TrustEYE

Trustworthy Sensing and Cooperation in Visual Sensor Networks

Joint TEWI / Lakeside Labs Colloquium

Jorge Fernández-Berni, PhD

Smart imaging, from silicon to vision: challenges and... specifications?

Abstract: Highly local parallel computing and efficient memory management are emerging as key architectural concepts to continue increasing the performance of CMOS technologies despite physical limiting factors. When it comes to vision systems, these concepts gain even greater relevance due to the nature of the information to be processed and the processing itself. Images contain a massive amount of data that must usually be analyzed under strict timing and power specifications. They require, at early processing stages, local interactions between pixels that can mostly take place in parallel. A distributed memory arrangement keeping topographical image information adapts seamlessly to such interactions. These particular features of low-level image processing demand to explore, for the sake of boosting performance, architectural solutions other than those based on conventional serial schemes. The industry is also pushing in this direction with the development of standards like OpenVX calling for specialized vision hardware.
In this talk, the approach for smart imaging followed by the vision research group of the Institute of Microelectronics of Seville will be described. This approach focuses on the exploitation of the inherent characteristics of early vision as well as on an intensive use of distributed memory. Some of the latest vision chips designed by the group will be presented while highlighting the challenges to be addressed in the future. Finally, the need for a tight integration between hardware and software providing specifications at different levels will be proposed as the next step to boost the performance of vision systems.

Biography: Jorge Fernández-Berni was born in Córdoba (Andalusia, Spain) in 1981. He received the B.Eng. degree in Electronics and Telecommunication in September 2004 from the University of Seville, Spain. He then spent three and a half months at the Department of Instrumentation and Space Exploration of the Center for Astrobiology (CAB) in Madrid, Spain, granted by the Spanish National Research Council (CSIC). From January 2005 to September 2006, he was working in the telecommunication industry, first as a junior programmer developing remote database access software and later as head of department. In October 2006, he joined the Institute of Microelectronics of Seville (IMSE-CNM-CSIC) as a doctoral student, receiving the M.Sc. degree in Microelectronics in December 2008 and his Ph.D. in June 2011 with honors. He was visiting the Computer and Automation Research Institute (SZTAKI) of the Hungarian Academy of Science in Budapest for a term in 2010. There he worked in vision system integration with Professor Ákos Zarándy, current Head of the Cellular Sensory and Optical Wave Computing Laboratory. Since February 2011, he holds a part-time Assistant Professorship at the Department of Electronics and Electromagnetism (University of Seville), where he also works as a full-time post-doctoral researcher.

Personal Website: http://www2.imse-cnm.csic.es/~berni/

when

Wed. April 9th, 2014
16:00s.t.

where

Lakeside Labs
Room L4.1.114
Lakeside Science &
Technology Park B4b
9020 Klagenfurt
Austria

ALPEN-ADRIA UNIVERSITÄT
KLAGENFURT | WIEN GRAZ

Lakeside Labs
SELF-ORGANIZING NETWORKED SYSTEMS

Förderverein Technische Fakultät an der Universität Klagenfurt

TrustEYE Project
http://trusteye.aau.at