

VR THOR – Virtual Reality Training with Hotstick on Operations Risks

Marcio Cabral*, Olavo Belloc, Andre Montes, Eduardo Zilles Borba, Marcelo Knorich Zuffo

Interdisciplinary Center in Interactive Technologies – Polytechnic School – University of São Paulo

ABSTRACT

In this work we present a simulator system for training operation and maintenance of power grids distribution lines with focus on workplace safety and risk control of fuse cutout activities. The student uses a VR goggles to visualize the virtual environment (Oculus Rift) and maneuver a real bat to interact with the 3D environment, both tracked by a high precision infrared camera system (OptiTrack). It all provides a high degree of immersion and realism to the user experience. The student arms, back and head are also tracked, and the movements are replicated in a virtual avatar, allowing the instructor to evaluate ergonomic aspects. The system consists of two modules: a) Instructor Interface, which helps her/him to create and to control different challenges in the scenario and, also, to follow the student reactions and behavior; and b) Simulation Interface, which is presented to the student through VR goggles. It is important to underline that the training session can also be viewed on a projected screen by other students, extending the learning process to the observation of mistakes and successes of their peers. The simulator features various risk scenarios such as: climate (sun, rain and wind), lighting (day and night), types of structures, transformer on fire and explosions, short-circuit and electric arc, defective equipment and many other obstacles (trees, cars, windows, swarm of bees, etc.)

Keywords: Immersion, virtual reality, simulation, power grid maintenance, computer graphic, natural to the user interactions.

Index Terms: I.3.6 [Computer Graphics]: Methodology and Techniques – Interaction Techniques.

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Figure 1: User interacting with real props in virtual world

* contact email: mcabral@lsi.usp.br