Development of an Integrated Simulation and Assessment in Donning and Doffing for healthcare professionals (ISADD) – Part 1

With the continuous progression of the COVID-19 pandemic, healthcare professionals must meticulously follow updated protocols on the appropriate use of control measures, including the appropriate wearing (donning), removal (doffing) and disposal of personal protective equipment (PPE), designed for the mitigation of transmission risks associated with infectious diseases. Unintentional breaching of processes during donning/doffing PPE, such as touching the face while doffing or incorrect removal of gloves, can increase transmission of COVID-19; thus, it is imperative that PPE protocols are strictly adhered to.

An issue is also encountered when training healthcare professional students. While, during their training, students are provided with Infection Control Unit official videos and verbal instructions on how to wear and remove PPE, once the students perform donning and doffing in practice, they need to rely on educators' observation skills to highlight any incorrect steps.

Therefore, **ISADD**, a research project led by Neville Schembri, a Senior Lecturer at the Institute of Applied Sciences at the Malta College of Arts, Science and Technology (MCAST), in collaboration with the Institute of Information and Communications Technology and the Applied Research & Innovation Centre at MCAST (research team photo in Figure 1), aimed to address this issue.

Figure 1: The ISADD Research Team (from left: Daren Scerri, Jonathan Vella, Gerard Said Pullicino, Lorna Bonnici West, Dorianne Cachia, Phyllis Abanifi, Neville Schembri)

The overall aim of ISADD was to build and test an augmented reality technological solution to support both healthcare professionals in a healthcare setting and healthcare professional students in a classroom setting with the correct sequence of donning and doffing PPE.

Image processing and machine learning techniques were used to identify articles of PPE as they are worn, and an innovative client server architecture was used to mitigate performance issues given the need for near real time response (NRT). During the application, the user starts the donning process (wearing on of PPE) and if the correct steps are not followed, the user is notified regarding the missed step in the sequence and has the option to begin the process again. The same occurs during the doffing process, i.e. during the removal of the PPE, as indicated in the Figure 2.
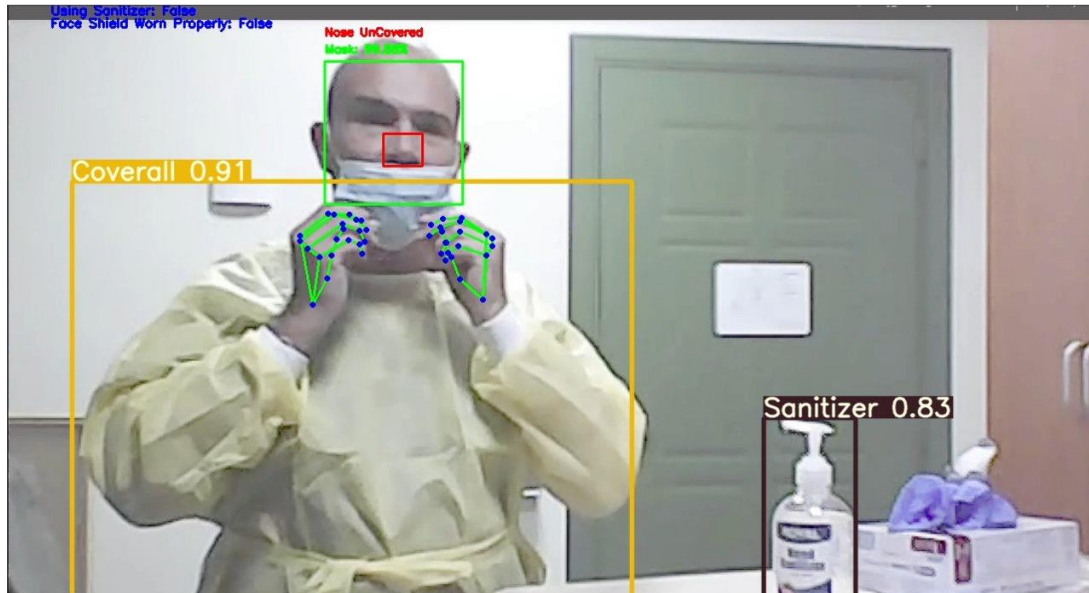
Figure 2: Donning and doffing process using ISADD prototype

The prototype, which is still part of the experimental proof of concept to determine whether the prototype is valuable, was tested amongst a purposive sample of nursing lecturers working at MCAST, experienced nurses at Mater Dei Hospital and nursing students from MCAST.

Further information can be obtained from the project's website: ISADD website or Facebook page.