Distinguished Lecturer Series "Leon the Mathematician" at the Department of Informatics, Aristotle University of Thessaloniki Greece (http://dls.csd.auth.gr) - CIS011 Greek Computational Intelligence Chapter - IAPR Greek Association for Image Processing and Digital Media

INVITED LECTURE

Maria Petrou (Fellow of the Royal Academy of Engineering, IET, and IAPR, and a Distinguished Fellow of the British Machine Vision Association, Professor in Signal Processing in the Electrical and Electronic Engineering Department at Imperial College, London and Director of the Informatics and Telematic Institute, Centre of Research and Technology Hellas) is going to lecture on

The Tower of Knowledge: A generic system architecture

at the **Auditorium of the Central Library** of the Aristotle University of Thessaloniki on **Tuesday May 3rd, 2011 at 16:00.**

ABSTRACT

The lecture will present a new system architecture, called Tower of Knowledge (ToK), inspired by human language. The ToK architecture is a generic framework that allows the combination of static and dynamic information, as well as expert knowledge. It will be exemplified in one of its simplest forms, where statistical feature distributions and logic rules, concerning the definition of a component, are combined to label the components of buildings within a probabilistic framework. The maximum likelihood method of label assignment is modified by being multiplied with a function, called utility function, which expresses the information coming from the logic rules programmed to the system. The logic rules are designed to define an object/component by answering the questions "why" and "how", referring to the actions in which a particular object may be observed to participate and the characteristics it should have in order to be able to participate in these actions. Two sets of measurements are assumed to be available: those made initially for all components routinely, and which supply the initial statistically based inference of possible labels of each component, and those that are made in order to confirm or deny a particular characteristic of the component that would allow it to participate in a specific action. A recursive version of the architecture may be used in which the distributions of the former types of measurement may be learnt in the process, having no training data at all.

M. Petrou, "Learning in Computer Vision: Some thoughts," in *Progress in Pattern Recognition, Image Analysis and Applications. The 12th Iberoamerican Congress on Pattern Recognition* (L. Rueda, D. Mery, and J. Kittler Eds.), LNCS 4756, Vina del Mar-Valparaiso, November, LNCS 4756, Springer, pp. 1–12, 2007.

M. Petrou and M. Xu, "The tower of knowledge scheme for learning in Computer Vision," in *Proc. Digital Image Computing Techniques and Applications*, 3–5 December, Glenelg, South Australia 2007.

M. Xu and M. Petrou, "Recursive Tower of Knowledge," in *Proc. 19th British Machine Vision Conf.*, Leeds, UK, 1–4 September, 2008.

M. Xu and M. Petrou, "Learning logic rules for the Tower of Knowledge using Markov Logic Networks," *Int. Journal Pattern Recognition and Artificial Intelligence*, to appear.