



Thesis Project Form

Title (tentative): Development of a Virtual Reality Simulator for Mechanical Ventilator Use training and evaluation

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Description

Motivation and application domain

Mechanical ventilators are critical devices both in controlled hospital environments, and in home care settings. Consequently, family members and caregivers without medical experience must be adequately prepared to operate these devices and respond promptly to alarms or malfunctions. By developing a VR simulator, this project aims to provide a realistic and engaging training tool. This project will be carried out with the collaboration of the Unipolar Spinal Cord Unit of Pietra Ligure, SV.

General objectives and main activities

The primary objective of this thesis is to develop a fully functional mechanical ventilator VR simulator. The main activities include:

â€¢ Literature Review

â€¢ Collaboration with Clinicians to study the functionalities of mechanical ventilators used by patients in the hospital and at home and to Gather data on typical alarms, malfunctions, and the necessary responses

â€¢ Design and develop a mechanical ventilator simulator, considering the device used at the spinal cord unit of Pietra Ligure. This includes (i) develop virtual environments that simulate common home settings where mechanical ventilators are used; (ii) implement algorithms that simulate the behavior of mechanical ventilators; (iii) develop a performance monitoring system to track user responses and provide feedback

â€¢ Usability and effectiveness tests and data analysis

Training Objectives (technical/analytical tools, experimental methodologies)

The thesis will offer the following training opportunities:

1. Gain expertise in developing immersive VR environments using relevant software tools (e.g., Unity, Blender).
2. Develop skills in algorithm development for simulating complex mechanical systems.
3. Design and carry out an experiment, and analyzed the obtained data
4. Work in a multidisciplinary environment of engineers, healthcare providers and caregivers

Place(s) where the thesis work will be carried out: JETS, SCllab

Additional information

Maximum number of students: 1