

AccessBIM model for environmental characteristics for vision impaired indoor navigation and way finding

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ABSTRACT

Blindness affects approximately 45 million people worldwide. Because of aging and population growth, this number is expected to double by the year 2020. As with the sighted population they want to be aware persons and objects in their environment and object features may be of importance when navigating a path to a given destination. Nevertheless the solution is not always apparent and turns more complex when people are in unfamiliar or difficult to access environments or in daily situations for visually impaired people. While navigation systems for outdoor environments are readily available, navigation within buildings still poses a challenge. The Global Positioning System (GPS), the dominant system offering location information outdoors, suffers a poor indoor performance due to low signal availability, as GPS signals are not designed to penetrate through most construction materials. Many indoor positioning techniques have been developed, most of which rely on RFID to determine the location. The built environment is a central factor in our daily life and a large proportion of human life is spent inside buildings. Traditionally the buildings are documented using building maps and plans stored in electronic form with tools such as computer-aided design (CAD) applications. Storing the maps in an electronic form is already pervasive but CAD drawings are not adequate for the requirements of effective building models aimed at indoor navigation systems. This research paper discusses a proposed novel model for a real-time communication model driven architecture for way finding and data synchronization, generating, in real-time, an AccessBIM for a remote user as a subset of BIM. Additionally, this research will aim to develop a real time model of the users environment to assist vision impaired individuals to navigate indoors (such as shopping malls, exhibitions and university environment or unknown environments) using their handheld devices (smart phone).

KEYWORDS: AccessBIM, Depthmaps, Conceptual Model, Vision Impaired, Indoor Navigation, Way finding,BIM.