

CICLO DI SEMINARI

DOTTORATO DI RICERCA IN INGEGNERIA DELL'INFORMAZIONE

AULA DI TELEDIDATTICA, FACOLTÀ DI INGEGNERIA
MARTEDÌ 3 LUGLIO - MERCOLEDÌ 4 LUGLIO 2012

Martedì 3 Luglio 2012, ore 16:00

"Communicating and Interacting with Embedded Web Resources"

Dott. Matthias Kovatsch,
Ricercatore presso l'ETH di Zurigo (Svizzera).

Mercoledì 4 Luglio 2012, ore 9:30

"Data Gathering in Vehicular Networks"

Prof. Thierry Delot
Visiting Professor presso il centro di ricerca INRIA di Lille (Francia).

Mercoledì 4 Luglio 2012, ore 11:30

"Multi-level methods for image inpainting"

Prof. Charles K. Chui
(University of Missouri, St. Louis, e Stanford University).

Mercoledì 4 Luglio 2012, ore 14:30

"Manifold approach to high-dimensional data processing"

Prof. Charles K. Chui
(University of Missouri, St. Louis, e Stanford University).



AVVISO DI SEMINARIO

Nell'ambito delle attività del Laboratorio ARTS, **Matthias Kovatsch**, ricercatore presso l'ETH di Zurigo (Svizzera), terrà un seminario dal titolo "***Communicating and Interacting with Embedded Web Resources***".

Abstract: With the standardization of 6LoWPAN, the common Internet protocol suite is now available on resource-constrained devices. The last mile, a common application layer to build an Internet of Things (IoT), is currently addressed by drafting the Constrained Application Protocol. It allows Web-like interaction directly with tiny networked devices. This talk is about bringing the full Web experience for developers and users to the Internet of Things. The author will present several building blocks to realize this goal, which are also publicly available to build IoT applications.

Il seminario si terrà **martedì 3 luglio 2012 alle ore 16.00 in aula di Teledidattica**.

Studenti, Dottorandi, Docenti e tutti gli interessati sono benvenuti.

Per ulteriori informazioni rivolgersi al Prof. A. Iera (antonio.iera@unirc.it).

AVVISO DI SEMINARIO

Nell'ambito delle attività del progetto *Palmares: Una Internet di Oggetti Intelligenti*, finanziato dal MIUR nel contesto Cooperlink - Cooperazione Interuniversitaria Internazionale - il **Prof. Thierry Delot**, *visiting professor* presso il centro di ricerca INRIA di Lille (Francia), terrà un seminario dal titolo **"Data Gathering in Vehicular Networks"**.

Abstract: In the last decade, a number of wireless and small-sized devices (e.g., PDAs, smartphones, sensors, etc.) with increasing computing capabilities have appeared in the market at very affordable costs. Some of these equipments have started to be embedded in modern cars in the form of on-board computers, navigation devices or even multimedia centers. Today, thanks to wireless networks, two vehicles nearby (within communication range of each other) can share relevant information about various static and mobile events (e.g., an emergency braking, an available parking space, a driver exhibiting risky behavior, etc.). All these trends are motivating a great amount of research to try to develop suitable data management strategies for vehicular networks. For instance, exchanging dynamic data (i.e., data whose relevance can change very quickly) in a vehicular network has been widely studied these last years. This constitutes the building blocks for new data gathering techniques, assuming that data sources/producers are numerous (e.g., sensors embedded in the car or deployed along the roads, drivers, or even classical data sources such as web services accessible through mobile telephony networks).

In this talk, we will focus on data gathering in vehicular networks and some of the pending questions: is pushing information towards potentially interested vehicles the only solution? How to manage the competition inherent to some of the events? How can classical data sources (e.g., Web services) help?

Il seminario si terrà **mercoledì 4 luglio 2012 alle ore 09.30 in aula di Teledidattica**.

Studenti, Dottorandi, Docenti e tutti gli interessati sono benvenuti.

Per ulteriori informazioni rivolgersi alla Prof.ssa A. Molinaro (antonella.molinaro@unirc.it).

Multi-level methods for image inpainting

Charles Chui

University of Missouri-St. Louis and Stanford University

Abstract

The objective of this talk is to introduce two multi-level methods for surface completion and digital image inpainting.

Along the line of the notion of diffusion maps with some “heat kernels” as integral kernels of the operators, we apply the directional derivatives of the heat kernels with respect to the inner normal vectors (on the boundary of the hole to be filled in) as integral kernels of the “propagation” operators. Wavelet-like detail-extensions are carried out by applying multi-level propagations followed by appropriate sequent diffusions.

As a case study, Green’s functions of some “anisotropic” differential operators are used as heat kernels, and the corresponding propagation operators provide a vehicle to transport the surface (or image) data, along with some mixed derivatives, from the exterior of the hole to recover the missing data in the hole in the MRA fashion, with the propagated mixed derivative data to provide the “details”.

An error formula in terms of the heat kernels is formulated and is applied to give the exact order of approximation for the isotropic setting.

Another multi-level method is to apply orthogonal wavelets in place of tight-frames. With appropriate thresholding parameters, this approach gives even better performance, particularly when the missing data to be recovered lie in relatively narrower holes.

Manifold approach to high-dimensional data processing

Charles Chui

University of Missouri-St. Louis and Stanford University

Abstract

With the current rapid technological advancement in image data acquisition, the high demand for innovative methods to manipulate and understand large volumes of high-dimensional image data is more urgent than ever. This talk is concerned with the manifold approach to image data representation and processing, although the same approach applies to many other high-dimensional data-sets as well. Understanding of images in terms of spectral curves will be discussed in some detail, and an unsupervised data organization method, called anisotropic transform (AT), will be introduced. We shall also discuss the integration of AT with random projection for fast computation with arbitrary pre-assigned accuracy in the probability sense. Applications to be discussed include cancerous tissue detection, agricultural control, homeland security, and fast image search.

Brief Academic CV

Charles K. Chui, 2011

Charles Chui is Curators' Professor of Mathematics and Computer Science at the University of Missouri-St. Louis and Consulting Professor of Statistics at Stanford University. Before his current academic affiliations, he was Distinguished Professor of Mathematics at Texas A&M University, with joint professorship appointments in 3 other departments of 2 Colleges: Computer Science and Electrical Engineering (of the Engineering College), and Statistics (of the Arts and Sciences College).

To serve the Mathematics community, Charles is co-Founder and co-Editor-in-Chief (with Raphy Coifman of Yale and Ingrid Daubechies of Princeton, now at Duke) of "Applied and Computational Harmonic Analysis" (ACHA), a highly competitive Mathematics journal, with current impact factor of 3.144. In addition, Charles currently serves or has served on the Editor Board of over 10 Mathematics journals, and as Editor-in-Chief of 3 book series (published by Academic Press, World Scientific, and Elsevier, respectively). He is also the Founding Editor-in-Chief of Advances in Mathematical and Engineering Sciences (AMES), a book series co-published by Atlantis Publisher and Springer. His recent service to the Mathematics societies was Chair of the 2010 George Polya Prize Selection Committee for SIAM.

Charles is author or co-author of over 300 journal papers, 9 books (with 4 published by Springer, 2 by SIAM, 1 by Taylor and Francis, 1 by Brooks-Cole, and a popular research monograph, "An Introduction to Wavelets", with over 2,500 citations, published by Academic Press and translated into 3 foreign languages: Chinese, Japanese, and Russian. He has also edited or co-edited over 40 book volumes, and is an inventor of 40 issued and 2 pending U.S. patents. His research interests and contributions range from Function Theory to Multivariate Splines, from Information Theory to Signal and Image Processing, from Computer Graphics to Data Analysis, and from Wavelets to Mathematics of Imaging. His current and past research effort is or has been supported by the U.S. Army Research Office, the National Science Foundation, Air Force Research Laboratories, Army Research Laboratories, Naval Research Laboratories, Panama City Naval Warfare Center, DARPA, NGA, as well as several industrial grants from Texas Instruments, General Motors, Boeing, EDS, HARC, and E-System.

Over his academic career, Charles has guided or is currently guiding 21 Ph.D. students, with 15 in Mathematics, 3 in Electrical Engineering, and 3 in Computer Science, as well as over 20 Post-Docs and Visiting Scholars. Among his numerous awards and honors, he was the 1981 and 1994 University Faculty Distinguished Research Achievement Award recipient, presented by the Former Students Association of Texas A&M University, and is an elected Life Fellow of IEEE. In addition, Charles was a Plenary Speaker in over 40 International Conferences, Workshops, and Society Meetings, and has delivered 3 invited Public Lectures in the past, including the prestigious "Twenty-sixth Annual Shanks Lecture" at Vanderbilt University on May 18, 2011. <http://www.math.vanderbilt.edu/~Nashville2011/>