An Inclusive Indoor Wayfinding Solution For People With Visual Impairment

In recent years, outdoor navigation has been highly successful, but indoor wayfinding and accessibility continue to pose significant challenges worldwide. Rapid complexity including size growth within indoor spaces has increased the volume of information, while simultaneously making availability, accessibility, and maintainability more difficult. This study aims to address indoor wayfinding and accessibility issues at a deeper level, with a focus on creating sustainable technology solutions that understand, analyze and annotate building maps to address inclusion within indoor spaces. The proposed research focuses on two complementary problems to create more accessible indoor spaces for all; low-resource countries and people with visual impairments. Our investigation found, built environments provide ample cues to support wayfinding and accessibility for visitors. Technology can capture, highlight, or redefine these cues in a more inclusive and transparent way through indoor maps. Our first solution focuses on inclusive mapping needs and offers an easy and scalable mapping mechanism for indoor spaces. These maps contain relevant information and are the basis to support wayfinding and accessibility. Indoor wayfinding and accessibility refer to a user's ability to navigate and access points of interest and associated services independently. Our positioning solution can pinpoint the user's location in real time over indoor maps and deliver relevant information and services via smartphones. The second solution addresses the wayfinding and accessibility needs by providing an accessible application interface to navigate and access complex indoor spaces. Finally, we have formulated two major reports as an outcome of this research. First is an open information specification that provides a semantic taxonomy of indoor information. The second report includes a standard operating procedure to implement or retrofit a multi-model intervention to any old or new building to make them navigation and accessible for a heterogeneous group of visitors. The proposed solutions have undergone pilot testing at three distinct venues, covering over 50,000 square meters of indoor spaces. We believe that an appropriate translation and implementation approach can enhance the utility of this research outcome, thus increasing the coverage of inclusive indoor maps and their accessibility.

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