Carnegie Mellon University
Software Engineering Institute

Augmented Reality (AR) Display for the Joint Improvised-Threat Defeat Organization (JIDO)

Reason for an AR Display

Cyberspace is unique in that it is intertwined with the other physical (air, land, sea, and space) warfighting domains.

There are many opportunities for front-line soldiers to use cyber tactics to help them achieve their missions. For example, a soldier on a reconnaissance mission who enters a potentially hostile or dangerous space, such as a storefront in enemy territory, might be able to gain access to an open wireless access point in the area or exploit vulnerabilities in the building's alarm-communication system.

Soldiers can expand their arsenal through greater awareness of specific lethal and non-lethal cyber tactics available to them.

The Reason the JIDO Worked with the SEI: Capability to Insert New Technology through Prototyping

JIDO seeks an AR display for a variety of threats such as facial ID matching, weapons, and biometric detection. SEI has the capability to assess the commercially available AR technology chosen by JIDO, the Osterhout Design Group R7 model AR smart glasses (https://www.techrepublic.com/article/odg-r-7-ar-enabled-smartglasses-the-smart-persons-guide/).

In addition, SEI can rapidly prototype development of a display interface that meets JIDO needs for threat identification.

SEI's Role: Design Display Interface for AR Glasses

In this 2017 work, the Carnegie Mellon University Software Engineering Institute (SEI)

- selected a Software Design Kit (SDK) for use with the AR glasses
- led design of a display interface to
  - overlay threats on the user's field of vision such as face ID, threat ID, and heart-rate anomaly
- tested the display interface for the various threats on the glasses in the following way
  - end-to-end software only simulation using software emulators
  - demonstrate software use in selected scenarios in the hardware environment
  - demonstrate software and hardware use with "actors" in a dynamic display event
- improved the performance of its heart-rate extraction algorithm, so that an individual's heart rate can be obtained from a video within 5 seconds

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