PATREC

Planning and Transport Research Centre (PATREC)

EXECUTIVE SUMMARY

Travel Behaviour Patterns – Micro Analysis

Project No	Project 4.2
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Executive Summary

Public transport is a critical aspect of any modern city. Many cities are moving to using paperless smart-card ticketing systems which provide a wealth of data about how the system is being used. This project aims to utilize SmartRider data from Perth's ticketing system to develop an understanding of how passengers are utilizing the system.

The aim of project 4.2 is to develop a system for querying, analysis and data mining, to support a knowledge discovery process centred on passengers, hubs, and journeys. The objective is to be able to generate evidence-based answers from SmartRider ticketing logs to queries such as:

What are the different types of passengers using the TransPerth network? How frequently and at what times do they travel?
Where are the activity hubs in the Perth network?
How intensively and with what stay patterns are the Perth hubs used?
What are spatial catchments for different hubs?
Which journey segments are heavily utilised during particular time periods?

Using TransPerth SmartRider ticketing logs and stop information, we have developed new data mining techniques that reveal latent information about passengers, activity hubs and heavy utilization of certain journey segments. Highlights of the findings of this project include:

- A total of 130 hubs were identified, 120 of which are located in the Perth metropolitan area, from Rockingham in the south, to Butler in the north. There were also hubs in Mandurah (4), Busselton (3), Albany (1), Geraldton (1) and Port Hedland (1). It was found that approximately half of all stays were at a single hub in Perth city, which covers Perth and Elizabeth Quay train stations.
- Identification of 5 distinctive ways in which hubs are used. Each of these uses is characterised by passengers' arrival time and length of stay. The five usage patterns suggest: work day, school day, overnight stays, and variable arrival times followed by either a long or short stay.
- Description of each hub region by its unique mixture of the five activities. Dominant hub activities correlated well with points of interest such as schools, universities, business and shopping centres.
- Discovery of a new and flexible typology for passengers. We found several significant passenger types that are not considered in traditional transport models viz. ad hoc travellers, and one-way-only commuters.
- Creation of databases and visualisation software for automatically generating reports on hubs, passengers and journeys, as well as textual narratives for the discovered patterns.
- For PATREC participants a full table of all the discovered Perth hubs and their activity mixes is available. Section 11 details all software and data outputs for this project. These outputs are available in electronic form to PATREC participants by request.

Project 4.2 has met its agreed milestones and completed the project deliverables. Some research streams from the project will be continuing into 2018.