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

The context

- 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

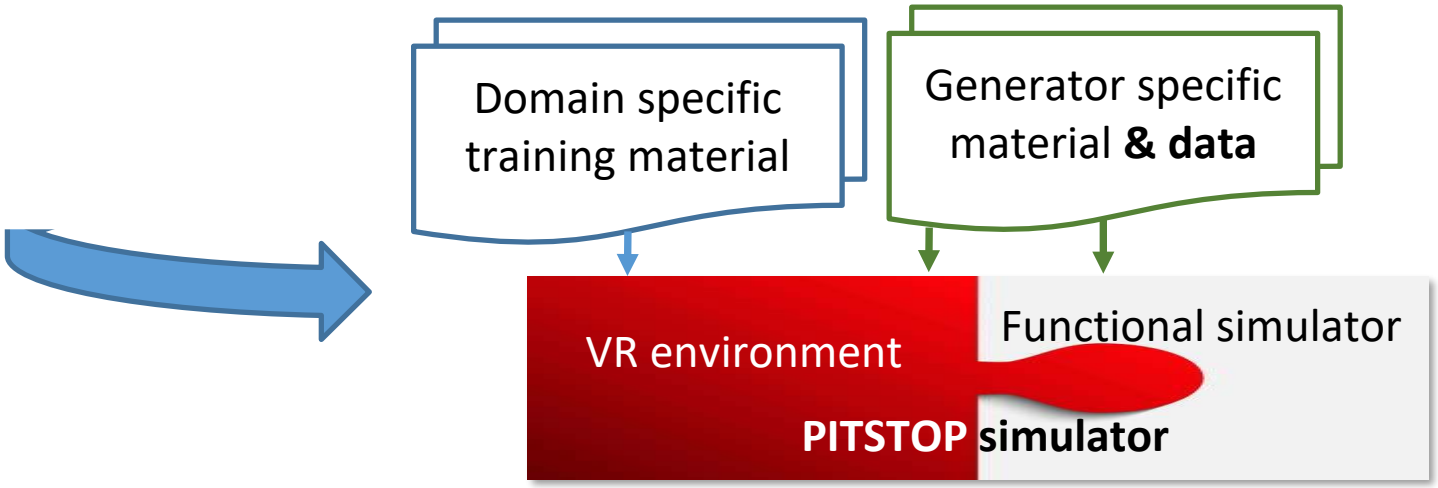
- Two different professional profiles to be considered as learners: **verifier** & **operator**;

- 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

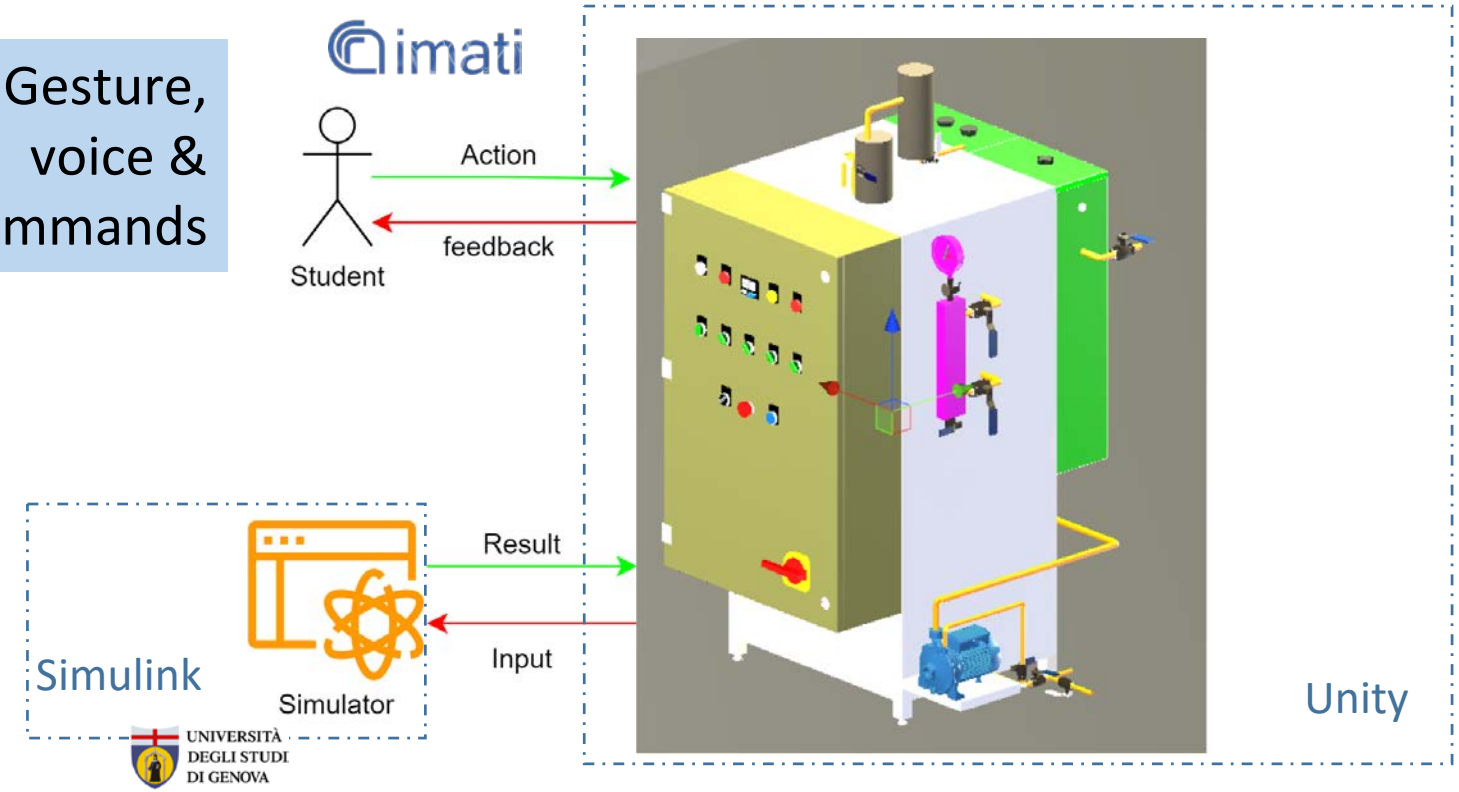
The system should be **customizable**, in particular to support:

- 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)



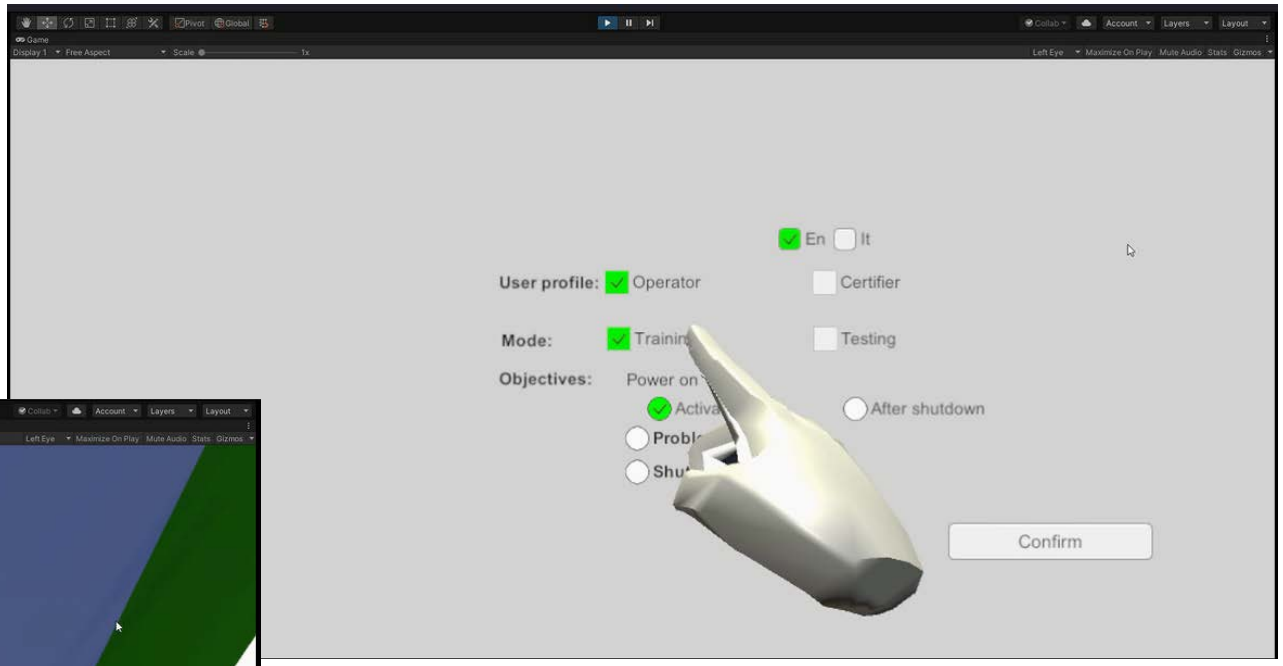
The PITSTOP system

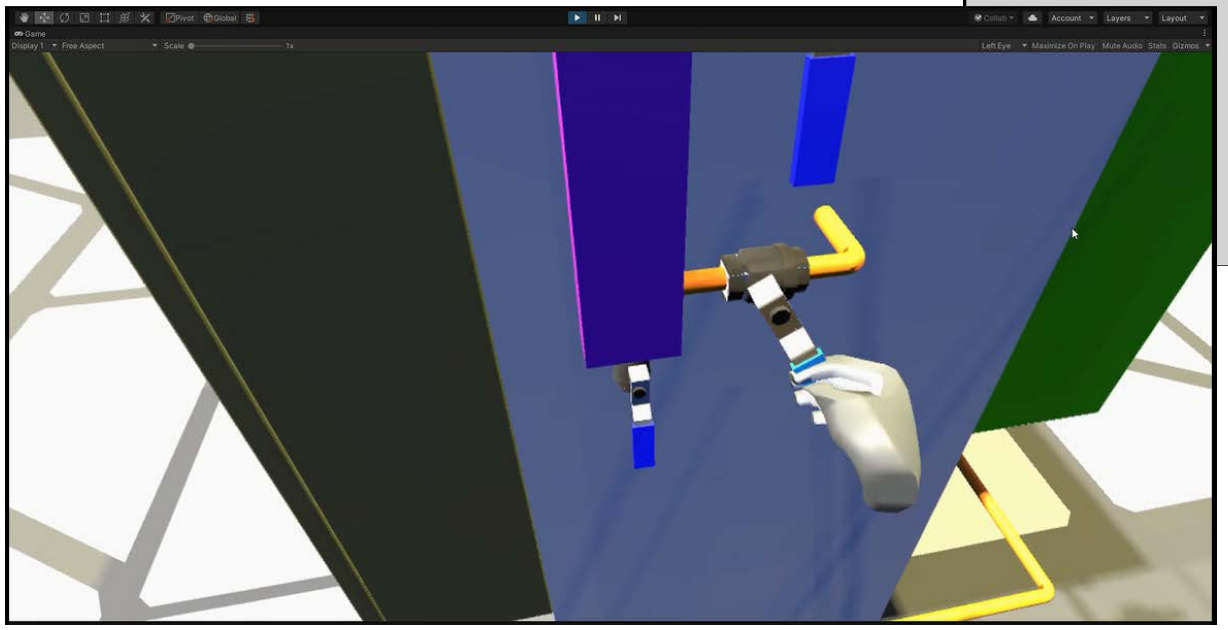
Gesture,
voice &
gaze commands



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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An approach for the creation of customizable and immersive training system for equipment operators

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