THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Department of Computing
電子計算學系

Research Seminar

Learning to Understand 3D Scenes

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Date : 14 July 2020 (Tuesday)
Time : 3:00 p.m. - 4:00 p.m.

▶ Abstract

Humans rely heavily on vision as a primary sensing modality for perceiving the world. Just by taking a single or few glances at our room, we can surely imagine what its likely 3D shape is for every piece of the furniture, guiding how we could interact with them. A long-standing goal in machine intelligence is to build systems that have similar capabilities to infer the underlying 3D structure of individual objects as well as understand the composition of multiple objects within complex 3D scenes. Traditional approaches towards this goal usually leverage hand-crafted features to estimate the 3D shape and semantics. However, they are difficult to generalize to novel objects and scenarios. The recent advancement of deep neural networks and the availability of large-scale datasets have yielded impressive results for various tasks on 2D images. This powerful data-driven approach has also emerged as a promising tool to tackle core tasks for 3D scene understanding. This talk presents a series of novel algorithms that aim to understand scenes and the objects within them by learning general and robust representations using deep neural networks, trained on large-scale real-world 3D data. In particular, the talk firstly introduces two neural architecture based on generative adversarial networks (GAN) and the self-attention mechanism to recover accurate 3D shapes for individual objects. After that, it presents two innovative neural frameworks to efficiently and effectively infer the semantics and composition of large-scale 3D scenes. Lastly, a number of new research directions are discussed and identified as future work.

▶ About the Speaker

Bo Yang is a Ph.D. candidate (Oct 2016-) in the Department of Computer Science at the University of Oxford, supervised by Profs. Niki Trigoni and Andrew Markham. He is interested in machine learning, computer vision, and robotics, and his research goal is to build intelligent systems that endow machines to recover, understand, and eventually interact with the real 3D world. His research works have been published at NeurIPS, CVPR, TPAMI, IJCV, ICRA, IROS, etc.

ALL are welcome!

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