

Usability evaluation of multimodal transit maps: preference, performance and route planning

Summary

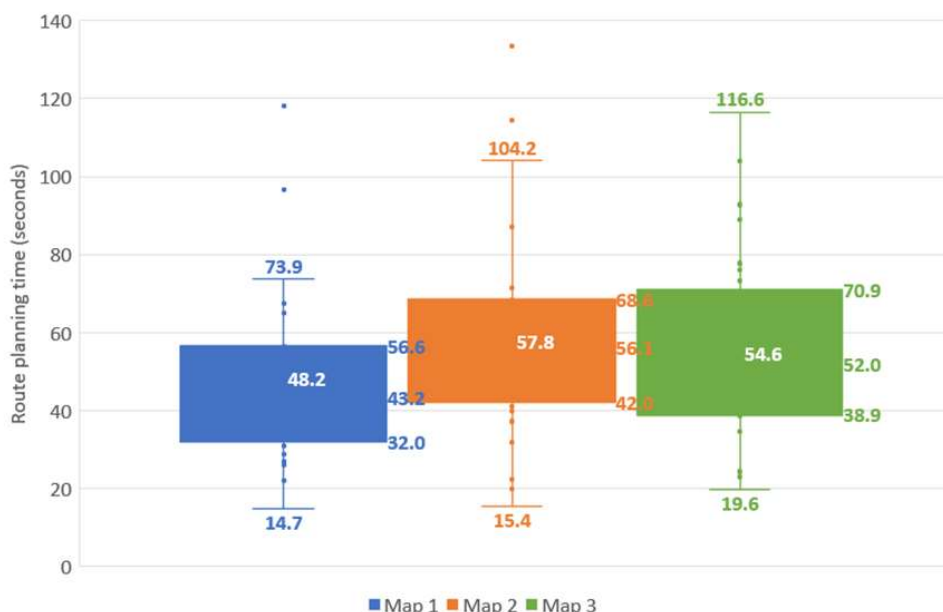
The usability of transit maps is the focus of this doctoral thesis. These maps feature amongst the most important means of providing users with information on public transport networks. In other words, they represent the networks they portray and, also, have the vital function of helping users navigate through them. This is of great importance especially in cases of multimodal trips involving numerous routes and transfers. Thus, the way transit maps are designed has a crucial impact on their usability, e.g. how users perform and engage when using a map, as well as on how they plan their routes. Studies on transit map usability have been developed particularly focusing on dense and complex railway networks such as the ones from London, Paris and Berlin, but have not considered multimodal networks.

Designing maps for these networks, especially when they include bus services, must be done carefully, taking into account not only topological representations (octolinear versus curvilinear), but also the graphical style with which lines are depicted (line juxtaposition versus line overlapping), since both aspects can influence multimodal map usability. In this sense, to answer the question of whether there are any differences in usability between distinct designs of multimodal transit maps, a usability evaluation was performed contemplating both user preference and performance. For this, a set of tests was applied considering three different designs of multimodal schematic maps for Lisbon, differing in terms of those topological and graphical aspects. The test allowed to objectively and subjectively determine how people perform and engage when using these maps, as well as how map design influences their route planning process.

Results indicated that, from the three maps studied, Map 1 had the best performance with faster route planning times and was the most preferred map receiving higher statement rating scores, with statistically significant differences from Map 2. However, Map 1 also had a higher number of route planning errors, suggesting that even when a map shows good performance and engagement, it can be improved regarding its design. In this way, based on the results found, recommendations were proposed for the design of multimodal transit maps in terms of graphical and topological aspects, and according to usability factors.

Keywords

Multimodal transit maps, usability, user preference, user performance, route planning.



Route planning time distribution of the maps tested.



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