Distinguished Lecturer Series "Leon the Mathematician" at the School of Informatics, Aristotle University of Thessaloniki Greece (https://www.csd.auth.gr/en/news/lectures) - SP01 Greek IEEE Signal Processing Chapter - European Association for Signal Processing - IAPR Greek Association for Image Processing and Digital Media

INVITED LECTURE

Professor Petros Maragos (IEEE Fellow, EURASIP Fellow, IEEE Signal Processing Society Distinguished Lecturer 2017-2018, National Technical University of Athens) is going to lecture on

Graph-theoretic Approaches to Segmentation based on Active Contours and Random Walk Schemes on Arbitrary Graphs

at the **Auditorium I of Aristotle University Research Dissemination Center – ΚΕΔΕΑ ΑΠΘ** (September 3rd Ave., University Campus) on **Thursday May, 31st, 2018** at **14:00.**

ABSTRACT

Graph-based methods have attracted interest in areas such as computer vision, signal processing and network science. In this talk we will present some advances from our research on graph-theoretic approaches for clustering and segmentation. We will focus on two approaches: 1) An unsupervised approach where we extend the active contours of computer vision to arbitrary graphs by developing efficient finite difference schemes and geometric approximations of gradient and curvature, for which we provide theoretical results on their convergence in probability and asymptotic error bounds for the class of random geometric graphs. 2) A supervised approach where we develop graph-driven diffusion processes on arbitrary graphs by relating the SIR epidemic propagation model to the random walker algorithm. This helps us to develop the normalized random walker by integrating the importance of each node to the final clustering or segmentation solution. For both approaches we provide experimental results for graph clustering and image segmentation.

About the Speaker:

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Petros Maragos received the Diploma in E.E. from the National Technical University of Athens (NTUA) in 1980 and the M.Sc. and Ph.D. degrees from Georgia Tech, Atlanta, in 1982 and 1985. In 1985, he joined the faculty of the Division of Applied Sciences at Harvard University, where he worked for eight years as professor of electrical engineering affiliated with the Harvard Robotics Lab. In 1993, he joined the faculty of the School of ECE at Georgia Tech, affiliated with its Center for Signal and Image Processing. During periods of 1996-98 he had a joint appointment as director of research at the Institute of Language and Speech Processing in Athens. Since 1999, he has been working as professor at the NTUA School of ECE, where he is currently the director of the Intelligent Robotics and Automation Lab. He is also the coordinator of a robotics perception & interaction research unit at the Athena Research and Innovation Center. He has held visiting positions at MIT in 2012 and at UPenn in 2016. His research and teaching interests include signal processing, systems theory, machine learning, image processing and computer vision, audio-speech & language processing, and robotics. He has served as: member of IEEE SPS technical committees; associate editor for the IEEE Trans. on ASSP and IEEE Trans. on PAMI, editorial board member and guest editor for several journals on signal processing, image analysis and vision; co-organizer of several conferences and workshops on image processing, computer vision, multimedia and robotics (including recently EUSIPCO 2017 as general chair). He has also served on the Greek National Council for Research and Technology. His is the recipient or co-recipient of several awards for his academic work, including a 1987-1992 National Science Foundation Presidential Young Investigator Award, a 1988 IEEE SPS Young Author Best Paper Award, a 1994 IEEE SPS Senior Best Paper Award, the 1995 IEEE W.R.G. Baker Prize Award for the most outstanding original paper, the 1996 Pattern Recognition Society's Honorable Mention Award, the EURASIP 2007 Technical Achievement Award for contributions to nonlinear signal, image and speech processing, and the Best Paper Award of the IEEE CVPR-2011 Gesture Recognition Workshop. He was elected a Fellow of IEEE in 1995 and a Fellow of EURASIP in 2010 for his research contributions. He has been elected IEEE SPS Distinguished Lecturer for 2017-2018.