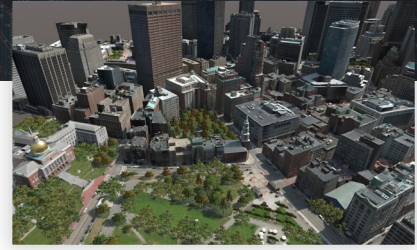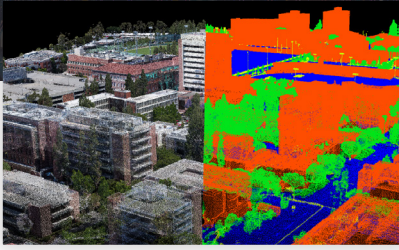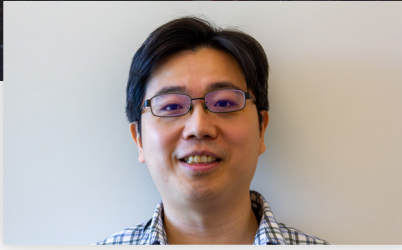# Geospatial Terrain

2016 - Current
Project Leader: Andrew Feng

Background

The Geospatial Terrain team focuses on constructing high-resolution 3D geospatial databases for use in next-generation simulations and virtual environments. Utilizing both the commercial photogrammetric solution and our in-house R&D processing pipeline, the 3D terrain is procedurally recreated using drone platforms and EO sensors.

Objectives

The Geospatial Terrain team focus on research and development to create the high resolution terrain reconstructions and corresponding run-time terrain simulation capabilities for Military users. The end-to-end pipeline streamline the data capture, 3D processing, and semantic segmentation to produce simulation-ready high-resolution terrain. Our current research include neural 3D terrain reconstructions for large scale environments and semantic terrain segmentations that utilize zero-shot AI models to extract object information for building aperture.

Results

To date, ICT has produced 3D terrains through the UAV collections of over a hundred different sites to support the terrain research efforts for US Army STTC. Our technology is also an integral part of Army's One World Server (OWS) system, which utilizes our semantic terrain processing algorithms for creating and processing simulation-ready high-resolution 3D terrain from low-altitude UAV collections. We have developed the terrain simulation applications including line-of-sight analysis, path finding, real-time terrain effects, concealment analysis, and so on. We are also actively developing new technologies to improve the terrain generation process. Our recent research focus will investigate neural-based methods for terrain reconstructions and zero-shot models for 3D segmentations.

Next Steps

For future research, we aim to address the current limitation of the photogrammetry process for creating 3D terrains. Specifically, we plan to develop the capability for photorealistic reconstruction and visualization of the geospatial terrain using neural rendering techniques.

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

Project Leader: Andrew Feng

Established in 1999, the USC Institute for Creative Technologies (ICT) is a Department of Defense (DoD) University Affiliated Research Center (UARC), sponsored by the US Army. Harnessing Hollywood-derived creativity with academic innovation and military-domain expertise, ICT conducts award-winning R&D in Artificial Intelligence (AI), Computer Graphics, Geospatial Sciences, Human Performance, Learning Sciences, Modeling, Simulation & Gaming, Mixed Reality (MxR), Medical VR, Narrative, and Virtual Humans.