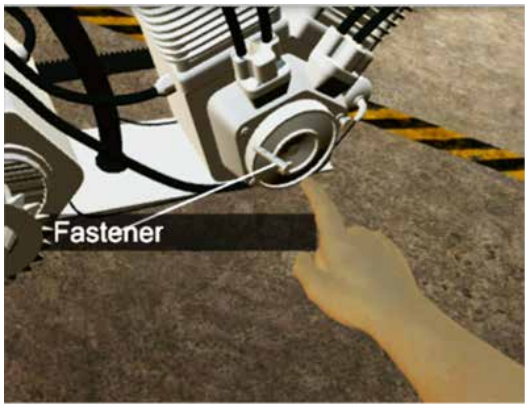
CTC Concurrent Technologies Corporation

Visualization and Mixed Reality

Helping clients grasp the future of mixed reality

Mixed reality represents a merger of the real and virtual worlds where real and digital objects co-exist and interact in real-time. Clients who have questions about using visualization and mixed reality in their businesses are invited to contact Concurrent Technologies Corporation (CTC) where we conduct research, development, test, and evaluation (RDT&E); and create and deliver vivid, engaging solutions across the mixed reality continuum.

At CTC's Mixed Reality Laboratory researchers construct prototypes and conduct tests using the latest in augmented, mixed, and virtual reality devices and software. The outputs from this process are used to innovate within new and existing programs through technology transition and to improve the mixed reality knowledge base by publishing and presenting research at industry conferences.



CTC demonstrates how fine motor hand interaction can be improved in immersive learning simulations.

Areas of Expertise

Immersive Simulation

Virtual reality experiences are now so immersive that they are often perceptually indistinguishable from experiences in reality. At CTC's Mixed Reality Lab, experts perform research and development across tactical, spatial, narrative, and strategic immersive simulation using augmented and virtual reality headsets and traditional mediums, such as PCs and tablets.

Human-Computer Interaction

Human-computer interaction (HCI) is focused upon the ways in which people and computers communicate with one another. Recent improvements in the availability, cost, and capability of HCI devices are radically changing the way that people and computers interact. CTC's experts research and develop applications that may be controlled using electromyography, gaze computer vision, voice and traditional input methods.

Prototypes

Horizon Platform

The Horizon platform prototype demonstrates mixed reality concepts for collaborating teams of GEOINT, SIGINT, and multi-INT analysts and operators. The platform collects, normalizes, contextualizes, and aggregates multi-INT data for consumption across joint virtual and augmented reality. Analysts working in simulated real-world locations work with operators within correlated actual locations to task collection activity and to inject and consume multi-INT in real-time.

Cognition and Dexterity Virtual Reality Trainer

The Cognition and Dexterity Virtual Reality Trainer (CogDex VR) prototype demonstrates the use of virtual hands for use in fine motor learning tasks. The prototype is designed to enable learners to work with natural and intuitive hand articulation to manipulate virtual objects, as they do in the real world. Demonstrations include learning applications in biology, equipment maintenance, and tourist exhibits.

Software

- Unity
- Unreal
- VBS3
- Android
- iOS
- Windows Mixed Reality
- SmartFox Server

Devices

- Oculus Rift
- Epson Moverio
- Google Glass
- Microsoft HoloLens
- Leap Motion
- ODG R6 Goggles
- Occipital Structure
- Myo
- Tobii EyeX
- Ike Spike Sensor

Case Study:

Revolutionizing the Tourism Experience

Augmented reality is transforming the museum's exhibit space, seamlessly combining the virtual experience with real artifacts, buildings, historic images, and scenes.

CTC is perfecting ground-breaking digital technology that instantly engages museum audiences.

When a visitor raises a smartphone empowered with CTC's Digital Tour Guide app to a designated photo at the Johnstown Flood Museum, a fully animated, historically accurate character appears and begins speaking directly to the museum-goer. The result is a spine-tingling first-person tale of that day in 1889 when the Great Johnstown Flood claimed more than 2,000 lives and brought worldwide attention to the Little Conemaugh River Valley.

The harrowing story is of international consequence, as period advances in communications made the Great Johnstown Flood the world's first shared disaster, and the outpouring of support included the help of Clara Barton and resulted in the founding of The American Red Cross.

CTC is in a unique position to develop proprietary software and to license versions of this fully customizable Digital Tour Guide app, enabling museums, zoos, visitor centers, national parks, and similar sites to repurpose their existing exhibits and transform their visitor experiences for a whole new generation of tech-centric customers.

Museums can transport visitors into new worlds of immersive environments using CTC's customizable Digital Tour Guide app.

Case Study:

"Grasping the Future" with Natural Learning Interfaces

Senior Software Engineer and Mixed Reality Lab Technical Lead Ron Punako's Paper, "Grasping the Future: Virtual Hands Control for Fine Motor Tasks," has gained national recognition. The thesis: measurement of learner presence when using virtual hands for equipment maintenance procedures along with cognitive and psychomotor skills training benefits.

The paper was developed as part of CTC's research and development activities into novel learning interfaces for virtual equipment maintenance training simulations, which enable users to assemble and disassemble 3D virtual components, such as engines with their hands in virtual reality.

Ron illustrates cognitive and psychomotor benefits of training using highly-articulated virtual hands rather than abstracted mediation using controllers. CTC is researching joint immersive environments in which educators and students share the same spatial experience while using a variety of augmented and virtual reality devices and conventional interaction mediums.

Ron notes, "The human perceptual system does an amazing job at enabling us to infer as to the state of the world. However, like many systems, it may be tricked, leading to the question of what is real? By employing artificially generated inputs that are neurologically congruent with stimuli experienced in consensus reality we can remove the question of is this real? from the table and enable users to focus upon the experience at hand."

Contact us today to transform galleries, zoos, science centers, visitor centers, historic sites, monuments, parks, libraries, and archives and educational institutions—remaking them all into engaging digital vanguards.

Concurrent Technologies Corporation (CTC) is an independent, nonprofit, applied scientific research and development professional services organization. Together with our affiliates, Enterprise Ventures Corporation and CTC Foundation, we leverage research, development, test and evaluation work to provide transformative, full life-cycle solutions. To best serve our clients' needs, we offer the complete ability to fully design, develop, test, prototype, and build. We support our clients' core mission objectives with customized solutions and strive to exceed expectations.

CTC's quality management system is certified to the ISO 9001:2008 (Quality) and 14001:2004 (Environmental) standards. CTC's for-profit affiliate, Enterprise Ventures Corporation (EVC), is certified to the AS9100 standard for aerospace activities.

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