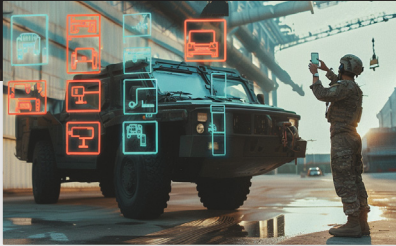# Intelligent Training for Equipment Maintenance System (ITEMS)

2023 - Current
Project Leader: Benjamin Nye, David Nelson, Mark Core

Fluid Leakage

Tighten the Track Jack

Background

The Intelligent Training for Equipment Maintenance System (ITEMS) is a rapid prototyping effort to develop a mobile app for maintaining and repairing heavy equipment, used by the Army National Training Center (NTC), such as the M113 armored personnel carrier and the M1 Abrams Tank.

Training at the NTC involves full-scale live simulated battles across an area the size of Rhode Island, with a large complement of Army vehicles and equipment ranging from lighter vehicles to full-size tanks. Equipment goes through heavy use and requires regular maintenance, making effective recognition of problems essential during the preventative maintenance checks and services (PMCS) process. ITEMS uses augmented reality (AR) to move PMCS off of traditional manuals and into the field so soldiers can diagnose issues faster.

Objectives

ITEMS will support on-the-job training (current maintenance tasks) and also function as an adaptive learning system, allowing the gain and long-term retention of skills. For example, Augmented Reality overlays enable soldiers of differing experience to deal with a range of diagnostic and repair situations, including rare breakdowns or when working on obsolete equipment, in real-time. Soldiers can also customize their maintenance steps and resources with custom images or videos of issues to help new soldiers.

Drawing on two decades of experience at ICT in Learning Sciences, ITEMS incorporates extensive adaptive coaching models (PAL3), personalized training resources, and open-response tutoring dialogs, as well as a deep content knowledge base, and resource feedback loop. ITEMS will support on-the-job training (current maintenance tasks) and also function as an adaptive learning system, allowing users to gain and retain long-term skill development.

From a platform perspective, ITEMS will build on ICT's Mixed Reality hybrid and holistic media ecosystem (INVRSE), which combines traditional formats (text, photos and videos) with emerging mediums (VR, AR). INVRSE has been used to provide research and development solutions for the US Navy exploring the future of communication and collaboration and for DARPA investigating body based interactions for big data visualization and analysis.

Results

The first ITEMS prototype is scheduled for testing at NTC Summer 2024.

Next Steps

Once ITEMS is rolled out for NTC, it will be available for adaptation by other maintenance-related branches of the US military.

Published academic research papers are available from https://ict.usc.edu/research/publications
(Search engine keyword: USC ICT Publications)

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