

ICRoM 2017 Full day Workshop

Title: Deep Learning for Self-Driving Cars

Deep learning, and in particular convolutional neural networks, has become the main component of many intelligent vehicle algorithms.

Self-Driving Cars need to choose actions, e.g. steering commands which will affect the driving scenes encountered. This setting is well-suited to apply deep learning to determine the optimal commands.

Recent advances in deep learning techniques in computer vision applied to a broad range of applications including classification, detection, and segmentation.

These techniques are used in self-driving cars in order to detect objects from camera images such as other cars, bicycles, pedestrians and etc.

In camera-based sensing systems for intelligent vehicles, object detection offers the fundamental ability to real-time environment perception. In this workshop we explain what is deep learning and introduce open source software like Python, Keras and Tensorflow to build deep learning models on real world data. The workshop is conceived to maximize the learning experience for everyone and includes 50% theory and 50% hands-on practice. Previous experience programming in Python or in other languages is advised to make best use of the workshop. Additionally, some familiarity with machine learning is necessary.

The goal of this workshop is to bring together researchers and practitioners in the field of autonomous driving to address core challenges with machine learning.

These contents of this workshop include, but are not limited to

- 1 - Introduction to Deep Neural Networks
- 2 - Finding lane lines by low-level image processing techniques
- 3 - Introduction to TensorFlow
- 4 - Traffic sign classification by TensorFlow
- 5 - Introduction to Keras
- 6 - Behavioral cloning
- 7 - Accurate and efficient vehicle detection

Speakers:

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Hamid D. Taghirad has received his B.Sc. degree in mechanical engineering from [Sharif University of Technology](#), Tehran, Iran, in 1989, his M.Sc. in mechanical engineering in 1993, and his Ph.D. in electrical engineering in 1997, both from [McGill University](#), Montreal, Canada.

He is currently a Professor and the dean of the [Faculty of Electrical Engineering](#), and the Director of the [Advanced Robotics and Automated System \(ARAS\)](#) at [K.N. Toosi University of Technology](#), Tehran, Iran. He is a senior member of IEEE, the chairman of [IEEE control system chapter](#) in Iran section, member of the board of Industrial Control Center of Excellence (ICCE), at K.N. Toosi University of Technology, editor in chief of Mechatronics Magazine, and Editorial board of [International Journal of Robotics: Theory and Application](#), and [International Journal of Advanced Robotic Systems](#). His research interest is robust and nonlinear control applied to robotic systems. His [publications](#) include five books, and more than 200 papers in international Journals and conference proceedings.

Alireza Norouzzadeh Ravari received the B.Sc. and M.Sc. degrees in electrical engineering from Shahid Bahonar University of Kerman, Kerman, Iran, and K. N. Toosi University of Technology, Tehran, Iran, respectively. He is pursuing the Ph.D. degree in electrical engineering at K. N. Toosi University. He is currently a member of the [Advanced Robotics and Automated System](#) at K. N. Toosi University of Technology. His current research interests include machine vision, mobile robotics and information theory.