ARWindow: Integrating Building Information Modeling (BIM) & Mobile Augmented Reality (AR) to Access Facility Management Related Information

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The objective of this research is to test the hypothesis that mobile Augmented Reality (AR) can enhance facility management data access through seamless integration of facility information with the physical environment. Recent developments in mobile AR have allowed the design and implementation of new Human Computer Interaction (HCI) paradigms that are inexpensive and accessible via current mobile technologies (e.g. smart phones or tablet devices). These mobile devices would play the role of 'magic' windows where users would access augmented information superimposed on those interactive windows. Facility Management serves as a test bed for these new approaches where successes and failures largely depend on efficiently accessing information in the right place at the right time. Fundamental research is conducted to model the user operational requirement of Facility Managers through a user-centered approach, with an emphasis on facility-specific maintenance issues. ARWindow, an innovative approach utilizing building information systems that makes extensive use of intuitive user interactions, is proposed and tested. Using ARWindow, the data and 3D information of the Building Information Models can be augmented on the Facility Manager's live view of the facility. ARWindow is a 'transparent window' in the hands of the Facility Mangers that interactively provides them with their required information for performing their tasks all in a single interface. It also helps support that a "magic" lens approach to AR could be suitable for facility mangers needs and database querying tasks. This innovative application of AR and integrating it with BIM has the potential to improve AEC practices, and in this case, facility management. Consequently, ARWindow was developed as a low-cost solution that leverage current AR technology, showing that it is possible to take an idealized BIM model and integrate its data and 3D information in an AR environment and make it accessible on current handheld mobile tools.

Keywords: BIM, Augmented Reality (AR), Interactive displays, Facility management, Human computer interaction.