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Analysis and Synthesis Approaches in Geospatial Machine Learning

The collective mission of understanding the world is never complete: We need to discover and classify roads, settlements, landmarks, disasters, populations, and many other complex organic relations occurring on the world. In addition to the computational advancements due to the AI era, the recent proliferation of remote sensing data enabled automatic extraction of such structures to better understand our world. In this talk, I will first mention how several deep learning approaches revolutionized the way we analyze geospatial data for extracting meaningful information. Although many applications depend on that information, analysis itself may not be enough for large scale impact. As its counterpart, synthesis approaches are becoming popular for mimicking real world data in completion and creation of new worlds. In the second part of the talk, we will explore some generative models that propose realistic and impactful solutions for going beyond observations. I will also mention some 2D/3D urban proceduralization techniques to leverage geospatial data for both obtaining and utilizing generative models.

Short Biography: Ilke Demir's research focuses on 3D vision approaches for urban proceduralization, geospatial machine learning, and computational geometry for synthesis and fabrication. She received her Ph.D. degree in Computer Science from Purdue University in 2016, in addition to her M.S. degree from Purdue, and her B.S. degree in Computer Engineering from Middle East Technical University with a minor in Electrical Engineering. Afterwards, she joined Facebook as a postdoc working on deep learning and generative models for geospatial and urban data. She worked at Pixar Animation Studios as an intern in 2015-2016. She has interned at KOVAN Robotics Lab and Havelsan Inc. on robotics, graphics, and simulation projects. Ilke received numerous awards including Bilsland Dissertation Fellowship, GHC Scholarship, and best poster, paper, and reviewer awards. In addition to her publications in top-tier venues (SIGGRAPH, CVPR, ICCV, ...), she has also organized several workshops and

competitions in the intersection of deep learning, remote sensing, and computer vision, including the renowned DeepGlobe workshop at CVPR.