Title: Applications of Deep Learning in Autonomous Robot Navigation

Abstract:

Over the past decade, research in deep learning has exploded, much due to its impressive performance in solving a plethora of difficult problems across a multitude of application domains including natural language processing, image understanding, and computer vision. Robotics, as a field within artificial intelligent, has also benefitted from the significant progress of deep learning, leading to solutions to challenges in sensory data processing and decision making. Much of the rapid development in deep learning is supported by its tremendous power in learning representations from data, be it texts, audios, images, or videos, to extract features or uncover hidden structures in the data. In this presentation, I will focus on recent research in applying deep learning to autonomous robot navigation. Specifically, I will explain why and how deep learning can be exploited to advance research in robot navigation, with example problems in robot person following, visual robot mapping, and robot localization.

Bio:

Professor Hong Zhang received his B.S. from Northeastern University (Boston) in 1982, and Ph.D. from Purdue University in 1986, both in Electrical Engineering. Subsequently he conducted post-doctoral research at the University of Pennsylvania before he joined the Department of Computing Science at the University of Alberta, Canada, where he worked for over 30 years. Since October 2020, he has been a Chair Professor in the Department of Electronic and Electrical Engineering at the Southern University of Science and Technology in Shenzhen, China.

Professor Zhang's research interests include robotics, computer vision, and image processing, with over 300 publications in these areas. While in Canada, Professor Zhang held a prestigious NSERC Industrial Research Chair from 2003 to 2017. He was the General Chair of 2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), in Vancouver, Canada. He is currently on a three-term as the Editor-in-Chief of IROS Conference Editorial Board (2020-2022). In recognition of his accomplishments, he is elected Fellow of the IEEE, and Fellow of the Canadian Academy of Engineering.