

What's in your dataset? Using Graphs to Understand Machine Learning Problems



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Lecture Room #1, BASE, Koganei Campus, TUAT

Abstract

Datasets encountered in many machine learning tasks consist of objects represented by feature vectors and with labels associated to them. Because these objects are in general represented by high-dimensional features, it is not easy to visualize their relative positions in feature space, characterize the boundary between classes or understand the effect of feature transformation algorithms (e.g., deep neural networks). In this talk we describe our recent work using similarity graphs as a tool to describe datasets. We start by introducing similarity graphs and describe a novel sparsification that illustrates how these graphs capture structural information of datasets. We next review our semi-supervised learning techniques, which use similarity graph structure to select data to be labeled. Finally, we show how these graphs can be used to improve deep neural network robustness.

Biography

Antonio Ortega received his undergraduate and doctoral degrees from the Universidad Politecnica de Madrid, Madrid, Spain and Columbia University, New York, NY, respectively. In 1994 he joined the Electrical Engineering department at the University of Southern California (USC), where he is currently a Professor and has served as Associate Chair. He is a Fellow of the IEEE and EURASIP, and a member of ACM and APSIPA. He is currently a member of the Board of Governors of the IEEE Signal Processing Society and the Editor-in-Chief of the IEEE Transactions on Signal and Information Processing over Networks. He has received several paper awards, including the 2016 Signal Processing Magazine award. His recent research work is focusing on graph signal processing, machine learning, multimedia compression and wireless sensor networks.

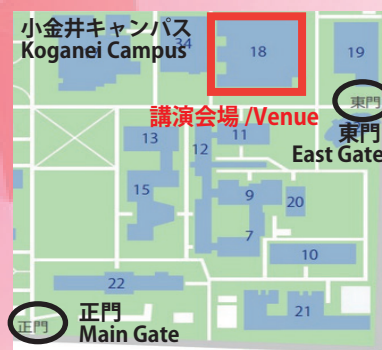
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