ISSPIT 2017 – Bilbao, Spain, University of Deusto
Auditorio Icaza (La Comercial Building)

DAY 1: Monday, December 18th

Plenary talk: Prof. Hichem Frigui

Biography

Hichem Frigui received the Ph.D. degree in computer engineering and computer science from the University of Missouri, Columbia, in 1997. From 1998 to 2004, he was an Assistant Professor with The University of Memphis, Memphis, TN. He is currently a Professor and the Director of the Multimedia Research Lab, University of Louisville, KY. He has been active in the research fields of fuzzy pattern recognition, data mining, and image processing with applications to content-based multimedia retrieval and land mine detection. He served as an Associate Editor of the IEEE Transactions on Fuzzy Systems and Fuzzy Sets and Systems. He has participated in the development, testing, and real-time implementation of several land mine detection systems. His research has been funded by the National Science Foundation (NSF), Office of Naval Research (ONR), Army Research Office (ARO), and Kentucky Science and Engineering Foundation (KSEF). He has coauthored over 200 technical publications. In 2002, he has received the National Science Foundation Career Award for outstanding young scientists.

ABSTRACT

Supervised and Unsupervised Learning with Multiple Instance Data

A typical machine learning task relies on the assumption that each data sample can be represented by a single feature vector. Unfortunately, there exist applications for which nature or logistics render the data impossible to describe using this singular representation. In these cases of interest, samples are instead characterized by multiple, alternate feature vectors and it is unknown to the user which specific feature vector(s) has the correct description of the data sample. This class of problems is generally known as Multiple Instance Problems (MIP or MILP), and the class of machine learning solutions proposed to address these problems are referred to as Multiple Instance Learning (MIL). MIL analysis presents a nontrivial set of challenges that greatly complicate the utilization of conventional learning algorithm.

In this talk, I will start by introducing the need for MIL and the data representation used for this task. Then, I will outline supervised and unsupervised learning algorithms that have been developed to solve the MIP. Experimental results from two applications will be presented and used to illustrate the need and the advantages of MIL. The first one involves detecting buried landmines using ground penetrating radar sensor. The second application involves using low-level visual features for image annotation.