

Using Panoramic Augmented Reality to Develop a 360° Immersive Safety Training Environment

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ABSTRACT: Increasingly dynamic and complex construction work conditions require that workers and professionals acquire the safety-related knowledge to make safety conscious decisions. Safety training helps to prevent construction accidents by allowing those workers and professionals to early identify hazardous situations. Currently, virtual modeling methods—such as Building Information Modeling (BIM)—provide the means for visualizing the associated safety conditions present during construction projects and for simulating real working environments for safety-training purposes. However, these simulations do not provide users with a full experience of the real-world, since the simulations deliver an artificial computer-generated replication of the construction environment. One of the emerging technologies that can address this limitation is panoramic augmented reality. This presentation discusses the use of 360° panoramas for visualizing complex spatiotemporal situations on real construction sites and augmenting them with required layers of safety-related information. Panoramic augmented reality creates highly realistic and detailed representations of real construction sites while giving users a highly engaging, immersive experience. These features enable 360° panoramic augmented reality to become a strong tool for developing training materials specifically for construction safety. In such an environment, construction workers and professionals are capable of navigating within the data-rich environment of a real construction project to observe and identify the safety challenges present in those circumstances. To illustrate this on-going research project, technical process of virtual safety training environment development using panoramic augmented reality techniques will be presented. Moreover, the process of generating the panoramic scenes, the techniques for augmenting the captured panoramas with different layers of safety-related information, and the resulting safety training platform will be demonstrated.