VirCA NET: A Collaborative Use Case Scenario on Factory Layout Planning

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Abstract—At this demo a working distance collaboration tool, involving two full immersive VR systems will be introduced. Thereby a typical use-case coming from the Manufacturing Engineering field will be addressed. Users at Budapest, Hungary and Kaiserslautern, Germany will come together in a shared virtual environment provided by VirCA NET (Virtual reality Collaboration Arena). They will be able to investigate a digital shop floor model, interact with intelligent virtual agents, and identify and solve problems as if they were co-located in an immersive visualization system.

Index Terms—3D Internet, Virtual Reality, Collaboration platform

I. INTRODUCTION

The scenario is composed of three spatially distributed planning entities, which are each focusing on a special point of view at the factory layout planning problem. Budapest will represent a robotic specialist, providing a virtual robot that is implemented in a hardware-in-the-loop setup. Kaiserslautern will represent the local production plant, where the shop-floor to be optimized is located and local knowledge is bundled. Kosice, as central planning unit, will represent the head office, where a central Industrial Engineering division is located.

II. USE-CASE DEFINITION, OBJECTIVES AND CHALLENGES

The specialists in Budapest and Kaiserslautern will perceive the shared virtual environment by the usage of full immersive CAVE systems. This allows them to investigate the future shop floor and its objects at scale 1:1 and with full identification to the environment. Kosice head office will use a laptop instead, to transfer the networked setup to the conference and management constraints. In cooperation all three entities will work in the online live-demo on the optimization of the shop floor layout. Thereby Budapest Partners will focus on the integration of a robot. Kaiserslautern Partners will take care to address requirements coming from the lathe and Kosice will be in charge of a balanced overall performance. The joint positioning and relocation of objects will be the main task to carry out. But also robotic relevant functions will be performed in real-time.

This setup is typical for evolving worldwide markets and the industrial reaction on this trend. Globally dislocated production facilities require spatially dislocated planning teams, if planning relevant specialists are distributed within a production network. The need to support such planning teams with distance collaboration tools is identified throughout the research community. The approach introduced in this paper aims at transferring existing virtual enhanced workflows for factory layout planning activities to a shared virtual environment. Hence planners can reuse their already learned skills and adopt them to the spatially distributed planning network, as if partners were co-located. To enable such a flexible and synchronous collaboration system three main challenges have to be taken into account.

• shared model visualization
• human-model interaction features
• human-human interaction

For each of the challenges coming from the field of Mechanical Engineering, according challenges coming from computer science and Cognitive Infocommunications can be identified. To go deeper into these topics we would like to refer to the respective papers [1], [2].

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REFERENCES