ORAL PAPER

CADMUS: use of affordances in cognitive modeling for wayfinding

Pierre-Emmanuel Michon • David Duguay •

Geoffrey Edwards

Background

Accessibility to public spaces is very often a problem for disabled people. With an aging population, this is going to become a problem for effecting more and more people and as a result, the question of universal accessibility is rapidly gaining attention. The CADMUS system produces maps of real and perceived difficulties of displacements in complex buildings, for the nondisabled and for individuals with a physical or sensory disability.

Main contribution

The environment is modeled to be composed of objects with visual, physical and associative features with these objects being linked to concepts (prototypes) which are themselves linked to afforded actions. Affordances are some of the characteristics perceived by users, and can help recognition. We analyzed an Universal Accessibility Guide, from which we determined eight categories of features involved in wayfinding and accessibility (general, cognitive, visual, movement, support, manipulation, auditory and tactile features). These features constitute the user model, and only have to be specified when differing from the nondisabled user. The cognitive model computes interactions between the user and the environment. It is composed of six independent modules: perception, memory, synthesis, evaluation, decision and motricity. The perception module is defined as a set of filters giving access or not to information stored into the object model database, and recognition is done in the memory module. Synthesis module elaborate a model of the situation and problems to address, while evaluation module manage priorities and preferences, and decision module anticipate results of possible actions. The other modules are in the development stage.

Implications

Centering on cognition, as an interaction of user with their environment, allow the CADMUS system to differentiate between real and perceived difficulties involved in displacement. The maps produced by the CADMUS system will allow designers and building administrators, along with therapists, to evaluate accessibility of both existing and future buildings. The importance of this system is that these professionals will be able to take into account not only the broad range of people's physical and cognitive abilities, but also how these differences can effect the individuals perception of their environment.

P.-E. Michon (✉)• D. Duguay • G. Edwards
Centre de Recherche en Géomatique, Pavillon Louis Jacques Casault,
Université Laval, Quebec City, Canada
e-mail: pe.michon@gmail.com

G. Edwards
Centre for Interdisciplinary Research in Rehabilitation
and Social Integration (CIRRIS), Quebec City, Canada