for either travellers, or operational decisions makers, and refine the user interface for optimum usability, including for mobile devices
- Research how to best deliver ATD as a ***service*** that supports sustained behaviour change to active travel mode
- ***Deployment*** of the ATD to three high value use cases such as supporting new cycle hire capability at key points in the city of Nottingham.

References

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[3] Citycard Cycles http://www.citycardcycles.com/

[4] Open Data Nottingham: Streetlights http://www.opendatanottingham.org.uk/dataset.aspx?id=35