



Summer School on Computational Intelligence and Applications (SSoCIA)

1. INTRODUCTION

Summer School on Computational Intelligence and Applications was developed as co-located event of the IEEE Latin American Conference on Computational Intelligence (IEEE LA-CCI 2016). This proposal was implemented to offer different activities at diverse levels for students, professionals, practitioners, researchers and, in general, people with interests on Computational Intelligence (CI). At the same time, resources provided by Computational Intelligence Society (CIS) were optimized when both events were developed, using the same location and other logistic necessities. Some lecturers acted in both activities, spreading to more people the new tendencies of CI.

For attendees, this proposal allows to share unrepeatable moments to make questions, drink a cup of coffee with colleagues and expand more the contacts networks around CI. All assistants, from students to fellow researchers, enjoy the SSoCIA and IEEE LA-CCI with academic, social and touristic activities in Cartagena, close to the Caribbean Sea.

SSoCIA was composed by six plenary talks, shared with the IEEE LA-CCI and six tutorials: three with international lecturers (all from IEEE CIS) and three local lecturers. Other shared activities with the conference were: a short welcome reception with a cup of wine, a social activity, a poster session and a panel with specialists in CI of the world.

In total, eighty people made registration for both events: 53 for IEEE LA-CCI 2016, 9 lecturers and members of the organizing committee and 18 people for SSoCIA. This last number can be divided in ten paid assistants and eight grants. In spite of the number of people addressed for the SSoCIA, room dedicated to the tutorials was crowded, with 25 people as minimum. A good quantity of people that was attending IEEE LA-CCI was interested on activities of the summer school.

Poster session was an important activity. IEEE LA-CCI had a contest for postgraduate thesis, which had a final decision based on poster presentation of these works. This show possibilities in topics about CI, for future research projects, which new students can be involved.

Next, details about SSoCIA will be presented, showing titles and abstracts of the plenary talks, tutorials, program of the event, participants and so on. Finally, some conclusions and recommendations about the present proposal are described.

2. PLENARY TALKS

	<p align="center">Big Data Analysis using Deep Learning and Information Theoretical Learning: Applications to Time-Domain Astronomy</p> <p align="center">Pablo A. Estévez, Ph.D Department of Electrical Engineering, University of Chile, and Millennium Institute of Astrophysics, Chile President of the IEEE Computational Intelligence Society (2016-2017)</p>
	<p align="center">Intelligence in the cyber-physical revolution</p> <p align="center">Cesare Alippi, PhD. Politecnico di Milano, Italy and Università della Svizzera Italiana, Switzerland</p>
	<p align="center">State-of-the-Art Many-Objective Evolutionary Algorithms For Optimization</p> <p align="center">Gary G. Yen, Ph.D, Regents Professor, FIEEE, FIET Oklahoma State University School of Electrical and Computer Engineering</p>
	<p align="center">The role of AI/CI in this new human revolution and potential in Latin America</p> <p align="center">Fernando Buarque de Lima Neto. Ph.D University of Pernambuco, Brazil</p>
	<p align="center">Computational Intelligence Technologies for Smart Grid Monitoring and Control</p> <p align="center">G. Kumar Venayagamoorthy, PhD, MBA, FIET, FSAIEE, SMIEE Clemson University</p>
	<p align="center">Deep learning: the rebirth of neural networks</p> <p align="center">Fabio A. González. PhD. Universidad Nacional de Colombia</p>

Big Data Analysis using Deep Learning and Information Theoretical Learning: Applications to Time-Domain Astronomy

Pablo A. Estévez, Ph.D

Astronomy is facing a paradigm shift caused by the exponential growth of the sample size, data complexity and data generation rates of new sky surveys. To cope with a change of paradigm to data-driven astronomy new computational intelligence, machine learning and statistical approaches are needed. In this talk first I will introduce the current and future big data challenges in astronomy. I will present two main applications. The first is to discriminate periodic versus non-periodic light curves, and then estimate the period of the periodic ones. Light curves are one-dimensional time series of the brightness of a star versus time. We have developed several methods based on the correlation function (generalized correlation using information theoretical learning concepts), which outperforms

conventional approaches. Results using tens of millions light curves will be presented. The second application is the automated real-time transient detection in astronomical images. The aim is to achieve real-time detection of supernovae and other transients with the Dark Energy Camera. A novel transient detection pipeline was developed. We have been applying convolutional neural nets to discriminate between true star-like transients and bogus transients. Other techniques have been applied too, for example non-negative matrix factorization combined with random forests. Results using 1.5 million images will be presented. The new pipeline was successfully tested online in February 2015 finding more than 60 supernovae in a few days of observation. We are also developing an extended Kalman filter based on correntropy to preprocess the images discarding unwanted objects such as cosmic rays and asteroids.

Intelligence in the cyber-physical revolution

Cesare Alippi, PhD.

Politecnico di Milano, Italy and Università della Svizzera Italiana, Switzerland

The emergence of non-trivial embedded sensor units and cyber-physical systems has made possible the design and implementation of sophisticated applications where large amounts of real-time data are collected, possibly to constitute a big data picture as time passes. Within this framework, intelligence mechanisms play a key role to provide systems with advanced functionalities. Intelligent mechanisms are needed to guarantee appropriate performances within an evolving, time invariant environment, optimally harvest and manage the residual energy, identify faults within a model-free framework, solve the compromise between output accuracy and computational complexity.

The talk will show how the above aspects of intelligence are needed to boost the next generation of cyber-physical-based and Internet of Things applications, generation whose footprint is already around us.

State-of-the-Art Many-Objective Evolutionary Algorithms For Optimization

Gary G. Yen, Ph.D, Regents Professor, FIEEE, FIET

Evolutionary computation is the study of biologically motivated computational paradigms which exert novel ideas and inspiration from natural evolution and adaptation. The applications of population-based heuristics in solving multiobjective optimization problems have been receiving a growing attention. To search for a family of Pareto optimal solutions based on nature-inspiring problem solving paradigms, Evolutionary Multiobjective Optimization Algorithms have been successfully exploited to solve optimization problems in which the fitness measures and even constraints are uncertain and changed over time.

When encounter optimization problems with many objectives, nearly all designs performs poorly because of loss of selection pressure in fitness evaluation solely based upon Pareto optimality principle. This talk will survey recently published literature along this line of research- evolutionary algorithm for many-objective optimization and its real-world applications. In particular, focus will be placed on the design of selection strategy, including mating selection and environmental selection. We will show the design of a coordinated selection strategy to improve the performance of evolutionary algorithms in many-objective optimization. This selection strategy considers three crucial factors: 1) the new mating selection criterion considers both the quality of each selected parent and the effectiveness of the combination of selected parents; 2) the new environmental selection criterion directly focuses on the performance of the whole population rather than single individual alone, and 3) both selection strategies are complement to each other and the coordination between them in the evolutionary process can achieve a better performance than each of them used

individually. Based on performance metrics ensemble, we will provide a comprehensive measure among all competitors and more importantly reveal insight pertaining to specific problem characteristics that the underlying evolutionary algorithm could perform the best.

The role of AI/CI in this new human revolution and potential in Latin America

Fernando Buarque de Lima Neto. Ph.D

"During the World Economic Forum of Davos, early this year, Klaus Schwab (one of the founders and coordinators of the Davos Forum), today one of the leading futurologist through his seminal book "The Fourth Industrial Revolution" (http://www3.weforum.org/docs/Media/KSC_4IR.pdf), also points in the direction of a mega-trend and prominent role for IA. According to him, a revolution yet unnamed, greater than the information is forming and that smart technologies, as well as the computer was seminal to the information revolution, will be the new mainstay. In line with that, one just need to observe the increasing volume of journals, conferences, technical and scientific books dedicated to Artificial Intelligence. It is remarkable, in particular, the number of times that global magazines recently put the issue IA in its first pages: Nature (01/28/2016) New Scientist (3/26/2016), Science (17.07.2015), the Economist (09/05/2015) and the list goes on, at length. Another interesting indicator coming out from Davos is the estimate for markets of AI & Robotics for 2017, a mind boggling US \$ 137 billion. In this talk we are going to analyze consequences of that, especially for Latin America Countries".

Computational Intelligence Technologies for Smart Grid Monitoring and Control

G. Kumar Venayagamoorthy, PhD, MBA, FIET, FSAIEE, SMIEE

The electric power grid of the near-future has to evolve into a very complex adaptive and reconfigurable system under semi-autonomous distributed control. Its spatial and temporal complexity, non-convexity, non-linearity, non-stationarity, variability and uncertainties exceed the characteristics found in today's traditional power system. The distributed integration of variable sources of energy and electric vehicles (EVs) in a smart grid further adds complexity and challenges to its modeling, control and optimization. Innovative technologies are needed for a smart grid to handle the growing complexity, stochastic bidirectional optimal power flows, and maximization of penetration of renewable energy and utilization of available energy storage including PEVs.

Smart grids will need to be monitored intelligently to maintain stability, security, reliability and economical and environmental efficiency under normal and abnormal operating conditions and disturbances. A combination of capabilities for forecasting, predictive state estimation, dynamic power flow, system optimization, cybersecurity and solution practicability verification and validation will be necessary. The secure optimization and control systems for a smart grid environment will require dynamic information and computational capabilities to handle the uncertainties and variability that exist. Intelligent technologies needed for sense-making, situational awareness/intelligence, decision-making, control and optimization in a smart grid environment will be presented in this talk.







Deep learning: the rebirth of neural networks

Fabio A. González. PhD

Deep learning has revolved machine learning and computational intelligence landscapes. Deep neural network models (i.e. with a high number of layers) have shown outstanding performance in different learning, perception and data analysis tasks in areas as diverse as computer vision, speech recognition

and natural language understanding. This talk will present the foundations of deep learning models as well as several applications in different areas. Also it will discuss some of the local research work in the topic.

3. TUTORIALS

	<p>Neural networks: what did we learn from the theory and where are we going? Cesare Alippi, PhD. Politecnico di Milano, Italy and Università della Svizzera Italiana, Switzerland</p>
	<p>Introduction to Data Mining Carlos Alberto Cobos Lozada. PhD. Universidad del Cauca</p>
	<p>Evolutionary Many-Objective Optimization Algorithms Gary G. Yen, Regents Professor, FIEEE, FIET Oklahoma State University School of Electrical and Computer Engineering</p>
	<p>Interactive dimensionality reduction Diego Hernán Peluffo-Ordóñez. PhD. Universidad Técnica del Norte</p>
	<p>Computational intelligence applications in Smart grid operations G. Kumar Venayagamoorthy, PhD, MBA, FIET, FSAIIEE, SMIEE Clemson University</p>
	<p>Recurrent Neural Networks and Natural Language Processing Tutorial Fabio A. González. PhD. Universidad Nacional de Colombia</p>

TUTORIAL 1:

Neural networks: what did we learn from the theory and where are we going?
 Cesare Alippi, PhD.
 Politecnico di Milano, Italy and Università della Svizzera Italiana, Switzerland

Many of us have been practicing with artificial neural networks for decades, some others have started after convolutional neural networks and deep learning showed their amazing impact on applications. Some others are following the Big data and data analytics mood. Feedforward, recurrent, spiking, convolutional neural networks represent valid alternatives for many applications with the complexity of the model family and the learning procedure fully justifying both further investigation and neural accelerators.

What's beyond the plug-and-play magic? And what about the satisfaction of some hypotheses we do make to have the theory amenable?

TUTORIAL 2:

Introduction to Data Mining

PhD. Carlos Alberto Cobos Lozada
Universidad del Cauca

In this tutorial, participants are going to be introduced into main tasks and techniques of data mining, including: classification, clustering and association rules. A practical example will be developed using Weka (a free data mining tool) and RapidMiner.

TUTORIAL 3:

Evolutionary Many-Objective Optimization Algorithms

Gary G. Yen, Regents Professor, FIEEE, FIET
Oklahoma State University
School of Electrical and Computer Engineering

Evolutionary computation is the study of biologically motivated computational paradigms which exert novel ideas and inspiration from natural evolution and adaptation. The applications of population-based heuristics in solving multiobjective optimization problems have been receiving a growing attention. To search for a family of Pareto optimal solutions based on nature-inspiring problem solving paradigms, Evolutionary Multiobjective Optimization Algorithms have been successfully exploited to solve optimization problems in which the fitness measures and even constraints are uncertain and changed over time. When encounter optimization problems with many objectives, nearly all designs performs poorly because of loss of selection pressure in fitness evaluation solely based upon Pareto optimality principle. This talk will survey recently published literature along this line of research- evolutionary algorithm for many-objective optimization and its real-world applications. Based on performance metrics ensemble, we will provide a comprehensive measure among all competitors and more importantly reveal insight pertaining to specific problem characteristics that the underlying evolutionary algorithm could perform the best. The experimental results confirm the finding from the No Free Lunch theorem: any algorithm's elevated performance over one class of problems is exactly paid for in loss over another class.

TUTORIAL 4:

Interactive dimensionality reduction

Dr. Diego Hernán Peluffo-Ordóñez
Universidad Técnica del Norte

The objective of this emergent research area is to link the field of dimensionality reduction (DR) with that of information visualization (IV), in order to harness the special properties of the latter within DR frameworks. In particular, the properties of controllability and interactivity are of interest, which should make the DR outcomes significantly more understandable and tractable for the (no-necessarily-expert) user. These two properties allow the user to have freedom to select the best way for representing data. In this workshop, an interactive model based on a linear combination of kernel matrices will be explained. Also, a generalized kernel framework for DR as well as kernel representations of DR methods will be studied.

TUTORIAL 5:

Computational intelligence applications in Smart grid operations

G. Kumar Venayagamoorthy, PhD, MBA, FIET, FSAIEE, SMIEE
Clemson University

With the emerging innovations to the electricity infrastructure (referred to as the smart grid), high levels of penetration of renewable energy, and an emphasis on competitive pricing, it will become necessary to optimize the safety margins presently allowed, and use existing equipment as optimally as possible. Maintaining reliable service and implementing emergency defense plans during major unintended disturbances and intended attacks is critical with the growth of the electric power network and its information infrastructure. The development of reliable and scalable intelligent monitoring and control algorithms, and situational awareness and intelligence technologies are needed as the smart grid is embracing synchrophasor measurement data for operation analysis, making-decisions and implementing controls.

Situational awareness (SA) is the perception of elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future. Situational intelligence (SI) is seeing ahead how the situations will unfold over time. The report on the Northeast Blackout on August 14, 2003, shows that it was difficult to get reliable information from the state estimation software/simulations, contingency analysis results, and critical status of power lines relating to the status of systems outside of the individual areas. Intelligent sense-making is essential for maintaining and enhancing the stability, security and safety of smart grid.

Data obtained from synchronized phasor measurement units (PMUs) installed at the transmission system buses can contain measurements including several voltage and current phasors (each of which has magnitude and phase angle), frequency as well as other analog and digital signals and status flags. Problems in power system data analytics starts at data acquisition all the way up to knowledge discovery. The problems are associated with heterogeneity, multiple timescales, scalability, timeliness, and complexity of data that impedes the ability of current technologies to effectively utilize them.

The objective of this tutorial is to expose system operators, engineers and researchers from the industry, academia and government to what is situational awareness (SA), when and why it is needed in control center operations, and the recent advances and on-going research in the development of SA/SI systems for smart grid control centers.

TUTORIAL 6:

Recurrent Neural Networks and Natural Language Processing Tutorial

Fabio A. González. PhD.
Universidad Nacional de Colombia

4. INFORMATION ABOUT REGISTRATION

Registration

Class of Registration		Registration Fees	
R5	IEEE Member	COP\$350.000	Around USD120
R6	IEEE Non Member	COP\$470.000	Around USD160

Registration Includes:

- Participant Kit (Badge, Pencil, Notebook)
- Lunchs
- Coffee Breaks
- Certificate
- Access to plenary conferences of the IEEE LA-CCI 2016

Contact:

This Summer School is co-located with the IEEE Latin America Conference on Computational Intelligence LA-CCI 2016

[http://la-cci.org/school-lasci/
lacci2016@ieee.org.co](http://la-cci.org/school-lasci/lacci2016@ieee.org.co)
dorjuela@ieee.org

5. PROGRAM

Time/Day	November 2nd	November 3rd	November 4th
8:30 - 9:00		Intelligence in the cyber-physical revolution Cesare Alippi Ph.D Politecnico di Milano, Italy and Università della Svizzera Italiana, Switzerland	State-of-the-Art Many-Objective Evolutionary Algorithms For Optimization Gary Yen Ph.D Oklahoma State University
9:00 - 10:00	Opening Registration		
10:00 - 10:20	Opening Ceremony	Computational Intelligence Technologies for Smart Grid Monitoring and Control Kumar Venayagamoorthy Ph. D Clemson University	The role of AI/CI in this new human revolution and potential in Latin America Fernando Buarque Ph. D University of Pernambuco
10:30 - 11:00	Big Data Analysis using Deep Learning and Information Theoretical Learning: Applications to Time-Domain Astronomy Pablo Estevez Ph.D University of Chile	Coffee Break	Coffee Break
11:00 - 11:20	TUTORIAL 1:	TUTORIAL 3:	TUTORIAL 5:
11:20 - 13:00	Neural networks: what did we learn from the theory and where are we going? Cesare Alippi Ph.D Politecnico di Milano, Italy and Università della Svizzera Italiana, Switzerland	Evolutionary Many-Objective Optimization Algorithms Gary Yen Ph.D Oklahoma State University	Computational Intelligence Applications in Smart Grid Operations Kumar Venayagamoorthy Ph. D Clemson University
13:00 - 14:00	Lunch	Lunch	Lunch
14:00 - 16:00	TUTORIAL 2: Introduction to Data Mining Carlos Cobos Ph.D Universidad del Cauca	TUTORIAL 4: Recurrent Neural Networks and Natural Language Processing Tutorial Fabio Gonzales Ph.D Universidad Nacional de Colombia	TUTORIAL 6: Interactive dimensionality reduction Diego Peluffo Ph.D Universidad Técnica del Norte
16:00 - 16:30	Coffee Break	Coffee Break	Coffee Break
16:30 - 18:00	Deep learning: the rebirth of neural networks Fabio Gonzales Ph.D Universidad Nacional de Colombia	Poster Session	Panel
18:00	Welcome Reception	Meeting Steering Committee LA-CIS	Closing Ceremony
19:30	Gala Dinner	Social Activity	

6. ABOUT LECTURERS

International lecturers:

Pablo A. Estévez (M'98–SM'04) received his professional title in electrical engineering (EE) from Universidad de Chile, in 1981, and the M.Sc. and Dr.Eng. degrees from the University of Tokyo, Japan, in 1992 and 1995, respectively. He is a Full Professor with the Electrical Engineering Department, Universidad de Chile, and former Chairman of the EE Department in the period 2006-2010.

Prof. Estévez is one of the founders of the Millennium Institute of Astrophysics (MAS), Chile, which was created in January 2014. He is currently leading the Astroinformatics/Astrostatistics group at MAS. He has been an Invited Researcher with the NTT Communication Science Laboratory, Kyoto, Japan; the Ecole Normale Supérieure, Lyon, France, and a Visiting Professor with the University of Tokyo.

Prof. Estévez is the President of the IEEE Computational Intelligence Society (CIS) for the term 2016-2017. He has served as IEEE CIS Vicepresident of Members Activities, Member-at-Large of the IEEE CIS ADCOM, CIS Distinguished Lecturer and as an Associate Editor of the IEEE TRANSACTIONS ON NEURAL NETWORKS AND LEARNING SYSTEMS.

Prof. Estévez served as conference chair of the International Joint Conference on Neural Networks (IJCNN), held in July 2016, in Vancouver, Canada, and he is serving as general co-chair of the IEEE World Congress on Computational Intelligence, WCCI 2018, to be held in Rio de Janeiro, Brazil.

His current research interests include big data, neural networks, self-organizing maps, information theoretic-learning, time series analysis, and advanced signal and image processing. One of his main topics of research is the application of computational intelligence techniques to astronomical datasets and EEG signals.

For more information visit <http://www.cnnchile.com/noticia/2016/01/03/panorama-15-datos-son-el-nuevo-petroleo> (CNN interview in Spanish)

Cesare Alippi received the degree in electronic engineering cum laude in 1990 and the PhD in 1995 from Politecnico di Milano, Italy. Currently, he is a Full Professor of information processing systems with the Politecnico di Milano. He has been a visiting researcher at UCL (UK), MIT (USA), ESPCI (F), CASIA (RC), USI(CH), A*STAR (SIN), UKobe (JP).

Alippi is an IEEE Fellow, Vice-President education of the IEEE Computational Intelligence Society, member of the Board of Governors of the International Neural Networks Society, Associate editor (AE) of the IEEE Computational Intelligence Magazine, past AE of the IEEE-Trans Instrumentation and Measurements, IEEE-Trans. Neural Networks, and member and chair of other IEEE committees. In 2016 he received the INNS Gabor award and the IEEE Transactions on Neural Networks and Learning Systems outstanding paper award; in 2004 the IEEE Instrumentation and Measurement Society Young Engineer Award; in 2011 has been awarded Knight of the Order of Merit of the Italian Republic; in 2013 he received the IBM Faculty Award.

Among the others, Alippi was General chair of the International Joint Conference on Neural Networks (IJCNN) in 2012, Program chair in 2014, Co-Chair in 2011 and General chair of the IEEE Symposium Series on Computational Intelligence 2014.

Current research activity addresses adaptation and learning in non-stationary environments and Intelligent embedded systems.

Alippi holds 5 patents, has published in 2014 a monograph with Springer on “Intelligence for embedded systems” and (co)-authored about 200 papers in international journals and conference proceedings.

Home Page: <http://home.dei.polimi.it/alippi/>

Gary G. Yen received the Ph.D. degree in electrical and computer engineering from the University of Notre Dame in 1992. He is currently a Regents Professor in the School of Electrical and Computer Engineering, Oklahoma State University. His research interest includes intelligent control, computational intelligence, evolutionary multiobjective optimization, conditional health monitoring, signal processing and their industrial/defense applications.

Gary was an associate editor of the *IEEE Transactions on Neural Networks* and *IEEE Control Systems Magazine* during 1994-1999, and of the *IEEE Transactions on Control Systems Technology*, *IEEE Transactions on Systems, Man and Cybernetics* and IFAC Journal on *Automatica* and *Mechatronics* during 2000-2010. He is currently serving as an associate editor for the *IEEE Transactions on Evolutionary Computation* and *IEEE Transactions on Cybernetics*. Gary served as Vice President for the Technical Activities, IEEE Computational Intelligence Society in 2004-2005 and is the founding editor-in-chief of the *IEEE Computational Intelligence Magazine*, 2006-2009. He was the President of the IEEE Computational Intelligence Society in 2010-2011 and is elected as a Distinguished Lecturer for the term 2012-2014. He received Regents Distinguished Research Award from OSU in 2009, 2011 Andrew P Sage Best Transactions Paper award from IEEE Systems, Man and Cybernetics Society, 2013 Meritorious Service award from IEEE Computational Intelligence Society and 2014 Lockheed Martin Aeronautics Excellence Teaching award. Currently he serves as the chair of IEEE/CIS Fellow Committee and General Co-Chair of 2016 IEEE World Congress on Computational Intelligence to be held in Vancouver, Canada. He is a Fellow of IEEE and IET.

Fernando Buarque de Lima Neto has a Ph.D. in Artificial Intelligence from University of London (2002), Diploma of Imperial College London on Artificial Neural Networks (2002), Masters in Computer Science from Federal University of Pernambuco (1998) and a degree in Computer Science Catholic University of Pernambuco (1990). He also studied Philosophy of Science, Neuroscience and Administration. In 2012 he was at INRIA (Paris-Rocquencourt) as 'Professeur invité' and in 2015 he was on sabbatical leave at Westfälische Wilhelms-Universität Münster, Germany. He is Associate Professor at the University of Pernambuco, IEEE Senior Member, Humboldt Fellow and Accredited Researcher by the Brazilian Council of Research. Currently, he has three international appointments with: Texas A&M (Adjunct Professor), Florida Tech (Graduate Faculty) and University of Johannesburg (Visiting Professor). His current research focuses at: (1) Computational Intelligence (Evolutionary, Social and Hybrid Metaheuristics), (2) Complex and Stochastic Modeling/Simulation, and (3) Intelligent and Semiotic Decision Support Systems. For the past 15 years he leaded or was member of projects funded by CNPq, CAPES, FINEP, FACEPE, Petrobras, South African HESA, European Community Programs, Alexander von Humboldt Foundation among others. Fernando Buarque is member of several scientific organizations among them the Brazilian Computer Society (SBC), the Brazilian Society of Computational Intelligence (SBIC, past president), the Computational Intelligence Society (IEEE-CIS) and the Systems, Man & Cybernetics Society (IEEE-SMC). In recent years he has committed himself to internationalization hence he co-chaired/steered several international conferences such as BRICS-CCI 2013(Recife-Brazil), BRICS-CCI 2015(Beijin-China), LA-CCI 2014(Bariloche-Argentina), LA-CCI 2015(Curitiba-Brazil), IEEE LA-CCI2016(Cartagena-Colombia) among others."

G. Kumar Venayagamoorthy is currently the Duke Energy Distinguished Professor of Power Engineering and a Professor of Electrical and Computer Engineering and Automotive Engineering with Clemson University, Clemson, SC, USA. He is also the Founder and Director of the Real-Time Power and Intelligent Systems Laboratory (<http://rtpis.org>) with Clemson University. He is an Honorary Professor with the School of Engineering, University of KwaZulu-Natal, Durban, South Africa. Dr. Venayagamoorthy's interests are in the research, development and innovation of advanced computational methods for smart grid operations, including intelligent sensing and monitoring, power system optimization, stability and control, and signal processing. He has published ~ 500 refereed technical articles. His publications are cited over 11,000 times with a *h*-index of 53. Dr.

Venayagamoorthy has been involved ~ 70 sponsored projects in excess of \$10 million. He has received several awards from professional societies and institutions for his contributions to research and professional activities.

Dr. Venayagamoorthy is involved in the leadership and organization of many conferences including the General Chair of the Annual Power System Conference (Clemson, SC, USA) since 2013, and Pioneer and Chair/co-Chair of the IEEE Symposium of Computational Intelligence Applications in Smart Grid (CIASG) since 2011. He is currently the Chair of the IEEE PES Working Group on Intelligent Control Systems, and the Founder and Chair of IEEE Computational Intelligence Society (CIS) Task Force on Smart Grid. Dr. Venayagamoorthy is a Senior Member of the IEEE and International Neural Network Society, and a Fellow of the IET, UK, and the SAIEE. He has served as an Editor/Guest Editor of several IEEE and Elsevier journal.

Local lecturers:

Fabio A. Gonzalez is a Full Professor at the Department of Computing Systems and Industrial Engineering at the National University of Colombia, where he leads the Machine Learning, Perception and Discovery Lab (MindLab). He earned a Computing Systems Engineer degree and a MSc in Mathematics degree from the National University of Colombia in 1993 and 1998 respectively, and a MSc and PhD degrees in Computer Science from the University of Memphis, USA, in 2003. His research work revolves around machine learning, information retrieval and computer vision, with a particular focus on the representation, indexing and automatic analysis of multimodal data (data encompassing different types of information: textual, visual, signals, etc.).

Diego Hernán Peluffo-Ordóñez was born in Pasto - Colombia in 1986. He received his degree in electronic engineering, the M.Eng. and PhD. degree in industrial automation from the Universidad Nacional de Colombia, Manizales - Colombia, in 2008, 2010 and 2013, respectively. Afterwards, he worked as a post-doc at Université Catholique de Louvain at Louvain la-Neuve, Belgium. In 2014, he worked as an assistant teacher at Universidad Cooperativa de Colombia - Pasto. Currently, he is working as a researcher/professor at Universidad Técnica del Norte - Ecuador. His main research interests are dimensionality reduction and spectral methods for clustering and representation.

Carlos Cobos is a Full Time Professor in Computer Science at the University of Cauca (Colombia), director of the Information Technology Research Group (GTI at the University of Cauca), and coordinator of the master program in computation at the University of Cauca since 2014. He has been researcher on several projects related to data mining, text mining, metaheuristics and e-learning. He has been responsible for coordinating the Systems Engineering Program at the University of Cauca, Manager of the Systems Department (Computer Science), and has taught a wide range of courses, among them: Data mining, Information retrieval, Metaheuristics, Databases, Software Engineering and Programming. He has written papers, reports and other material on information retrieval, data mining, metaheuristics, learning management systems and mobile learning. He has also worked as a reviewer of several indexed journals like Information Sciences (Elsevier), Applied Mathematics & Computation (Elsevier), Expert Systems with Applications (Elsevier) and the Journal of Intelligent and Fuzzy Systems (IOS Press), among others.

7. ORGANIZATION COMMITTEE

General Chair:

Name: Alvaro David Orjuela Cañón

Affiliation: Universidad Antonio Nariño – Chair Professional Chapter IEEE CIS - Colombia

Contact and Email: dorjuela@ieee.org

Organizing Committee Members:

Name 1: Jose David Cely

Affiliation: Universidad Distrital Francisco Jose de Caldas, Colombia

Email: j.d.cely@ieee.org

Name 2: Carlos Alberto Cobos Lozada

Affiliation: Universidad del Cauca, Colombia

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Name 3: Diego Hernán Peluffo-Ordoñez

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Email: diegohpo@gmail.com

Name 4: Lys Garlacha

Affiliation: IEEE Colombia

Email: eventos@ieee.org.co

Name 5: Diana Briceño

Affiliation: IEEE Colombia

Email: colombia@ieee.org.co

8. SOCIAL ACTIVITY

As social activity all participants from both events were carried by the Cartagena city in a traditional bus known as “chiva”. Some special locations of Cartagena were visited, going with local music and drinks. Attendees enjoyed the promenade in the chiva, dancing and singing funny rhythms of Colombian costs.

9. COMPETITION

In the IEEE LA-CCI 2016 where a contest of thesis at master and doctorate levels. Three best works were awarded based on its quality.

Award	Title	Author	Institution	Country
First place	Weight-Based Approach for Niching in Fish School Search	Marcelo Gomes Pereira de Lacerda	Universidade de Pernambuco	Brazil
Second Place	Evolution of Reward Functions for Reinforcement Learning applied to Stealth Games	Matheus Ribeiro Furtado de Mendonça	Universidade Federal de Juiz de Fora	Brazil
Third Place	Metodología Híbrida para Resolver el Problema de Ruteo de Vehículos con Depósitos Múltiples Considerando el Consumo de Combustible	María Janeth Bravo Montenegro	Universidad Mariana	Colombia

10. PARTICIPANTS

NAME	INSTITUTION	COUNTRY
RAMON VICTOR CANABAL GUZMAN*	UNIVERSIDAD TECNOLOGICA DE BOLIVAR	Colombia (Grant)
LORENZO CARDONA HOYOS*	UNIVERSIDAD TECNOLOGICA DE BOLIVAR	Colombia (Grant)
MIGUEL ANTONIO JIMENEZ PEREZ*	UNIVERSIDAD TECNOLOGICA DE BOLIVAR	Colombia (Grant)
PABLO CESAR MARTINEZ MEZA*	UNIVERSIDAD TECNOLOGICA DE BOLIVAR	Colombia (Grant)
DANIELA PAOLA TORRES BALLESTAS*	UNIVERSIDAD TECNOLOGICA DE BOLIVAR	Colombia (Grant)
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- These people were members of the logistic committee, which support both events

11. CONCLUSIONS

These kind of events is strengthening in Latin American region, where each year, more and more people attend conferences, tutorials, schools and different activities related with CI topics.

Initially, summer school was planned to 30 assistants, but in the event 18 people manifested to go as attender of SSoCIA. In spite of difference, tutorials were crowded, attracting participants of the IEEE LA-CCI. This shows that topics treated in the tutorials are of interest for Latin American community around CI.

An important aspect that could be seen is the relevance of proposing co-located events. In this opportunity, it was possible to share resources of IEEE CIS and to apply for developing a conference and a summer school simultaneously, sharing financial, personnel and physical resources. An example of this was the possibility of giving some grants for students, and at same time, to have an additional support to carry out the events.

Two of main difficulties found in the developing of the summer school were: 1) Publicize the SSoCIA, where we waited more assistants. In this case, it is important to improve the publicity ways, giving a guarantee that information reaches to the potential assistants. 2) Unfortunately, complementary aspects as language or professional skills are delicate topics. For future editions, tutorials about how to write papers and other professional aspects must be presented. This can be useful for Latin American community of CI.

12. ACKNOWLEDGMENTS

We would thank to IEEE Computational Intelligence Society for all support with the summer school with different resources available to any chapter. To all distinguished lecturers of the society that accepted to come to Colombia as professors: Cesare Alippi, Gary Yen, Pablo Estevez and Kumar Venayagamoorthy.

Aid from IEEE Colombia was fundamental for developing of the SSoCIA, with the help of Lys Garlacha, Diana Briceño, Jose David Cely. Also, all members of logistic committee, which are students of Colombian university in the city of Cartagena.

Thank you all of you.

13. PICTURES



Participant kit.



Tutorial of professor Gary Yen



Tutorial of professor Kumar Venayagamoorthy



Plenary talk of professor Gary Yen



Plenary talk of professor Pablo Estevez



Coffee Break of co-located events.



Distinguished lecturers and participants.



Tutorial of professor Carlos Cobos.



Plenary talk of professor Fabio Gonzalez.



Some relevant talks of the Latin American community (Brazil, Colombia and Ecuador).



Lunch time.



Coffee break time.



Attendees of SSoCIA.

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