

『 Tsinghua Information Forum #110- SAMSUNG #8 』



- **Title:** Cognitive Fault Detection in Sensor Networks
- **Speaker :** Cesare Alippi
Professor, IEEE Fellow
Politecnico di Milano
- **Time:** 10 July., 2013 16: 00-17: 30
- **Venue:** 1-312, FIT Building

Abstract :

Availability and usability of data coming from a process/environment, e.g., those generated by a sensor network, introduce serious issues about their quality. In fact, not rarely acquired measurements are affected by sensor aging and faults which might introduce errors impacting on the correctness of the subsequent decision making process. The ability to detect faults is a mandatory step, which cannot be underestimated or neglected in real deployments.

In this direction, Fault Diagnosis Systems (FDS) are tools designed to supervise a process operation in order to detect, isolate and identify potential faults and, possibly, design accommodation actions.

However, most FDS assume that some of -not necessarily amenable- hypothesis are satisfied, e.g., a description for the process is available; the system model is linear; a fault dictionary containing the fault signatures is provided; the nature of the fault profile and its development are known.

Current research in machine learning aims at removing/weakening the above assumptions so that FDS can be designed directly from available data, possibly within a cognitive framework.

The talk will focus on aspects related to the design of cognitive FDSs for sensor networks able to discriminate between faults, changes in the environment and model bias within an evolving framework.

Biography :

Cesare Alippi received the Dr.Ing. degree in electronic engineering (summa cum laude) in 1990 and the Ph.D. degree in computer engineering in 1995, both from Politecnico di Milano, Milan, Italy. He has been a visiting researcher at the University College London, London, U.K., the Massachusetts Institute of Technology, Cambridge, USA, the École Supérieure de Physique et de Chimie Industrielles, France, the University of Lugano, Switzerland, and the Chinese Academy of Sciences, China.

Alippi was a research scientist of the Italian National Research Council (1996-98), then Reader and Associate Professor at Politecnico di Milano. Since 2002, he has been a Full Professor in Information Processing Systems at the same institution.

Cesare is a Fellow of the IEEE, Vice President for Education of the IEEE Computational Intelligent Society –CIS-, Adcom member of the CIS (2012-2014), Chair of the Awards Committee of the CIS (2012), Associate Editor of the IEEE-TNN (2004-2011), Associate Editor of the IEEE-TIM (2003-2010), Chair of the IEEE CIS NNTC (2008-2010) and chair and member of many other IEEE Committees among which the IEEE Rosenblatt award (2011-2013), the IEEE CIS Research grant sub-committee (2011), the CIS awards Committee (2009-10) and the CIS Subcommittee for Outstanding Early Career Award (2011).

In 2004 he received the IEEE Instrumentation and Measurement Society Young Engineer Award; in 2011 he has been awarded Knight of the Order of Merit of the Italian Republic; in 2013 he was awarded the IBM Faculty Award. Among many other conferences, he has been conference chair of IEEE International Joint Conference on Neural Networks, IJCNN12, Brisbane, and will be the program chair of IEEE IJCNN14, Beijing (RC) and General Program Chair of IEEE SSCI 2014, Orlando (USA).

Current research activity addresses adaptation and learning in non-stationary and evolving environments and Intelligent Embedded Systems. Research is also carried out on the industrial front with several well known companies.

Alippi holds 5 patents and has published about 200 papers in international journals and conference proceedings.