

Dec 2016 Complexity Community Sharing Session

9 Dec 2016 (Fri) 11:00am-01:00pm

Seminar Room 102

(opposite Learning Hub), Blk 1 Innovation Centre, Level 1
16 Nanyang Drive, Singapore 637722



Assoc Prof. Andrea Nanetti

Complexity History. Provenance and Validation as Key Issues in Reloading the Treasure of Human Experiences in an AI Perspective

The treasure of human experiences (big) data are embedded & embodied in artefacts & media created to encode knowledge and values for better utilising them in the present and transmitting to the future generations. Thus artefacts & media are knowledge aggregators of human experiences. We call them "THE data", or "Treasure of Human Experiences data", which is the most valuable component of what called heritage (i.e. what may be inherited). I present the discourse developed at NTU (CI, ADM, and SPMS) with Microsoft Research between 2014 and today. My team and I believe that neglecting the human experiences makes us impoverished, less prepared to the uncertainty and increasing complexity of the future. We foresee the need of a formal science of heritage, that investigates & pioneers integrated action plans & solutions towards the challenges of an increasingly complex society, and answer the question: "What kind of heritage should our society take care of, and how can it be safeguarded & transmitted?" In the context of data & computer science, the question would be: How can the present human experiences become what might be inherited by machine learning & algorithms to explain the present ties and illustrate potential future scenarios and visions? To decode them and extract THE data, we propose to train machine learning (which allows algorithms to learn through experience, and do things that we are not able to program) in the observation of how scholars used methodologies and ontologies of traditional disciplines to deal with their subjects of investigation (e.g. palaeography, diplomatics, codicology, philology, linguistics, epigraphy, numismatics, heraldry, history, art history, archaeology, anthropology, semiotics). In this process, provenance and validation are seen as the key to solve (algorithmically?).

Biography: Dr. Andrea Nanetti undertook Medieval & Renaissance studies 1986 - 2000 in Italy (University of Bologna), France (University of Paris), Germany (University of Cologne), Greece (National Hellenic Research Foundation), and USA (Brown University). He started his research in historical studies at the advent of computer operating systems with graphical user interface. He has always been fascinated by the interdependencies between artificial actions and computational operations. With this interest, he proposes the theoretical need to direct traditional disciplinary knowledge towards a formal science of heritage which focuses on how data and information may be inherited by machine learning algorithms. Between 1996 and today, the results have been made available in 13 books, 5 edited books, 10 e-publications, 1 cloud computing based management system for historical sources, 11 exhibitions, 37 major international events, 4 videos, and 55 other refereed academic publications multi languages, in three main areas of: global histories of intercontinental networks of cities, national art-heritage-politics dynamics, territorial human-heritage-landscape systems, and biocultural heritage & human interpretation of the external world. He is an Assoc. Prof. of School of Art, Design & Media, and Senior Research Member of NTU Complexity Institute, and Senior Assoc. Researcher of European Centre for Living Technologies, University of Venice Ca' Foscari. See: www.andreananetti.com



Asst. Prof. Roland Bouffanais

Collective dynamics of swarms in the presence of conflicting external signals

Consensus and cooperation in networked multi-agent systems is a topic that is starting to receive significant attention in control theory and distributed computing owing to numerous possible engineering applications. For instance, the power grid, urban traffic, arrays of distributed sensors, multi-robot systems, and social networks are various examples of collective systems requiring an effective response to local perturbations. Using the linear time-invariant system theory, we present some unexpected features arising in the collective dynamics of swarming systems in the presence of conflicting external signals.

Biography: Roland Bouffanais is an assistant professor at the Singapore University of Technology and Design (SUTD). He has been a postdoctoral fellow and associate at MIT after completing his Ph.D. at the Swiss Federal Institute of Technology in Lausanne (EPFL). Bouffanais' research group – the Applied Complexity Group – focuses on both fundamental and applied interdisciplinary problems rooted in the field of complexity, with funding support from various sources including the NRF, MINDEF, SMART and the SUTD-MIT International Design Center. For more information: <http://people.sutd.edu.sg/acg/>