“Reality Check:” Augmented Reality as an Educational Tool For Diagnostic and Interventional Radiology

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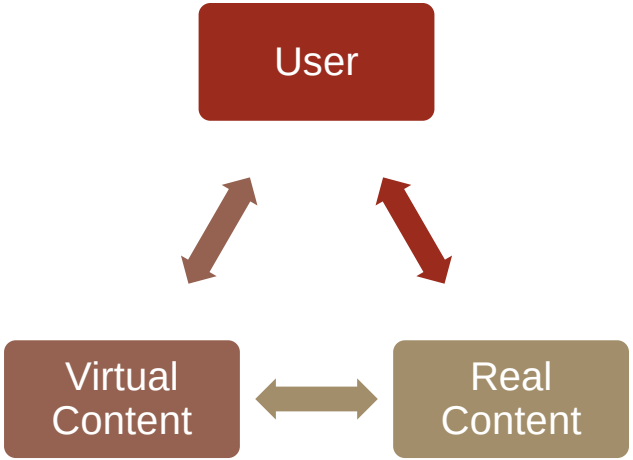
Objectives

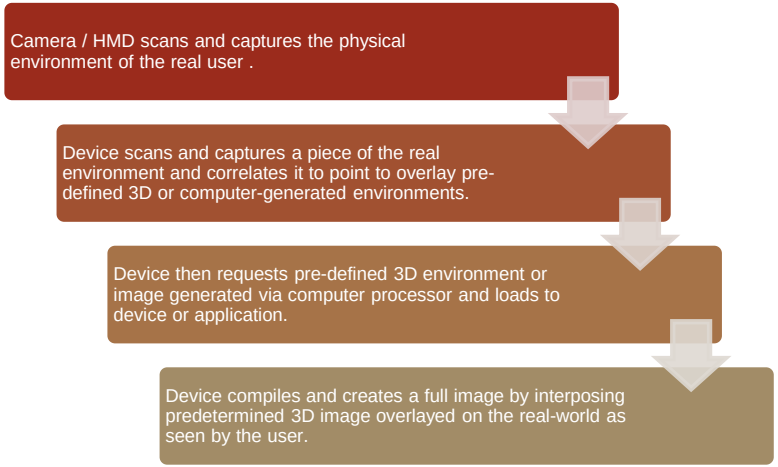
- To provide a brief overview of augmented reality (AR) systems and how they can be useful in diagnostic and interventional radiology education.

- To understand the range of potential applications and pitfalls of augmented reality devices, describe how they can be integrated into radiology education.

What is Augmented Reality?

- Augmented introduces a computer-generated, 3D simulation to the user, allowing individuals to truly immerse themselves in that experience using visual, auditory and sensory modalities.





Available Augmented Reality Devices on the Market

- Oculus Quest
- Magic Leap
- Microsoft HoloLens
- Epson Moviero
- Google Glass
- Raptor AR
- ThirdEye
- Vuzix Blade

Clockwise: Magic Leap, HoloLens, Epson Moviero, Oculus Quest, ©

Healthcare and Radiology Centric Applications

Each individual AR system have varying software environments for simulation and medical education. Numerous additional developer solutions exist with varying device compatibility. Individuals/institutions can also create/incorporate “home-grown” programming

Examples include:

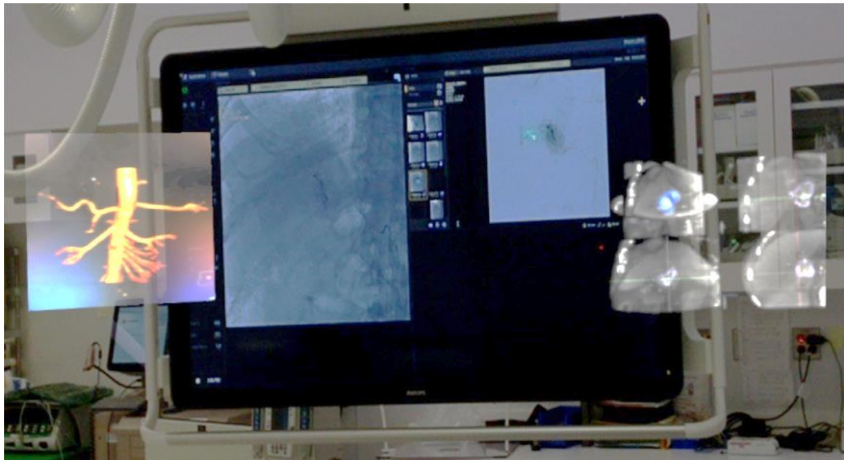
- HoloLens- HoloAnatomy, HoloHuman, CAE VimedixAR
- Magic Leap- BrainLab, SynThink, XRHealth
- Oculus – Osso VR, Facebook Reality Labs

Applications for Diagnostic Radiology Education

- Immersive experiences with cross-sectional imaging (CT, MRI, Ultrasound). Allowing users to interact in both a 2D and 3D environment across numerous body parts and pathologies.
  - e.g. UCSF- Temporal bone and cardiac anatomy.
- Interactive training to respond to rarely encountered scenarios in everyday practice, i.e. contrast reactions or ferromagnetic objects in the MRI suite.
- Creation of a collaborative communication platform between radiologists and referring physicians to discuss complex and difficult cases.

Applications for Interventional Radiology Education

- Simulations for both routine and complex interventional procedures prior to performing them in real-world patients.
- Providing a heads-up and interactive display to correlative pre-procedural imaging during the procedure.
- Real-time collaboration with faculty during procedures for training and education.



Strategies to Incorporate AR into Radiology Education

- Purchasing AR device(s) and/or partnering with a hardware/software manufacturer or supplier.
- Designating a point-person and or informatics specialist to create a curriculum.
- Creation of an in-institution training program specific teaching folder to integrate interesting anatomy and pathology for AR education.

Potential Pitfalls

- Cost
- Compatibility and integration.
- HIPPA Compliance.
- Rapidly evolving hardware/software with potential expiration.
- Individual program adoption and support.

Summary

Augmented reality introduces a creative platform in teaching diagnostic and interventional radiology that fully immerses the learner in a three-dimensional, 360-degree view of the human body. This active learning process will allow for greater efficacy in the interpretation of diagnostic studies and increased confidence when performing interventions.

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