Using Deep Learning in various applications in Computer Vision: From Precision Agriculture to Autonomous Car Driving

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Host: Shantanu Sharma

Date: Wednesday, September 4, 2024
Coffee: 2:15 PM – 2:30 PM
Time: 2:30 PM – 3:30 PM
Location: GITC 4402 (4th floor Seminar Lecture Hall)
Zoom Link: https://njit-edu.zoom.us/j/96253693293?pwd=aElFADjUy5TeQmTaUtOlUXJX6gG.1

Abstract:
Deep learning has become a highly valuable tool for various tasks in image and video analysis. In this presentation, I will briefly overview my recent research in the areas of computer vision and video compression with deep learning. After a short introduction to neural networks, I will provide an overview of my current research projects.

These projects, funded by various agencies such as the Israeli Innovation Authority, the Ministry of Science and Technology, and the Ministry of Agriculture, include:

- Video compression using neural networks
- Smart utilization of video content to improve video compression in wireless channels for autonomous cars
- Enhancing robotic physiotherapeutic treatments using machine learning
- Innovative methodology for enhancing the resolution of images produced by low-orbit satellites
- Precise agriculture: enabling next-level research on roots by automating MiniRhizotron image acquisition and analysis
- Extracting Quality of Experience metrics of real-time encrypted video (e.g., in video conferencing tools)
- Designing defence algorithms for vision AI models to enhance their robustness against adversarial attacks

Bio:
Prof. Hadar received the BSc, the MSc (cum laude) and the PhD degrees from the Ben-Gurion University of the Negev, Israel, in 1990, 1992, and 1997, respectively, all in electrical and computer engineering. The prestigious Clore Fellowship supported his PhD studies. His PhD dissertation dealt with the effects of vibrations and motion on image quality and target acquisition. From August 1996 to February 1997, he was with CREOL at Central Florida University, Orlando, FL, as a research visiting scientist, working on angular dependence of sampling MTF and over-sampling MTF. From October 1997 to March 1999, he was a post-doctoral fellow in the Department of Computer Science at the Technion-Israel Institute of Technology, Haifa. In 1999 Prof. Hadar joined the Communication Systems Engineering Department at Ben-Gurion University of the Negev. Currently, he is a Full Professor and was the head of the department between 2012-2018. His main research topics involve with Deep Learning in various founded projects by competitive funding agencies, in a variety hot and emerging research areas such as autonomous cars, precision agriculture, tele-medicine: enhancing robotic physiotherapeutic treatments using machine learning, encrypted traffic analysis and adversarial AI. Since 2011, Prof. Hadar is an Associate Editor of the Optical Engineering journal. In July 2013 he was the guest editor with his former Ph:D student Dr. Dan Grois, of a special section on video compression technology in Opt. Eng. 52(7). From August 2015 Prof. Hadar to February 2016, he was in Sabbatical as a visiting Professor at Electrical Engineering Dept. at UCLA, working with Prof. Izhak Rubin on SVC video streaming over wireless network. In August 2018, Prof. Hadar, visited seven universities around Brazil for a lecture tour on “Cyber Security risks in the IoT domain”, with support from the Israeli embassy in Brasilia. Prof. Hadar also works as a consultant of various Hi-Tech companies in Israel, and is a Senior member of IEEE and SPIE.