Expanding the Horizons of Mixed Reality in Healthcare: Diverse Applications of Holomedicine in Clinical Procedures

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INTRODUCTION

Devices leveraging mixed reality, like HoloLens2, have not become commonplace in clinical settings yet, but they hold significant promise for enhancing patient care and supporting medical staff. The HoloMedicine team at NUHS is at the forefront, crafting various clinical applications that harness the capabilities of Hololens2 to assist doctors across numerous subspecialties.

Clinical Applications

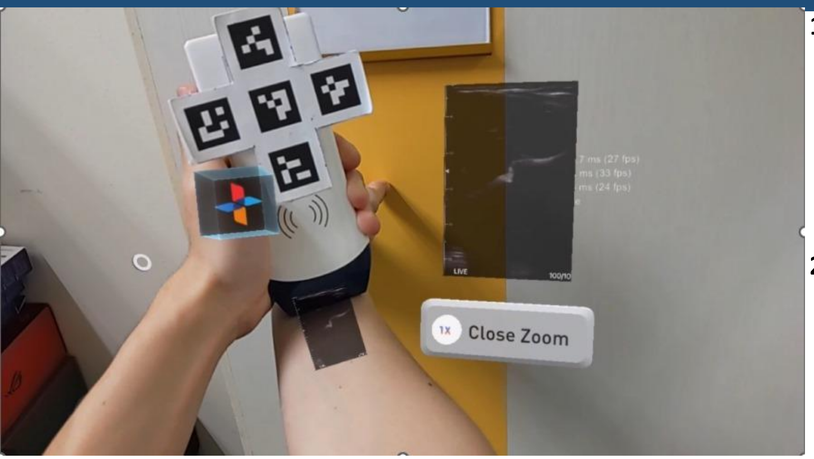
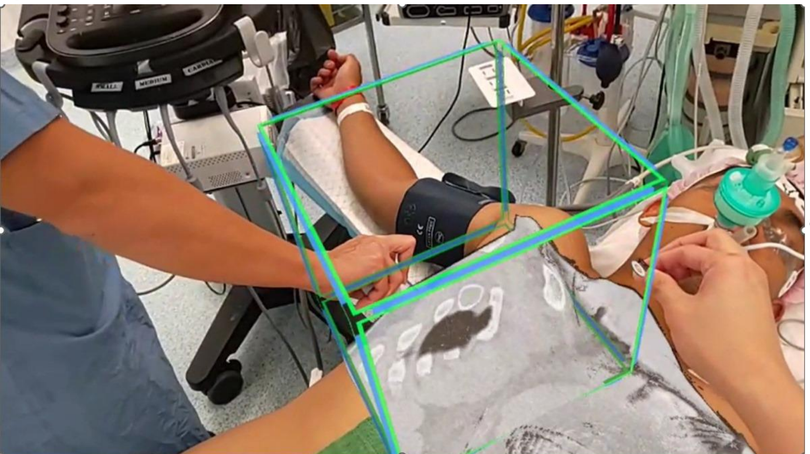


Figure 1: The use of HoloPocus in projecting the 2D overlayed image from the ultrasound into the patient's body

Figure 2: The rendering of scans and superimposition of a CT thorax prior to surgery



1. **HoloPocus** leverages the capabilities of Microsoft's HoloLens 2 for advanced sensing and imaging. It enhances clinical procedures by overlaying 2D ultrasound images onto the target area and reconstructing 3D models of organs. This technology aims to improve the accuracy of ultrasound-guided procedures, reducing potential complications for patients

2. **VSI HoloMedicine®** (medically certified cloud-based platform), we transform medical images (such as CT, MRI, ANGIO-CT, CBCT, SPECT, PETCT, and more) into an interactive 3D mixed reality environment. The holograms generated serves mainly as an aid for doctors to better plan surgery and anticipate potential difficulties, potentially reducing trauma and bleeding complications that might arise during surgery.

3. **HoloRehab**: Leveraging Holographic Technology for Enhanced Rehabilitation. This innovative platform provides in-house modules designed to assist Physiotherapists, Occupational Therapists, and Speech Therapists in delivering more effective rehabilitation tailored to each patient's recovery journey.

4. **HoloVein**: a clinical application we have developed which utilizes the infrared capabilities of Hololens2 that helps differentiate deoxygenated blood in the veins from blood seen in arteries.

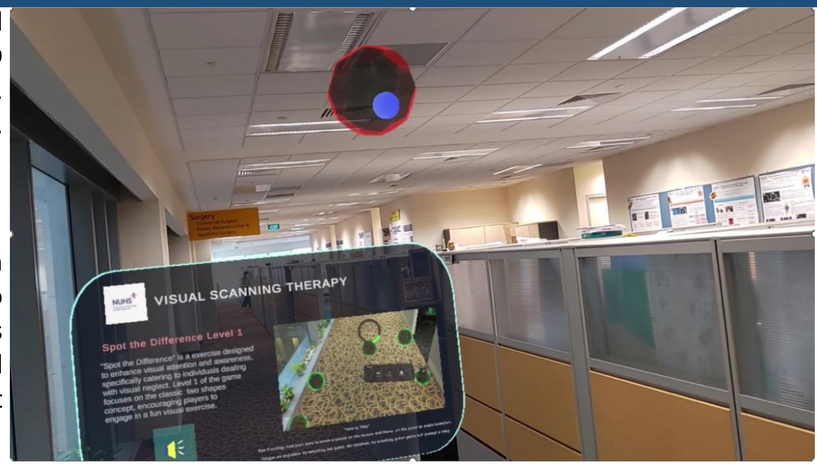


Figure 3: Rehab module built on the Hololens2 to assist occupational therapist rehabilitate patients with hemineglect

Figure 4: Utilizing the infrared camera on Hololens2 to identify the location of patient's veins on patient's peripheries

