CASS Conference Close Report

1. Overview of the technical program: number of tracks, regular sessions, special sessions, tutorials, live demos, keynotes, associated workshops, etc.

There were 4 keynote speakers:

Vincenzo Loia
Chair Professor
Department of Management and Innovation Systems
University of Salerno
Italy
Email: loia@unisa.it
Website: http://www.unisa.it/docenti/vincenzoloia/index

Dr. Vincenzo Loia received B.S. degree in computer science from University of Salerno , Italy in 1985 and the M.S. and Ph.D. degrees in computer science from University of Paris VI, France, in 1987 and 1989, respectively. From 1989 he is Faculty member at the University of Salerno where he teaches Safe Systems, Situational Awareness, IT Project & Service Management. His current position is as Chair and Professor of Computer Science at Department of Management and Innovation Systems. He is the coeditor-in-chief of Soft Computing and the editor-in-chief of Ambient Intelligence and Humanized Computing, both from Springer. He is an Associate Editor of various journals, including the IEEE Transactions on System, Man and Cybernetics: Systems; IEEE Transactions on Fuzzy Systems; IEEE Transactions on Industrial Informatics; IEEE Transactions on the IEEE Transactions on Cognitive and Developmental Systems.

His research interests include soft computing, agent technology for technologically complex environments Web intelligence, Situational Awareness He was principal investigator in a number of industrial R&D projects and in academic research projects. He is author of over 390 original research papers in international journals, book chapters, and in international conference proceedings. He hold in the last years several role in IEEE Society in particular for Computational Intelligence Society (Chair of Emergent Technologies Technical Committee, IEEE CIS European Representative, Vice-Chair of Intelligent Systems Applications Technical Committee).

City-scale Decision Making by Granular Situation Awareness

Abstract - Situation Awareness is usually defined in terms of what information is important for a particular job or goal. The Situation Awareness paradigm can represent a solution to such issues: "Moving away from many different platforms that provide different pieces of information to city stakeholders and toward one dashboard where they are able to keep track of what is really happening without tracking multiple independent systems" from * Situational Awareness in a Smart City: Lessons Learned from Aviation and Public Safety.

Situations must be recognized (after perceiving features coming from the environment and comprehending what is happening), in general, in uncertainty conditions and within complex and critical environments. After such identification, the situations are projected ahead on the timeline in order to predict future situations and acting accordingly to support decision making processes (accomplished by human operators).

Therefore, it is needed an effective hybridization of the human component with the technological (automatic) component to succeed in tasks related to Situation Awareness. To answer these issues, we propose a Cognitive Architecture, for defining Situation Awareness oriented systems, that is defined by starting from the well-known Endsley's Model and integrating a set of Computational Intelligence techniques to support the three main processes of the model (perception, comprehension and projection).

The proposed overall approach is based on the paradigm of Granular Computing, is enabled by both a multi-agent infrastructure and a solid Semantic Representation Layer and, lastly, provides learning and adaptation capabilities by means of Reinforcement Learning algorithms. Granular Computing makes information observable at different levels of granularity and approximation to allow humans to focus on specific details, overall picture or on any other level with respect to their specific goals, constraints, roles, characteristics and so on. Multi-agent Infrastructure and Semantic Representation Layer provide a solution to face the complexity and heterogeneity of the monitored environment and the capability to represent, in a machine-understandable way, procedural, factual and other kind of knowledge and all the memory facilities that could be required. Reinforcement Learning is used to adapt goal selection and proposition by exploiting implicit and explicit feedback of human operators.

Practical experiences deriving from the realization of complex systems in the domain of Smart Cities, and in particular, Safe Cities will be presented during the talk.

Geoffrey Charles Fox
https://www.engineering.indiana.edu/
http://www.dsc.soic.indiana.edu/
gcf@indiana.edu

Fox received a Ph.D. in Theoretical Physics from Cambridge University where he was Senior Wrangler. He is now a distinguished professor of Engineering, Computing, and Physics at Indiana University where he is director of the Digital Science Center, and both Department Chair and Associate Dean for Intelligent Systems Engineering at the School of Informatics and Computing. He previously held positions at Caltech, Syracuse University, and Florida State University after being a postdoc at the Institute for Advanced Study at Princeton, Lawrence Berkeley Laboratory, and Peterhouse College Cambridge. He has supervised the Ph.D. of 70 students and published around 1200 papers (over 400 with at least 10 citations) in physics and computing with an hindex of 74 and over 30000 citations. He is a Fellow of APS (Physics) and ACM (Computing) and works on the interdisciplinary interface between computing and applications.

Big Data and High-Performance Technologies for Natural Computation

Abstract - We examine the current state of Big Data and High-Performance Computing (HPC) and its significance for large-scale machine learning. We cover hardware and software systems with applications including deep learning and the deterministic annealing approach to both clustering and dimension reduction. We analyze results on machines with up to 1,000-10,000 cores and extrapolate to larger systems. The software model is built around the Apache Big Data Stack with HPC enhancements. The tension between HPC and cloud systems is explored stressing need for interoperable approaches

Swagatam Das
Electronics and Communication Sciences Unit
Indian Statistical Institute
Kolkata, India

Swagatam Das is currently serving as a faculty member at the Electronics and Communication Sciences Unit of the Indian Statistical Institute, Kolkata, India. His research interests include machine learning, optimization, and their interplay. Dr. Das has published one research monograph, one edited volume, and more than 250 research articles in peer-reviewed journals and international conferences. He is the founding co-editor-in-chief of Swarm and Evolutionary Computation , an international journal from Elsevier. He has also served as or is serving as the associate editors of several reputed international journals including some of the IEEE Transactions and Magazines. He is an editorial board member of Progress in Artificial Intelligence (Springer), PeerJ Computer Science, and Engineering Applications of Artificial Intelligence. Dr. Das has 10000+ Google Scholar citations and an H-index of

49 till date. He has been associated with the international program committees and organizing committees of several regular international conferences including IEEE CEC, IEEE SSCI, SEAL, GECCO, and SEMCCO. He has acted as guest editors for special issues in journals like IEEE Transactions on Evolutionary Computation, ACM Transactions on Adaptive and Autonomous Systems, and IEEE Transactions on SMC, Part C. He is the recipient of the 2012 Young Engineer Award from the Indian National Academy of Engineering (INAE). He is also the recipient of the 2015 Thomson Reuters Research Excellence India Citation Award as the highest cited researcher from India in Engineering and Computer Science category between 2010 to 2014.

Title: Evaluating the Evolutionary Algorithms for Continuous Optimization - Modern Performance Measures and the (Non-parametric) Statistical Perspectives

Abstract – Numerous metaheuristics have been proposed over the years for solving optimization problems involving continuous search spaces. However, whether these algorithms will survive in the long run or whether their names will remain stipulated within the world of paper writing - this issue largely depends on the ease of implementation and efficiency in solving practical optimization problems. Most of the pioneering papers on metaheuristics generally exhibit the efficiency of the algorithm on a set of synthetic benchmark functions which are supposed to capture the different aspects of the real world optimization problems. This talk will focus on the benchmarking procedures adopted for comparing different metaheuristics meaningfully. The talk will elaborate on modern performance measures, design of experiments and provide some guidelines for selecting the suitable metaheuristic for solving a domain-specific problem. It will also discuss some recent non-parametric hypothesis test procedures to evaluate the comparative results. Finally some shortcomings of the modern statistical benchmarking procedures will be highlighted along with the discussion on some important future research directions.

Zidong Wang
Professor of Computing
Brunel University London
UK

Zidong Wang is an IEEE Fellow and Professor of Computing at Brunel University London with research interests in intelligent data analysis, statistical signal processing as well as dynamic systems and control. He has been named as the Hottest Scientific Researcher in 2012 in the area of Big Data Analysis (see http://sciencewatch.com/articles/hottest-research-2012). He has been listed as a Highly Cited Researcher in both computer science and engineering science for three consecutive years 2014-2016 He was awarded the AvH Research Fellowship in 1996 from the Alexander von Humboldt Foundation of Germany, the JSPS Research Fellowship in 1998 from the Japan Society for the Promotion of Science and the William Mong Distinguished Research Fellowship in 2002 from the University of Hong Kong. Since 1997, He has published around 400+ papers in prestigious international journals (including 110 papers in IEEE Transactions) with h-index 81 according to the Web of Science. He is currently serving as the Editor-in-Chief for Neurocomputing, the Co-Editor for International Journal of Systems Science and an Associate Editor for 10 prestigious journals including 5 IEEE Transactions. His research has been funded by the EU, the Royal Society and the EPSRC of the UK.
.

Title: Intelligent data analysis: big vs bad

Abstract – In this talk, we discuss another side of big data analysis, bad data analysis, where the badness means the complexities resulting in the reproducibility issues. Some background knowledge is first introduced on the volatility of the big data analysis, which shows 1) “big” does not necessarily mean “better” and 2) the so-called multi-objective data analysis (against badness) is vitally important in advancing the state-of-the-art. Two examples are used for demonstration of the big data analysis, one for big data from complex networks and the other for big data from gene expression image processing. Finally, conclusions are drawn and some future directions are pointed out.

There were 12 oral sessions (11 regular sessions and 1 special session) and 6 poster sessions.

There 2 special session proposed on big data and the accepted special session papers were organized into 1 oral session and posters. The sessions were not organized into tracks and there were no tutorials, demos, or workshops.

2. Number of submitted papers: 1192
2.1: Regular Sessions: 721
2.2: Special Sessions: 471
2.3: Live demos: 0

3. Number of accepted papers: 517
3.1: Oral presentations: 127
3.2: Posters: 390
3.3: Special Sessions Papers: 32 oral presentations + 126 poster presentations (included in 3.1 and 3.2)
3.4: Live demos: 0

4. Total Number of accepted papers per category: (total 517)
4.1: Academia: 489
4.2: Industry: 28
4.3: Students: 201 (included in 4.1: Academia: 489)

5. Total Number of participants: 454
5.1: Academia: 428
5.2: Industry: 26
5.3: Students: 186 (included in 5.1: Academia: 428)

6. Budget summary (please attach the final budget to the report):
6.1: Registration fees per category: CASS members 480, IEEE members 480, Non members 520, Students 480, Reduced rates 480
6.2: Total revenue: 24,8160
6.3: Total expenses: 17,8052
6.4: Surplus: 70,108

7. Comments to improve next editions.

More efforts will be put into attracting industrial participations, for example, by directly contacting possible companies that may be interested.