The PITSTOP Project:
An approach for the creation of customizable immersive training systems for equipment operators

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PITSTOP (Immersive Platform for the Operator's Structured Training)

**Aim**: develop an immersive VR system for the training of operators and verifiers of steam generators

**Funded by**: National Institute for Insurance against Accidents at Work (INAIL)

**Duration**: 24 months (September 2020—August 2022)

**Partners**:
- IMATI - CNR
- DIME - UNIGE
For operating specific potentially dangerous equipment, current regulations require the acquisition of a qualification obtainable through participation in specific training courses.

The qualification for the management of the dangerous equipment, such as steam and superheated water generators, requires on-the-job training in addition to theoretical.

The on-the-job training varies according to the qualification degree which depends on the characteristics of the generators. It is often difficult to find an institution available to host the internship for the highest productive generators.

This on-the-job learning phase is generally restricted to carry out activities in regular situations, thus limited in the experienced situations.
An immersive VR simulator can offer the advantage of providing

- a **safe environment** where to deal with numerous situations and equipment
- a **sense of presence** of the user as if he/she were working in the real plant

Provided that

- the behavior of the digital equipment reflects the behavior of the physical equipment
- the user interaction with the equipment in the virtual environment mimics the interaction in the real life.
System Requirements

- Two different professional profiles to be considered as learners: **verifier & operator**;

- Two different usage modalities to be considered for the simulator:
  - **training mode**: the learner should
    - get information on the elements of the equipment,
    - have access to the documentation provided during the theoretical course,
    - be guided during the task execution;
  - **testing mode**: the learner should
    - execute the task without suggestions,
    - get feedback/corrections of her/his performance once completed the task.
**Requirements**

The system should be **customizable**, in particular to support:

- the **substitution of the equipment** on which executing the training and of the related documentation (e.g. user manual)

- the **specification of the tasks** (e.g. turn on the generator) to be accomplished by the learner **and of the sequence of actions** required to this aim (e.g. switch on the resistance after the setting of the pump functioning mode)
The PITSTOP system

Gesture, voice & gaze commands

Context

Conception

Requirements

Prototype

Conclusions

Simulink

Gesture

Action

feedback

Student

Result

Unity

Input

Simulator
Prototype Current Status

Module for Operator training almost completed
Conclusions

With the PITSTOP project we aim at demonstrating that Immersive VR

- can be a safe alternative to on-the-job-training
- can benefit from simulation models generated from data acquired on the physical system for the necessary realistic equipment behaviour simulation
Thank you for listening

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