

Cognitive-Technological Symbiosis for Evidence-Based Architecture Design

Vasiliki Kondyli¹, Mehul Bhatt¹ & Jakob Suchan¹

¹DesignSpace Group, University of Bremen, Germany

Evidence-Based Design for the architectural environment is a data-driven process, leveraging analytical and empirical methods aimed influencing design decisions by the creation of an integrated guide for people-centered analysis of space. Toward this direction, we investigate how people-centered cognitive assistive technologies provide feedback about users' visuo-locomotive experience in building space, and how one may leverage upon various aspects of this technologically externalized analysis in combination with morphological analysis of the structure and layout of the environment to evaluate effect of design decisions. The analysis of user's embodied visuo-locomotive behavior in built-up spaces involves the measurement and qualitative analysis of a range of aspects such as visual perception, user's decision-making procedures, intentions, affordances etc. Integrated environment-behavior analyses may be conducted through different methods including, mobile eye-tracking, visual data from external cameras, observational data, etc. and the the analysis of environmental parameters, e.g., topology, routes, isovists, available via computational analysis of 3D Building Information Models.

Based on a case study involving a large-scale experiment at the New Parkland Hospital (Dallas), we present an example of data collection and analysis of user's visuo-locomotive experience with a view to identify environmental cues significant for the indoor navigation. A range of sensors for measuring the visuo-locomotive experience of the users includes: eye-tracking, egocentric gaze analysis, external camera based visual analysis to interpret fine-grained behavior and they are presented through an integrated model in a virtual environment. Further experiments in virtual settings are suggested in order to independently examine environmental and situational characteristics that influence visuo-locomotive behavioral patterns concerning visual attention, and navigation behavior.