Case Study: Virtual and Augmented Reality for Medical Education & Training

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Traditional Medical Training (Lectures and Manikins)


Hand Calibration in 2008

Hand Alignment in 2008
Experiences Using Augmented Reality Environment for Training and Evaluating Medical Students (2013)

- Motivation
  - High-end manikins are too expensive
- Their approach (ARLIST)
  - Built on conventional manikins, used in cloth shops
  - Facial expressions are projected on a mask placed on the manikin face
  - When the student plugs the stethoscope on a connector, the system plays sound.
- Evaluation
  - Three editions of the Selection Exam
  - 450 users at local Brazil hospital

Video See Through AR Head-Mounted Display for Medical Procedures (ISMAR 2014 DS)

- Technical
  - Increase accuracy and robustness of the tracking methods
  - Advancements in marker detection
    - Modifying the chromatic properties of the marker
    - Environment lighting
    - Adaptive color segmentation with dynamic thresholds
    - Fluorescent dyes
  - Clinical Studies

Visuo-Haptic Augmented Reality Runtime Environment for Medical Training (ISMAR 2013 Doctoral Symposium)

- www.magicvisionlab.com
- Research Questions
  - What are measurable benefits of applications with VHAR user interfaces in general, and specifically for medical training simulators?
Superman-Like X-Ray Vision: Towards Brain-Computer Interfaces for Medical Augmented Reality

- Integrated a BCI device and a gaze-tracker into two medical AR systems
- The Neural Impulse Actuator (NIA, 250$ used on Amazon) is a head-band that can read bioelectric signals
  - Not to use alpha & beta waves due to long learning phase
  - Electromyographic (EMG), learnt from muscle tension, triggered by raising the eyebrows
- Eye-tracker: Tobii X60
- User study with 9 people to prove BCI is better. Not very convincing

Relevance-based blending of Xray with video

Magic Mirror - Anatomy Learning

BodyVis: A New Approach to Body Learning Through Wearable Sensing and Visualization

Augmented Reality in the Operating Room

Telepresence for Medical Surgery, Training, and Telemedicine
VR for Therapy

https://www.youtube.com/watch?v=jNIqyyypog