You-are-here Maps for the Blind: First Experiments in Cognitive Design of Non-visual Spatial Representations

Short Abstract

Gaining survey knowledge of a complex spatial environment has proven to be facilitated by so-called You-are-here (YaH) maps. The goal of the ongoing doctoral research is to develop a concept of augmenting YaH maps with language in such way that the resulting spatial representations support blind people in navigating the represented world independently. The presentation will show the cognitive commonalities and differences in map usage that need to be considered when designing YaH maps for the blind and augmenting them with textual information. From the cognitive motivation, first research questions are identified that focus on the constituent of every YaH map, the YaH symbol. Different approaches how to locate the Yah symbol based on information provided through language, through the tactile map and through the combination of them will be elaborated. Experiments are proposed to investigate the effective placement and the efficient announcement of the YaH symbol. Future investigations using computer controlled periphery are suggested and the idea of dynamically created, adaptable multimodal YaH maps is introduced. A view at future research results is cast, i.e. a set of design concepts for multimodal presentation of YaH maps for blind people integrating propositional and tactile representations.

Extended Abstract

Gaining survey knowledge of a complex spatial environment has proven to be facilitated by so-called You-are-here maps. Following recommendations from the cognitive sciences and psychology You-are-here maps are usually designed as visual medium for visually capable people. The external representation of the spatial environment helps the map-reader to build an internal mental model of his surrounding and to navigate it successfully. The goal of the ongoing doctoral research is to develop a concept of augmenting You-are-here maps with language in such way that the resulting spatial representations support blind people in navigating the represented world independently. Initially the represented world will be limited to parks, zoos and university campuses.

Propositional representations as part of visual You-are-here maps is common, e.g. as labels assigned to map entities, or as legends that resolve the meaning of map entities. The combination of propositional and spatial representations is used to convey abstract information and reasoning about the complex world to the reader in a compact and handy way. The need for such information is not limited to those audiences that are typically addressed by visual maps, but shared by disabled people who want to maintain their independence. For blind people YaH maps hold the advantage that they convey information about their proximate environment that is otherwise not accessible to them. They can gain information about locations that are not directly in the reach of their hands and arms and they can build up survey knowledge about their environment. This is why YaH maps would be an excellent approach to support blind people.

Building on the background in cognitive and psychological research about tactile maps, the presentation will shortly show the commonalities and differences in map design that need to be considered when designing You-are-here maps for the blind. Then, it investigates critical cognitive issues when designing tactile You-are-here maps augmented with textual information for visually impaired people. From the cognitive motivation, first research questions are identified that focus on the specific constituent of every YaH-map, the YaH symbol. Different approaches how to locate the Yah symbol based on information provided through language,

through the tactile map and through the combination of them will be elaborated. Experiments using the Wizard-of-Oz technique are proposed to investigate the effective placement and the efficient announcement of the YaH symbol. Future investigations using computer controlled periphery are shortly suggested and the idea of dynamically created, adaptable multimodal You-are-here maps is introduced.

The presentation shows how the reader of tactile maps may benefit from the multimodal presentation integrating propositional and tactile representations. It casts a view on the future result of the research that is a set of design concepts for the combination of YaH maps and language for visually impaired people.