

## Factory Virtual Environment Development for Augmented and Virtual Reality

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**Abstract :** Machine visualization is an area of interest with fast and progressive development. We present a method of machine visualization which will be applicable in real industrial conditions according to current needs and demands. Real factory data were obtained in a newly built research plant. Methods described in this paper were validated on a case study. Input data were processed and the virtual environment was created. The environment contains information about dimensions, structure, disposition, and function. Hardware was enhanced by modular machines, prototypes, and accessories. We added new functionalities and machines into the virtual environment. The user is able to interact with objects such as testing and cutting machines, he/she can operate and move them. Proposed design consists of an environment with two degrees of freedom of movement. Users are in touch with items in the virtual world which are embedded into the real surroundings. This paper describes the development of the virtual environment. We compared and tested various options of factory layout virtualization and visualization. We analyzed possibilities of using a 3D scanner in the layout obtaining process and we also analyzed various virtual reality hardware visualization methods such as Stereoscopic (CAVE) projection, Head Mounted Display (HMD), and augmented reality (AR) projection provided by see-through glasses.

**Keywords :** augmented reality, spatial scanner, virtual environment, virtual reality

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