VIRTUAL REALITY SIMULATOR AND COGNITIVE TASK TRAINER FOR HANDLING COVID-19 INFECTED PATIENTS

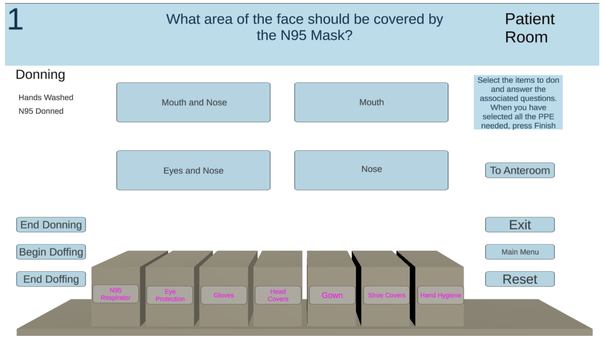
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Introduction

We are developing an interactive virtual reality (VR) training environment by following CDC's PPE donning and doffing protocol while handling COVID-19 patients. Our simulator instructs trainees based on their role in the operating room (anesthesiologist, nurse, technician, etc.) and the procedure being performed. In the simulated environment, trainees must equip the necessary equipment in the correct order while also answering questions regarding the items interacted with. To adopt the simulator for hospital specific protocols, the simulator allows for the customization of PPE available, the order in which actions can be performed, and the quiz questions.

Methods and Procedures

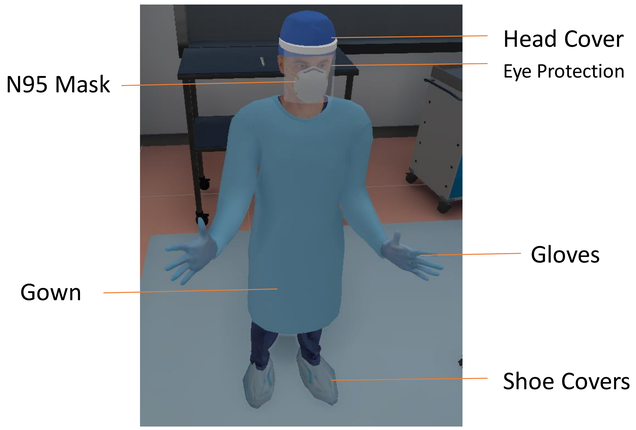
Training and Testing. The trainees will be able to test their knowledge and skills through the simulator. This will require selecting the appropriate PPE to don and doff and answering questions on how they should be appropriately donned or doffed. Their answers are then stored in a list which is retrieved and evaluated once they complete the scenario. The answers will allow us to aid individuals in correcting their practices. The simulator can be used as often as needed until the trainers declare it time to take the exam.



Low-Fidelity Simulator

- More convenient as it requires less technology
- Accessible through desktop link
- Contains the primary learning objectives

Fully Donned Surgeon



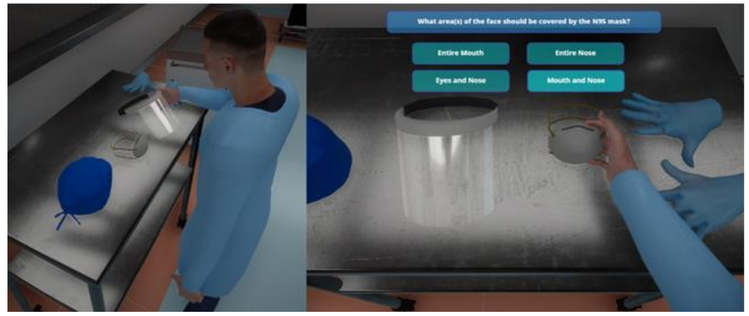
Learning Objectives

- Knowing and demonstrating the donning and doffing sequence for a COVID-19 patient
- Recognizing and performing the sequence for Rapid Sequence Intubation (RSI) on a COVID-19 patient

Methods and Procedures

VR Interactions. In our simulation, trainees will be able to interact with all the PPE items in a realistic setting. VR devices allow them to control the simulated avatar with their body movements and pick up any free-moving object in the simulation as they could with their own hands. When the trainee picks up the PPE in the specified order, the avatar will wear it, and the simulation will keep track of the correct action. If it is moved to an incorrect body part or out of order, the trainee will be notified of their error.

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VR-Simulator

- Requires VR headset
- Provides realism and simulates a real world scenario
- Contains the primary learning objectives

Conclusion and Future Work

The simulators will continue to be worked on to improve realism and functionality. This will also include a database containing players' answers that we can use to determine which parts of the donning and doffing process are frequently done incorrectly by medical professionals . This data can be relayed back to hospitals and schools to ensure they are a point of emphasis during instruction and in practice. Another study will be conducted on seeing the difference in effectiveness in VR training for medical procedures vs standard practices such as written exams or having to save space to demonstrate in a hospital. We have seen positive feedback from those who have tested the low-fidelity simulator so far and hope to see more of the same once the VR simulator is ready for testing.

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