Using an Online Data Portal and Prototype Analysis Tools in an Investigation of Spatial Livability Planning

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ABSTRACT

This paper introduces an online spatial data portal with advanced data access, analytical and visualisation capabilities which can be used for evidence based city planning and supporting data driven research. Through a case study approach, focused in the city of Melbourne, the authors show how the Australian Urban Infrastructure Network (AURIN) portal can be used to investigate a multi-faceted approach to understanding the various spatial dimension of livability. While the tools explore separate facets of livability (employment, housing, health service and walkability), their outputs flow through to the other tools showing the benefits of integrated systems.

KEYWORDS

Australian Urban Research Infrastructure Network (AURIN), City Planning, Employment, Health Service, Housing, Spatial Data Portal, Walkability

INTRODUCTION

The genesis of the work lies in a project to make it easier for firstly researchers and secondly decision-makers to access a wide range of urban spatial data across Australia through enabling e-research infrastructure. This paper is focussed on the specific application of the Australian Urban Research Infrastructure Network (AURIN) e-infrastructure to support city planning and decision support through data analytics, and visualisation (Pettit et al., 2015; Sinnott et al, 2014; Widjaja et al., 2014)). The AURIN e-infrastructure has been developed with the following aims:

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To enable improved collection and integration of disparate spatial built environment and urban research datasets, including improved modelling and visualisation capacities;

To provide open access to such urban data, analysis tools and a suite of visualisation options to the urban and built environment research communities (Pettit et al, 2013).

Through the AURIN Portal (aurin.org.au) users can now access over 1,650 data sets from a wide range of government and research institutions. In addition, there are over 100 on-line analytical tools for statistical analysis, spatial statistics, mapping and charting. These are supplemented by special purpose tools developed as part of focused projects. In one such project, AURIN together with Australian National Data Service (ANDS) funded a study based in the north-western region of Melbourne, Australia which:

- Facilitated discovery via Research Data Australia (https://researchdata.ands.org.au/) and access to a wide range of public data sets via the AURIN portal (https://portal.aurin.org.au/) . Datasets were collected and collated into the federated Melbourne Data Hub through online linkages with the majority of datasets remaining with the data custodians.
- Developed a range of specialised tools used to demonstrate the applicability of the data sets to livability analysis.
- Demonstrated how integrated thinking can draw on the opportunities provided by the data and tool access to make meaningful contributions to analysis and promotion of livability.

The objective in this work was not to redefine livability, nor to derive definitive (client-driven) plans for the case study area. Livability is used as a case study to illustrate how an on-line data repository, in conjunction with appropriate tools and integrated analysis, can contribute to complex spatially explicit constructs such as livability. To make this clearer the paper focuses on four areas that are recurring themes in the livability literature (see the next Section): access to employment, development potential for housing, availability of health services, and walkability. The prototype tools developed within the project allow users to:

- Disaggregate employment and travel statistics to apply to specific sub-areas.
- Search for housing redevelopment opportunities
- Access integrated cross-sectoral data to enhance health planning
- Explore the spatial relationships between key locations using an agent based mobility model

In the third Section, four individual on-line tools are described and illustrated in some detail. Then, these are applied to an integrated analysis of the district of Footscray in inner Melbourne, Australia.

ASPECTS OF LIVEABILITY

There is a great deal written about the overlapping concepts of livability, quality of life, sustainability and environmental quality. Within each of these there are multiple definitions and multiple factors applied to their estimation. Factor choice depends heavily on the conceptual model being applied (e.g. a preference for objective or subjective measures), the intended purpose of the estimation (e.g. city ranking or urban planning) and data availability. The purpose of this paper is not to re-review all the possibilities. A number of other authors provide a synthesis of this literature, for example Van Kamp et al (2003) and Marans (2012). Here the focus is on the requirements for evidence based future planning with a view to, especially, livability and quality of life and the implications of this for on-line data and analysis systems – especially the AURIN Portal. Literature is reviewed that argues for,
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