The Center for Cyber Defenders
Expanding computer security knowledge

Augmented Reality for Training

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Problem Statement

Augmented Reality (AR) offers novel solutions to industry training challenges due to its unique capability of integrating virtual components with real-world environments. Sandia National Laboratories is developing AR training for maintenance and assembly within several program areas: Nuclear Weapons, Z-machine and Space Systems. AR training has the potential to improve training retention, reduce operator errors, improve efficiency and reduce costs. Our project develops the underlying core capabilities necessary for an AR training system based on the Microsoft HoloLens and applies them to the development of two functional AR training systems.

Objectives and Approach

- Delineated AR training modules into three modes: Show Me, Teach Me, Test Me

- "Show Me" illustrates the assembly sequence from start to finish

- "Teach Me" provides step-by-step instructions on how to build the assembly

- "Test Me" assesses user's ability to accurately perform assembly procedures, using metrics such as eye-tracking and timing

Results

- Developed modular AR elements for use across multiple AR training scenarios including animations, voice recognition, and gestures

- Developed assembly training scenario for a portion of the Z-machine gas switch

- Developed AR training for notional weapon subsystem

Impact and Benefits

- Allows workers to practice training scenarios for improved training retention and performance

- Reduce assembly errors and costs

- Automate training and assessments

- Capture expert knowledge

Sandia National Laboratories

U.S. DEPARTMENT OF ENERGY

NNSA National Nuclear Security Administration