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Weighted Multi-Point Accessibility, Demonstrated through Flat Hunting

20 Software to Support Flat Hunting with a Modern Touch Interface, Focusing on Recommender Systems and Geographical Information as Decision Drivers



Main Screen of the Application, Showing Flat Details and Locations of Points of Interest



Compound Critiquing Proposals, Created Using a Hybrid Recommender System



Heatmap Comparison: Standard, Pure Rotated Lines and Rotated Lines Method

Market analysis shows that current internet services for flat rental ignore the existence of the most important decision drivers (Lechner et al., 2001) which include infrastructure, shopping facilities, public transport and workplace accessibility. The additional parameters require a decision support system to enable a «good» solution to be found.

Early research prototypes for flat finding helped users view and filter information interactively with techniques such as Direct Manipulation and Dynamic Displays (Williamson & Shneiderman, 1992). These Direct Manipulation approaches focused on giving users full control and minimizing system intelligence. In the meantime these approaches have been refined and applied in practical internet portals supporting home finding (e.g. immo.search.ch). More recently, decision support techniques have been developed that combine interactive techniques with more elaborate algorithmic approaches (Zhang & Pu, 2006; Chen & Pu, 2007). Results from the evaluation of these systems show a higher level of decision accuracy combined with less cognitive effort for the user.

The quality of the environment, which is dependent on personal attitudes to the decision drivers, can be visualized by the heat map method (Pryke et al., 2007). To ensure that people with deuteranopia (red-green color blindness) are taken into account, a color transformation into the yellow/blue color space is applied (Zeileis & Hornik, 2006).

In our research we are building on and further extending this work. In particular, we address three shortcomings of the prior research: a) lack of «usable information», b) intuitive interactive navigation within the decision space, and c) the impossibility of reading a heat map for people with color vision deficiencies other than deuteranopia.

Results have been achieved in three fields. 1) A framework has been created which allows the creation of decision drivers by importing point of interest and raster environment data. It includes the calculation of travel time from flats to various points of interest using the street network, elevation model and public transport timetable information. 2) An advanced recommender system which combines existing and new recommender system methods. Existing methods include incremental critiquing (Reilly et al., 2005) and dynamic critiquing (Reilly et al., 2004). Our new method – «Value Range Critiques» – shows a significant increase in efficiency. 3) Our «Rotated Lines» method allows interpretation of the heatmap by anyone, with steady efficiency for normal users.