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Personalized Soldier Avatars

2022 - Current
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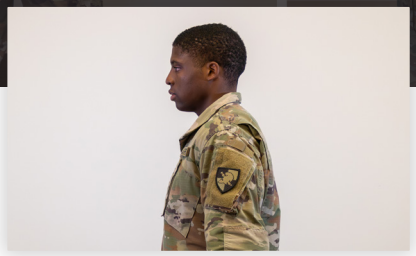

Background

Military simulations, such as the Army's Synthetic Training Environment (STE), could benefit from personalized soldier avatars (digital representations of real people) as these reflect the capabilities of individual soldiers and can enhance engagement, accelerate interpersonal skills learning, and improve health outcomes. For the Army, augmenting live training with virtual training allows soldiers to practice and consolidate important battlefield decision-making and individual skills in a safe and cost-effective manner.

By creating personalized soldier avatars that reflect actual individual attributes (e.g., fitness level, marksmanship scores, weapon training, individual skills, cognition, and more) we have the potential to increase realism and provide a more effective training environment. In addition, personalized avatars can be leveraged in Multi-Domain Operations (MDO), flight and vehicle simulations, supporting the Future Vertical Lift (FVL), STE Cross-Functional Team (CFT) and Next Generation Combat Vehicles (NGCV) CFT, as well as in telepresence use cases, supporting the Soldier Lethality (SL) CFT, particularly Integrated Visual Augmentation System (IVAS), and the Network (NET) CFT.

Objectives

Personalized avatars have many benefits, from increasing engagement to accelerating skill learning. If the avatar that a soldier uses in a simulation looks, behaves, and interacts like that soldier as much as possible, what effect would that have on training, as an individual or in a team context? Would the avatar have an effect on the soldier's behavior in the real world?

To answer these questions, we are developing an integrated personalized avatar testbed, leveraging both ICT's Rapid Integration & Development Environment (RIDE) and Virtual Human Toolkit (VHToolkit), that combines academic and industry technologies into a common framework in support of rapidly developing new avatar-related prototypes.

We will then investigate the effect of soldiers using personalized avatars versus generic avatars in a combat simulation. Our aim is to understand whether witnessing a high-fidelity personalized avatar, resembling a close personal friend experiencing a combat injury, leads to different reactions compared to observing a generic avatar enduring a similar injury.

Using fMRI scanners, we will measure activation of the pain matrix and record specific readings from neural regions in the brain such as the supplementary motor area (SMA), dorsal anterior cingulate cortex (dACC), anterior midcingulate cortex (aMCC), anterior insula, and periaqueductal gray (PAG). Additionally, surveys will be conducted to record data on measures of closeness, sense of presence, empathy, immersion, and the uncanny valley. The research findings will contribute to establishing the significance of personalized avatars in military medical simulation and training.

Within the context of the Army's Future Command's Army Modernization efforts, this proposed work directly supports the CFT.

Results

In Q4 2024, we will provide the Army, academic and S&T communities with valuable insights to further guide personalized avatar related S&T and vendor priorities and requirements, including the ability to rapidly create personalized avatar systems within the military domain to evaluate their efficacy.

Next Steps

ICT is currently creating a data store of personalized soldier avatars from photo capture sessions. Results will be integrated with RIDE and the VHToolkit in order to create a simulation with personalized avatars. The fMRI study in collaboration with the USC Brain and Creativity Institute (BCI) is slated for the summer of 2024. This project is funded by the 6.2 mission contract and is due for completion in 2024.

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

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