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SenSIP Seminar Series

Demonstrating Neural Representations and Deep Learning Methods for Reality Capture with Applications in Autonomous Driving, Defense, Mapping, and Photovoltaic Arrays

Presenter: David Ramirez, Ph.D. Student

September 14, 2023, 3:30 PM (AZ)

ASU Tempe, GWC 487 / Zoom: https://asu.zoom.us/j/84377030681

Abstract

Continuous mapping of the world is of vital importance for today's peace and tomorrow's prosperity. Satellite imagery captured periodically can be used to detect changes to the environment. These observations may measure military activity of uncertain neighbors; changes to forests, oceans, and natural resources; or the proliferation of technology, such as solar panels or vehicles. We present a variety of methods used for reality capture of the world - both at ground level and overhead perspectives. Through visual-SLAM and photogrammetry we can estimate the location of photographs within the environment. Neural Radiance Fields are used to rapidly create a neural representation of the 3D environment given the visual imagery. Lastly we demonstrate the use of object detection and semantic segmentation methods for extracting qualities of interest in video and imagery. This presentation will include several live demonstrations of neural representations and deep learning methods in action.

Biography:

David Ramirez is a Ph.D. student in computer engineering at Arizona State University (ASU). They received their Masters and Bachelors degrees both in electrical engineering from ASU, focusing in digital signal processing. David has worked in the space and defense industries since 2016 and most recently held the role of Senior Staff Data Scientist. They served in the United States Marine Corps and supported peaceful military operations in nearly a dozen countries. David's research interests focus on detection and surveillance for geospatial intelligence, applied machine learning, photovoltaic energy, and reality capture.

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