The Use of Augmented Reality in the Operating Room: a Review

John Bartlett
Introduction

• Survey of how AR is used in surgery

• Today:
  • the problem
  • overview of options
  • progress
Augmented Reality

- Hybrid of VR and reality
- Interactive in real time
- Registered in 3-D
Augmented Reality
Why AR in the OR?

- Medical Imaging is well-established
- Traditional displays are of limited use
- Surgical procedures are becoming more technical
- Want to improve accuracy and efficiency
Why AR in the OR?
Medical AR Techniques

- Head-Mounted Displays (HMDs)
- See-through Monitor Displays
- Stereoscopic Displays (teleoperators)
- Fluorescence Techniques
- Auditory Information
Head-Mounted Displays
Monitor Displays
Stereoscopic Displays
Fluorescence

- Benefits: invisible, safe, less attenuation than visible light, targeted

**Identification of SLNs (T = 15 secs)**

- **Color Video**
- **NIR Fluorescence**
- **Color-NIR Merge**

![Images showing color video, NIR fluorescence, and color-NIR merge with annotations](image-url)
Auditory Information
Applications

- Neurosurgery
- Laparoscopic Surgery
- Needle Insertion
- Orthopaedics
Neurosurgery
Laparoscopic Surgery

- Minimally-Invasive Surgery (MIS)
  - Pros: reduces surgical complications, operating times and recovery times
  - Cons: limits vision and increases difficulty
Laparoscopic Surgery
Needle Insertion
Orthopaedic Surgery
Goals

• In-depth look at techniques and procedures
• Bridge the gap between problem-driven and technique-driven research
• Evaluation of the options presented in December
Questions?