AN EMPIRICAL ANALYSIS TO DETERMINE A COMMON AUGMENTED REALITY OR MIXED REALITY SOLUTION TO IMPROVE TRAINING AND OPERATIONAL CAPABILITIES FOR THE MARINE CORPS

Naval Postgraduate School

Abstract

- I Marine Expeditionary Force is seeking to learn more about the development of applications for Augmented Reality, Mixed Reality, and Virtual Reality Systems to assist with completing a range of tasks within the Marine Corps. Conducting aircraft maintenance is a use case that would benefit from using augmented reality or mixed reality. Aircraft maintenance practices and supply chain management supporting aircraft maintenance can be improved with better data and seamless access to data. Augmented reality displays can overlay data that the user can reference in real time without the need to look away at a computer screen or map. Inclusion of artificial intelligence can assist the user with providing automated functions, selection options, and instructions for the performance of different tasks via an augmented reality wearable device. Augmented reality and mixed reality, supported by artificial intelligence can support multiple other military use cases.

Microsoft Integrated Visual Augmentation System v. 1.2 worn by an Army soldier.

Methods

- Conducted a baseline review of augmented reality, virtual reality, and mixed reality systems to identify capabilities provided by those systems.
- Perceptually Enabled Task Guidance (PTG)
  - Defense Advanced Research Projects Agency
- Site Visits
  - Redshred – Technical Area 2 performer – PTG
  - Raytheon BBN – Technical Area 2 performer – PTG
  - Microsoft – Prime developer for the Integrated Visual Augmentation System (IVAS)

HAVIK CORE

JTAC Virtual Trainer

3D WARFIGHTER AUGMENTED REALITY

QUEST 3

Results & Their Impact

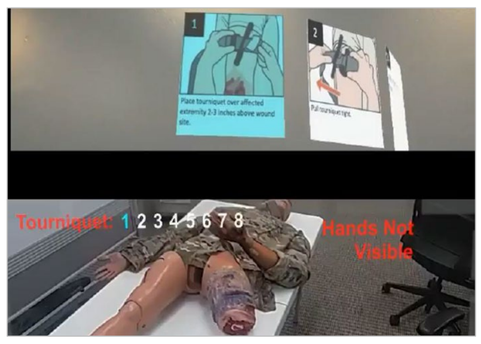
- PTG uses computer vision to identify actions and provides detailed instructions to the user to assist with task completion.
- PTG applications can be developed with software factories.
- Applications can support a wide range of military tasks.

COACH system capturing the component that needs maintenance actions.

Source: Redshred

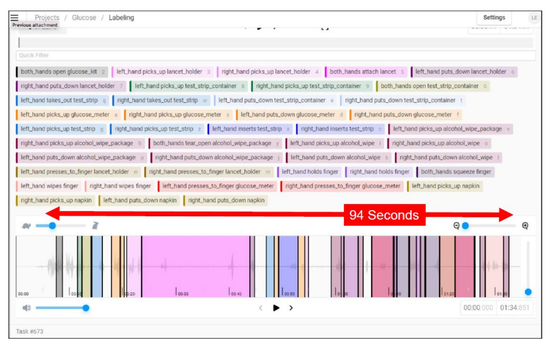
COACH system providing instruction to the user to conduct maintenance actions.

Source: Redshred



MAGIC system providing instructions to the user to apply a tourniquet.

Source: Raytheon BBN



Data labeling that provides computer vision-based recognition of actions taken by the user.

Source: Raytheon BBN

Department of Defense Management
www.nps.edu/ddm

Christopher A. Huff, Major, USMC

Advisors: Victor "Bob" Garza,
Dr. Mollie McGuire, Jeffrey Dunlap