The International Joint Conference on Neural Networks

IJCNN 2017

30th Anniversary!

2017 Conference Program

Organized by:

International Neural Network Society

IEEE Computational Intelligence Society

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Budapest Semester in Cognitive Science

International Joint Conference on Neural Networks (IJCNN) 2017

Program

Anchorage, Alaska, USA
May 14 – May 19, 2017

Organized by INNS, in cooperation with IEEE-CIS

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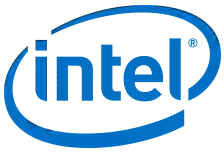

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1.1 Welcome Message from the Executive Committee of IJCNN 2017

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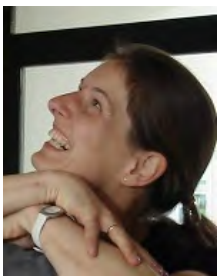

Barbara Hammer
Technical Program Co-Chair

Irwin King
Technical Program Co-Chair

As the Executive Committee, on behalf of the Program Committee and Organizing Committee, we would like to warmly welcome you to the 2017 International Joint Conference on Neural Networks (IJCNN 2017) in the city of lights and flowers: Anchorage, Alaska, USA. This year, we are especially honored to host our 30th anniversary meeting.

Continuing with the long tradition, this conference is organized by the International Neural Network Society (INNS), in cooperation with the IEEE Computational Intelligence Society (IEEE-CIS). We would like to thank the leadership of the two societies for their support and encouragement, especially the presidents Robert Kozma and Pablo Estevez.

In IJCNN 2017 we received 933 submissions from 73 countries, 24 of which were later withdrawn. Of these, 621 papers (66.6%) were accepted. The conference features 372 oral presentations and 249 poster presentations. The program also features 7 plenary talks, 4 panels, 20 tutorials, 5 post-conference workshops, 15 special sessions, and 2 competitions.

The plenary talks by Alex Graves, Stephen Grossberg, Odest ChadwickeJenkins, Christof Koch, Jose C. Principe, Hava Siegelmann, and Paul Werbos reflect the diverse themes of deep learning, consciousness, robotics, neuroscience, cognitive and brain architectures, and foundations of advanced learning systems. The program includes a broad coverage of topics in the general area of neural networks, with a strong showing of trendy topics such as deep neural networks.
The five panels on cutting edge neural networks research, cybersecurity intelligence, 30th birthday of the INNS, and new opportunities in neural networks funding are expected to provide deep insights and vision of the future for the field of neural networks.

Organizing a conference of this scale and diversity is not possible without the dedicated service by our colleagues. We are especially indebted to the two Technical Program Co-Chairs, Barbara Hammer and Irwin King for their timely and professional help with all matters relating to the program. We would also like to thank the Plenary Chair Cesare Alippi; Publication Chair Bill Howell; Panels Chair Robert Kozma; Publicity Co-Chairs Giacomo Boracchi, Simone Scardapane and Teck-Hou Teng; Tutorials Chair Asim Roy; Special Sessions Co-Chairs Derong Liu and Tatiana Tamcouratzis; Workshop Chair Lazaros Iliadis; Competition Chair Juyang (John) Weng; Poster Session Chair Richard Duro; Awards Chair Nikola Kasabov; Sponsors and Exhibits Chair Lipo Wang; Web Reviews Chair Tomasz Cholewo; Regional and Topical Liaisons Teresa Ludermir, Danilo P. Mandic, Minho Lee, Péter Érdi, Pierre-Yves Oudeyer, and Sven F. Crone; Local Arrangements Co-Chairs Frank W. Moore and Kenrick Mock; Registration Chair Jaerock Kwon; and last but not least, Webmaster Jaewook Yoo.

We are extremely grateful to all the program commitee members who helped us with the review of a record number of papers submitted this year, and all the reviewers who turned in thoughtful and meaningful reviews for the assigned papers. Foremost, we would like to thank all of the authors, especially student authors, who worked so hard on their research and took extreme effort to write up and submit their papers. Without such high quality, high impact papers, the continuing success of IJCNN would not have been possible.

We are also very grateful of the INNS Board of Governors for their support and advice, especially the past INNS presidents Ali Minai and Danil Prokhorov, and the late Dave Casasent who served as the treasurer for INNS for a long time.

We would also like to thank the INNS Central Office led by Marianne Van Wagner and Alison Watson, who took care of all of the complexities relating to the conference logistics so that the organizing committee can focus soley on the scientific aspect of the conference. Also, special thanks to Marianne Van Wagner for the beautiful cover page photo.

Finally, we would like to thank the following sponsors for their generous support: Platinum sponsor Intel; and Bronze sponsors Budapest Semester in Cognitive Science and Brain-Mind Institute. We also thank IEEE-CIS for providing generous travel support for student authors and attendees.

We wish you have a stimulating and informative experience at IJCNN 2017.

Yoonsuck Choe	Chrisina Jayne	Barbara Hammer	Irwin King
Texas A&M University	Robert Gordon University	Univ. of Bielefeld	The Chinese Univ. of Hong Kong
General Chair	Program Chair	Technical Program Co-Chair	Technical Program Co-Chair

1.2 Welcome Message from the President of INNS

Robert Kozma
INNS President

As President of the International Neural Network Society (INNS) I am delighted to welcome you at the International Joint Neural Network Conference (IJCNN 2017). IJCNN 2017 is the flagship conference of INNS, organized by INNS jointly with the IEEE Computational Intelligence Society (CIS). I would like the express my gratitude to the IJCNN 2017 organizing team lead by Yoonsuck Choe, Chrisina Jayne, Barbara Hammer, and Irwin King.

In 2017 we celebrate the 30th birthday of INNS and various events at IJCNN 2017 provide excellent forums to mark this special anniversary. Many pioneers of neural networks research attend IJCNN 2017 and provide an exciting vista of past, present, and future progress. Indeed, the past three decades demonstrated explosive proliferation of neural networks in science, technology, and in a wide range of applications. The recent popularity and success of novel AI techniques, deep learning, brain and cognitive networks, brain inspired computing, soft computing, and other influential approaches are rooted in the foundations that have been created in the past decades in the series of IJCNN conferences. We proudly carry this legacy. Collaboration between INNS and the IEEE CIS has a special significance producing IJCNN, which became one of the leading international conferences in the field. We rely strongly on these collaborations and explore new ones, in order to strengthen the success of INNS in working towards its mission and providing value to our members.

I want to use this opportunity to summarize key initiatives of INNS and convince you to join some of the many activities we provide to our members. INNS has a tradition of mutually beneficial collaboration with sister organizations such as the Japanese Neural Network Society, European Neural Network Society, Asian-Pacific Neural Network Society, INNS India Chapter, in addition to IEEE CIS, IEEE Systems, Man, And Cybernetics (SMC) Society, and many other regional and national organizations and Chapters. Our flagship journal “Neural Networks” published through our partnership with Elsevier is one of the leading journals on neural networks research. It is our resolve to strengthen Educational activities and connect effectively with young generations of scientists who represent our future. We work on developing efficient ways of Public Relations to reach out to our members and to the society at large. INNS gives additional value to our members who can present their newest results at IJCNN and other conferences, including Deep Learning and Big Data. We provide opportunity to professional development starting from Student Member, to Full and Senior Members, and election to the College of Fellows. We provide valuable networking opportunity with leaders of field, as well as acknowledging breakthrough achievements by prestigious Awards, such as the Gabor Award, Hebb Award, Helmholtz Award, and the Young Investigator Awards.

I wish you a very productive and enjoyable IJCNN 2017 and I look forward to meeting you at Anchorage.

Sincerely,

Robert Kozma
President of INNS

First Birthday of INNS, 1988, Boston, Massachusetts, USA
Photo courtesy of Harold Szu (INNS Fellow).

1.3 Welcome Message from the President of IEEE-CIS

Pablo A. Estevez
IEEE-CIS President

On behalf of the IEEE Computational Intelligence Society (CIS), it is my greatest pleasure to welcome you to the 2017 International Joint Conference on Neural Networks (IJCNN) held in Anchorage, Alaska. CIS has been a partner with INNS in running IJCNN every year for nearly three decades. INNS is leading the organization of IJCNN'17 and the next year IJCNN'18 will be led by IEEE CIS as part of the 2018 World Congress in Computational Intelligence, in Rio de Janeiro, Brazil (`http://www.ieee-wcci.org`).

IJCNN is the major event in the field of neural networks and learning systems, covering all topics in the field from theory to applications. It provides a forum for researchers, students and professionals in the field. The meeting is a unique opportunity to present our research to other colleagues and exchange the latest advances in theories, technologies and practices. It is tremendous opportunity also to know what are the trending topics, the current state-of-the-art and the main applications. The grow of the field is reflected in the success of the IEEE Transactions on Neural Networks and Learning Systems, which latest impact factor is 4.854. I take this opportunity to invite you to submit papers to the brand new IEEE Transactions on Emerging Topics in Computational Intelligence.

Glancing through the programme of IJCNN'17, one can find the trending topics ranked by the number of sessions: Deep Learning (9), Spiking Neurons (4), Extreme Learning Machines (2), Data Mining (2), Concept Drift (2), Clustering (2), and Big Data and Data Analytics (2). The range of topics include transfer learning, ensemble learning, metric learning, semisupervised learning, cortical modeling, sensory processing, attention and emotion, explainability and interpretability in machine learning, and many applications, among others.

I would like to express my gratitude to all the authors who submitted their work, to the program committee and reviewers, the organizers of Special Sessions as well as to all the participants of IJCNN 2017. Special thanks to the General Chair, Yoonsuck Choe, and the Executive Committee of IJCNN 2017. I would like to take this opportunity to congratulate the International Neural Network Society on its 30th anniversary.

Wish you all have a wonderful conference experience at IJCNN'17!

Pablo A. Estevez
President
IEEE Computational Intelligence Society

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Guandong, Xu
Guo, Quan
Guo, Wentao
Guo, Zhenyuan
Gusmao, Eduardo
Gutierrez, Pedro Antonio
Guyon, Isabelle
Hai, Zhao
Hajek, Petr
Hammer, Barbara
Han, Dongho
Han, Kun
Hara, Kazuyuki
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Hartono, Pitoyo
Hatzilygeroudis, Ioannis
He, Hongmei
He, Ran
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Hernandez-Gomez, Luis A.
Hervas-Martinez, Cesar
Heutte, Laurent
Hirose, Akira
Ho, Liangwei
Homenda, Wladyslaw
Honda, Katsuhiro
Hong, Wei-Chiang
Horikawa, Yo
Horio, Yoshihiko
Horvath, Gabor
Hou, Sujuan
Hou, Yuexian
Howell, Bill
Hsu, Chih-Yu
Hsu, Chung-Chian
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Lee, Hyekyoung
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Lee, Minwoo
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Leopold, Helmut
Leray, Philippe
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Li, Mei
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Li, Peng
Li, Wei
Li, Xin
Li, Xinde
Li, Yue
Li, Yuncheng
Liang, Yinghong
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Lima, Clodoaldo
Lima, Tiago
Lin, Daw-Tung
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Luo, Xiong
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Ma, Long
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Miao, Qiguang
Micheli, Alessio
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Mylonas, Phivos
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Nakano, Ryohei
Narayan, Sridhar
Nascimento Jr., Cairo L.
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Ni, Zhen
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O'Keefe, Simon
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Ozawa, Seiichi
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Palm, Guenther
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Pasa, Leandro
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Perez, Daniel
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Qin, Chunbin
Quiles, Marcos
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Rast, Alexander
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Rizzi, Antonello
Rogovschi, Nicoleta
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Rouco, Jose
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Saito, Toshimichi
Salatino, Angelo Antonio
Salvati, Daniele
Sang, Yingpeng
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Schuller, Bjoern
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Seth, Sohan
Sharma, Avinash
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Siirtola, Pekka
Silva, Catarina
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Oneto, Luca
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Panagiotopoulos, Dimokritos
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Pasero, Eros
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Schumann, Johann
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Sethi, Ishwar
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Shim, Myung Seok
Siano, Pierluigi
Sil, Jaya
Silva, Leandro Augusto
Skabar, Andrew
Sokolov, Yury
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Olsen, Megan
Oprea, Sergiu
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Palensky, Peter
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Panella, Massimo
Parisi, German I.
Patan, Krzysztof
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Qin, Bin
Qiu, Chen
Rai, Shri
Rani, Sobha
Raza, Haider
Regazzoni, Francesco
Ren, Zijian
Ridella, Sandro
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Rocha, Rui
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Roy, Asim
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Sani, Sadiq
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Schwenker, Friedhelm
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Slot, Krzysztof
Solari, Fabio
Song, Insu
Souliou, Dora

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Stilkerich, Stephan C.
Stubberud, Stephen
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Wang, Xiaoping
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Weng, Juyang (John)
Wiering, Marco
Wuertz, Rolf
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Xu, Yong
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Yoo, Jaewook
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Sperduti, Alessandro
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Stephanakis, Ioannis
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Suresh, Sundaram
Swarup, Shanti
Taheri, Javid
Tan, Mingkui
Tang, Bo
Tanscheit, Ricardo
Tax, David
Thiem, Clare
Timoszczuk, Antonio Pedro
Tizhoosh, Hamid Reza
Trivedi, Amit
Trovo', Francesco
Tu, Zhengwen
Twala, Bhekisipho
Valdez, Fevrier
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Verdes, Pablo F.
Verri, Filipe Alves Neto
Villa, Alessandro
Vincent, Nicole
Von Zuben, Fernando J.
Walter, Oliver
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Wang, Jianyong
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Watts, Michael
Wermter, Stefan
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Xiaoping, Fang
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Yang, Huei-Fang
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Valerio, Lorenzo
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Velde, Frank van der
Vellido, Alfredo
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Vrana, Stanislav
Wan, Feng
Wang, Haishuai
Wang, Jun
Wang, Qian
Wang, Shitong
Wang, Xinying
Wang, Yu-Xiong
Wang, ZhenZhen
Wei, Wei
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Xing, Junliang
Xu, Rui
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7 Plenary Talks

All plenary talks will be in La Perouse room.

Time	**Monday** 5/15	**Tuesday** 5/16	**Wednesday** 5/17	**Thursday** 5/18
8am–9am	Jose C. Principe	Alex Graves	Stephen Grossberg	Odest Chadwicke Jenkins
1:30pm–2:30pm	Hava Siegelmann	Paul Werbos	Christof Koch	

7.1 **Alex Graves,** Research Scientist, Google DeepMind

- Title: Frontiers in recurrent neural network research
- Abstract: In the last few years, recurrent neural networks (RNNs) have become the Swiss Army knife of large-scale sequence processing. Problems involving long and complex data streams, such as speech recognition, machine translation and reinforcement learning from raw video, are now routinely tackled with RNNs. This talk takes a look at some of the new architectures, applications and training strategies currently being developed in this exciting field.
- Bio: Research Scientist at Google DeepMind. Canadian Institute For Advanced Research (CIFAR) Junior Fellow at the University of Toronto.

7.2 **Stephen Grossberg ,** Wang Professor of Cognitive and Neural Systems, Boston University

- Title: Towards Solving the Hard Problem of Consciousness: The Varieties of Brain Resonances and the Conscious Experiences that they Support
- Abstract: What happens in our brains when we consciously experience sights, sounds, feelings, and knowledge about them? The Hard Problem of Consciousness is the problem of explaining how this happens. To solve this problem, a theory of consciousness needs to link brain to mind by modeling how brain dynamics give rise to conscious experiences, and specifically how the emergent properties of brain dynamics generate properties of individual experiences and of the psychological and neurobiological data that they generate. This talk summarizes evidence that Adaptive Resonance Theory, or ART, is accomplishing this goal. ART is a cognitive and neural theory of how advanced brains autonomously learn to attend, recognize, and predict objects and events in a changing world. ART has predicted that all conscious states are resonant states as part of its specification of mechanistic links between processes of consciousness, learning, expectation, attention, resonance, and synchrony. It hereby provides functional and mechanistic explanations of data ranging from individual spikes and their synchronization to the dynamics of conscious perceptual, cognitive, and cognitive-emotional behaviors. ART has now reached sufficient maturity to begin classifying the brain resonances that support conscious experiences of seeing, hearing, feeling, and knowing. The talk will review various of these resonances, their similarities and differences, including where they occur in our brains; how they interact when we feel and know about what we see and hear; and various of the normal and clinical psychological and neurobiological data that they explain and predict, and which have not been explained by alternative theories. The talk will mention some resonances that do not become conscious, and why, including why not all brain dynamics are resonant in terms of the computationally complementary organization of cortical processing streams.
- Bio: Wang Professor of Cognitive and Neural Systems, Boston University. Founding President, International Neural Network Society. Founding Editor-In-Chief, Neural Networks. Recipient of INNS Helmholtz Award (2003). INNS Fellow.

7.3 **Odest Chadwicke Jenkins,** Associate Professor of Computer Science and Engineering, University of Michigan

- Title: Perception of People and Scenes for Robot Learning from Demonstration
- Abstract: We are at the dawn of a robotics revolution where the visions of interconnected heterogeneous robots in widespread use will become a reality. Similar to ”app stores” for modern computing, people at varying levels of technical background will contribute to ”robot app stores” as designers and developers. However, current paradigms to program robots beyond simple cases remains inaccessible to all but the most sophisticated of developers and researchers.

  In order for people to fluently program autonomous robots, a robot must be able to interpret commands that accord with a humans model of the world. The challenge is that many aspects of such a model are difficult or impossible for the robot to sense directly. We posit the critical missing component is the grounding of symbols that conceptually

tie together low-level perception with user programs and high-level reasoning systems. Such a grounding will enable robots to perform tasks that require extended goal-directed autonomy as well as fluidly work with human partners.

Towards making robot programming more accessible and general, I will present our work on improving perception of people and scenes to enable robot learning from human demonstration. Robot learning from demonstration (LfD) has emerged as a compelling alternative to explicit coding in a programming language, where robots are programmed implicitly from a users demonstration. Phrasing LfD as a statistical regression problem, our multivalued regression algorithms will be presented for learning robot controllers in the face of perceptual aliasing. I will also describe how such regressors can be used within physics-based estimation systems to learn controllers for humanoids from monocular video of human motion. With respect to learning for sequential manipulation tasks, our recent work aims to perceive axiomatic descriptions of scenes from depth for planning goal-directed behavior.

- Bio: Associate Professor of Computer Science and Engineering, University of Michigan. Sloan Research Fellow, Recepient of the Presidential Early Career Award for Scientists and Engineers (PECASE), and young investigator award from Office of Naval Research and Air Force Office of Scientific Research.

7.4 **Christof Koch,** President and Chief Scientific Officer, Allen Institute for Brain Science

- Title: Big Science, Team Science, Open Science for Neuroscience
- Abstract: Over the past decade, the Allen Institute for Brain Science has produced a series of brain atlases. These are large (3 TB, $>$ million slides) public resources, integrating genome-wide gene expression, and neuroanatomical data across the entire brain for developing and adult humans, non-human primates and mice, complemented by high-resolution, cellular-based anatomical connectivity data in several thousand mice. It is the largest integrated neuroscience database world-wide. Anybody can freely access this data without any restrictions at www.brain-map.org.

  Six years ago, we embarked on an ambitious 10-year initiative to understand the structure and function of the neocortex and associated satellite structures in humans and mice. We are setting up high through-put pipelines to exhaustively characterize the morphology, electrophysiology and transcriptome of cell types well as their synaptic interconnections in the laboratory mouse and in human neocortex (via a combination of fetal, neurosurgical and post-mortem tissues). We are building brain observatories to image the activities of 10,000s of neurons throughout the cortico-thalamic system in behaving mice, to record their electrical activities, and to analyze their connectivity at the ultra-structural level. We are constructing biophysically detailed as well as simplified computer simulations of these networks and of their information processing capabilities focusing on how the neocortical tissue gives rise to perception, behavior and consciousness.
- Bio: Professor of Biology and Engineering at the California Institute of Technology in Pasadena. Chief Scientific Officer of the Allen Institute for Brain Science in Seattle. INNS Fellow.

7.5 **Jose C. Principe ,** Distinguished Professor, University of Florida

- Title: A Cognitive Architecture for Object Recognition in Video
- Abstract: This talk describes our efforts to abstract from the animal visual system the computational principles to explain images in video. We develop a hierarchical, distributed architecture of dynamical systems that self-organizes to explain the input imagery using an empirical Bayes criterion with sparseness constraints and dual state estimation. The interpretation of the images is mediated through causes that flow top down and change the priors for the bottom up processing. We will present preliminary results in several data sets.
- Bio: Distinguished Professor of Electrical and Biomedical Engineering at the University of Florida. Recipient of INNS Gabor Award (2006). INNS Fellow.

7.6 **Hava Siegelmann ,** Professor, University of Massachusetts, Amherst; Program Manager, DARPA

- Title: How brain architecture leads to abstract thought
- Abstract: Using 20 years of functional magnetic resonance imaging (fMRI) data from tens of thousands of brain imaging experiments, our recent research suggests how the physical brain could give rise to abstract thought. The work demonstrates not only the basic operational paradigm of cognition, but shows that all cognitive behaviors exist on a hierarchy, starting with the most tangible behaviors such as finger tapping or pain, then to consciousness and extending to the most abstract thoughts and activities such as naming. This hierarchy of abstraction is found related to the connectome structure of the whole human brain. (Joint with Patrick Taylor)

- Bio: Professor of Computer Science and Core Member of the Neuroscience and Behavior Program at University of Massachusettes, Amherst. Program Manager at DARPA. Recipient of INNS Hebb Award (2016).

7.7 **Paul Werbos ,** Program Director (retired), National Science Foundation

- Title: Backpropagation in the Brain and More Advanced Learning Systems
- Abstract: The recent explosion of interest in deep learning based on backpropagation is the result of empirical demonstration and testing of methods developed long ago, funded by NSF, DARPA and Google. The usual convolutional neural networks are not a valid model of computing in the cerebral cortex, because they assume Euclidean symmetry and are unable to learn simple mappings required, for example, in learning how to navigate a cluttered space; however, more general networks were also developed years ago, and demonstrated on less popular problems like power grid forecasting and incremental chess playing. This year empirical tests were also carried out on 24khz data from prefrontal cortex, strongly supporting our original theory of brain intelligence in which regular clocks and alternative forward and backward passes explain the power of cortical computation, and are preferred in the data over the more ancient theories of pure asynchronous computing by spiking networks or ODE. An empirical pathway has also been laid out to allow physical backpropagation of information, which promises to enable a new level of general intelligence through analog quantum computing more conscious than what we see in the mammal brain.
- Bio: Former program director of National Science Foundation. Recipient of INNS Hebb Award (2011). INNS Fellow.

8 Panels

All panels will be in La Perouse room.

Time	**Monday** 5/15	**Tuesday** 5/16	**Wednesday** 5/17
2:50pm-4:30pm	Cutting Edge NN Research	Cybersecurity Intelligence	30th Birthday of the INNS
4:40pm-6:20pm			Opportunities for NN Research Funding

8.1 Cutting Edge NN Research

5/15 (Monday), 2:50-4:30pm

- Chair: Asim Roy (Arizona State University), Co-Chairs: Robert Kozma (University of Massachusetts Amherst and University of Memphis) and Yoonsuck Choe (Texas A&M University)
- Panelists: Christof Koch (Allen Institute for Brain Science), Alex Graves (Google), Jose Principe (University of Florida), Peter Erdi (Kalamazoo College and Hungarian Academy of Sciences), Leonid Perlovsky (Northeastern University); Hava Siegelmann (University of Massachusetts Amherst, DARPA)
- Abstract: This panel addresses cutting edge developments in neural networks research based on the contribution of leading expects in the field, covering areas of computational neuroscience and brain imaging, deep learning and advanced machine learning breakthroughs, brain-computer interfaces and hardware tools, neuropharmacology and systems science, aspects of consciousness, emotion, and ethics, and new generation of novel computational devices mimicking brains. The panel will provide a forum for extensive discussions on these topics and will answer questions from the audience.

8.2 Cybersecurity Intelligence

5/16 (Tuesday), 2:50-4:30pm

- Chair: Catherine Huang (Intel)
- Panelists: Celeste Fralick (Intel/McAfee), Alan Ross (Intel), Sven Krasser (Crowdstrike), John Brock (Cylance), David Mountain (US Department of Defense).
- Abstract: Cybersecurity is among the most serious economic and national security challenges we face in the 21st century. Internet growth massively increases the number of potential targets for cyberattacks, which could potentially have disastrous consequences for individuals and for society. With vast amounts of data of many types at multiple scales in time and in space, there is an essential need for computational intelligence approaches to accelerate progress. In this panel we will illustrate the challenges and opportunities in cybersecurity intelligence through real-world problems and call for artificial intelligence community to join and contribute to advance the protection of cyberspace from attacks.

8.3 30th Birthday of the International Neural Network Society

5/17 (Wednesday), 2:50-4:30pm

- Chair: David Brown (United States Food and Drug Administration [Retired], INNS Senior Fellow)
- Panelists: Steven Grossberg (Boston University), Dan Levine (University of Texas at Arlington), Don Wunsch (Missouri University of Science and Technology), Robert Kozma (University of Massachusetts Amherst and University of Memphis)
- Abstract: Looking back and looking forward–we will discuss the founding of the International Neural Network Society (INNS) and our journal, ”Neural Networks,” thirty years ago, the major accomplishments of the Society since that time, and the challenges and opportunities facing us now. Short presentations will be made by the panelists, covering the early history of INNS, the IJCNN series of meetings, the emphasis on neuroscience, the relationship with IEEE and the European and Japanese neural network societies, as well as collaborations in Asia, Pacific, and The Americas, critical developments in the neural networks field, and the future role of the Society. Open discussion will follow, with audience participation strongly encouraged.

8.4 New Opportunities in NN Research Funding

5/17 (Wednesday), 4:40-6:20pm

- Chair: Hava Siegelmann (DARPA)
- Panelists: Henry Markram (EPFL), Sankar Basu (NSF), Paul Werbos (NSF, retired)
- Abstract: This panel addresses novel avenues to support neural network research. Leading experts in the field will describe research challenges and funding opportunities. It is expected to have an intensive Questions and Answers section with the audience.

8.5 Competition Panels

See the Competition Section (Section 9).

9 Competitions

9.1 2017 Looking at People CVPR/IJCNN Coopetition

Coopetition = Cooperation + Competition

- Title: ChaLearn Job Candidate Screening Coopetition @CVPR17 and @IJCNN17
- Organizers: Sergio Escalera (University of Barcelona, Spain), Hugo Jair Escalante (INAOE, Mexico), Xavier Baró (Universitat Oberta de Catalunya & Computer Vision Center, Barcelona, Spain), Isabelle Guyon (University Paris-Saclay, France and ChaLearn USA), Meysam Madadi (Universitat de Barcelona and Computer Vision Center, Spain), Stephane Ayache, Julio Jacques (Universitat de Barcelona and Computer Vision Center, Spain), Umut Guclu (Radboud University, Netherlands), Yagmur Gucluturk (Radboud University, Netherlands), Marcel van Gerven (Radboud University, Netherlands), and Rob van Lier (Radboud University, Netherlands).
- Aims and Scope: Research progress in computer vision and pattern recognition has lead to a variety of modeling techniques with (almost) human-like performance in a variety of tasks. A clear example of this type of models are neural networks, whose deep variants dominate the arena of computer vision among other fields. Although this type of models have obtained astounding results in a variety of tasks they are limited in their explainability and interpretability. We are organizing a workshop and a competition on explainable computer vision systems. We aim to compile the latest efforts and research advances from the scientific community in enhancing traditional computer vision and pattern recognition algorithms with explainability capabilities at both the learning and decision stages.
- Details: *Candidate screening coopetition*:

  This proposed challenge is part of a larger project on speed interviews. The overall goal of the project is help both recruiters and job candidates using automatic recommendations based on multi-media CVs. As a first step, we organized in 2016 two rounds of a challenge on detecting personality traits from short videos, for the ECCV 2016 conference (May 15, 2016 to July 1st 2016), and the ICPR 2016 conference (June 30 2016 to 16 August 2016). This second round evaluated using the same data a coopetition setting (mixture of collaboration and competition) in which participants shared code. Both rounds revealed the feasibility of the task (AUC 0.85) and the dominance of deep learning methods. These challenges have been very successful, attracting in total 100 participants.

  We propose for the competition programmes of IJCNN17 and CVPR 2017 a new edition of the challenge with the more ambitious goals to:

  - Stage 1: Predict whether the candidates are promising enough that the recruiter wants to invite him/her to an interview (quantitative competition).
  - Stage 2: Justify/explain with a TEXT DESCRIPTION the recommendation made such that a human can understand it (qualitative coopetition).

  We will be using the same dataset, but with new annotations never used before about inviting the candidates for a job interview. For the quantitative task, the problem will be cast as a regression task (predict a continuous invite-for-interview score variable). For the qualitative task, a jury will decide whether the method developed proposes clear and useful explanations of recommendations.

  In this new stage of the first impressions challenge, we are going several steps further:

  1. This will be the first time we will address the task of predicting "invite-for-interview".
  2. We will also provide previous annotation data on personality traits (in training data only). This will encourage participants with work on algorithms in that benefit from learning both personality traits and hiring recommendations. In addition, predictions on personality traits could be also be exploited to explain decisions made.
  3. The competition will assess the explanatory capabilities of models, a topic that has not been previously considered in academic competitions. The topic of explainable computer vision and pattern recognition is very hot at the moment.
  4. We further explore the "coopetition" protocols (encouraging a mixture of collaboration and competition between the participants) using a new setting, for which we expect more participation.

- Details: Please see `http://chalearnlap.cvc.uab.es/challenge/23/description/`

9.2 The AIML Contest: Full Automation of Machine Learning

- Title: Artificial Intelligence Machine Learning Contest: Unique for Task-Independent and Modality-Independent Brain-Inspired Engines
- Organizer: Juyang (John) Weng and Juan Castro-Garcia (Michigan State University).
- Overview: The terms artificial intelligence, machine learning, robotics, signal processing, control, dynamic systems, data mining, big data, and brain projects often have different emphases, but the related disciplines are converging. The Artificial Intelligence Machine Learning (AIML) Contest serves as a converging platform for these highly related disciplines and beyond. It is open to, but not limited to, all researchers, practitioners, students and investors. The main goal of the contest is to promote understanding of both natural intelligence and artificial intelligence, beyond the currently popular pattern classification. The AIML Contest aims to address major learning mechanisms in natural and artificial intelligence, including perception, cognition, behavior and motivation that occur in cluttered real-world environments. Attention, segmentation, emergence of spatiotemporal representations, and incremental scaffolding are parts of each life-long learning stream.

  The major characteristics of this contest include:

  1. Use inspirations from learning by natural brains, such as grounding, emerging, natural inputs, incremental learning, real-time and online, attention, motivation, and abstraction from raw sensorimotor data.
  2. General purpose learning engines that are task-independant. Task-independant means that the learning engine is capable of being trained to generate a machine "brain" to learn and do any collection of body-capable and open-ended tasks. Base engines will be available to participants and open for enhancements. The providers of base engines are free to provide assistance to participants, such as courses, tutorials, and workshops.
  3. Modality-independant engines. Modalities that are the well-recognized bottlenecks of AI will be tested on the same machine learning engine from each contest entry, including vision, audition, language understanding, and autonomous thinking.
  4. Training-and-testing sensorimotor streams will be provided to the participants. Each frame of the stream contains a sensory vector and a motoric vector. Training and testing are mixed in the streams, so that learning systems can perform scaffolding: early learned simpler skills are automatically selected and used for learning later more complex skills.

- Panels: Tuesday May 16, 2017, La Perouse room.
  - 9:20am–10:40am: AIML Contest Panel (1): Awards and Contest Presentations
  - 11:00am–12:20pm: AIML Contest Panel (2): AIML Contest 2017 Engine Download and Introductions
- Details: Please see `http://www.brain-mind-institute.org/AIMLcontest`.

10 Tutorials

Please refer to the full program (section 14) for time and place of the tutorials.

10.1 **Tutorial 1:** Interactive Machine Learning: From Classifiers to Robotics

Organizer(s): Brad Hayes (Massachusetts Institute of Technology), Ece Kamar (Microsoft Research), and Matt Taylor (Washington State University)

10.2 **Tutorial 2:** Physics of the mind

Organizer(s): Leonid I. Perlovsky (Northeastern Univ.)

10.3 **Tutorial 3:** Brain-Inspired Turing Machine Logic in Neural Networks for Vision, Speech, and Natural Languages

Organizer(s): Juyang Weng (Michigan State Univ.)

10.4 **Tutorial 4:** Information theoretic learning in pattern classification

Organizer(s): Bao-Gang (B.-G.) Hu (Chinese Academy of Sciences)

10.5 **Tutorial 5:** Change and Anomaly Detection in Data Streams

Organizer(s): Giacomo Boracchi (Politecnico de Milano)

10.6 **Tutorial 6:** Deep Learning Using Multi-Layer Perceptron and Improving its Performance

Organizer(s): B.Chandra (Sprinklr)

10.7 **Tutorial 7:** Topological and graph based Clustering: recent algorithmic advances

Organizer(s): Nistor Grozavu (Univ. Paris 13), Rushed Kanawati (Univ. Paris 13)

10.8 **Tutorial 8:** Advanced Methodologies for Predictive Learning

Organizer(s): Vladimir Cherkassky (Univ. of Minnesota)

10.9 **Tutorial 9:** Deep Learning for EEG Signal Processing and Health

Organizer(s): Informatics Francesco Carlo Morabito (Mediterranean University of Reggio Calabria)

10.10 **Tutorial 10:** Deep Learning for Face Recognition

Organizer(s): Richa Singh and Mayank Vatsa (IIIT-Delhi)

10.11 **Tutorial 11:** Graphical Probabilistic Modeling and Machine Learning for Multimedia Content Analysis

Organizer(s): Xiao-Ping (Steven) Zhang (Ryerson University) Zhu Liu (AT&T Labs - Research)

10.12 **Tutorial 12:** Monte Carlo Tree Search and other Simulation Optimization Methods

Organizer(s): Michael C. Fu, (Univ. of Maryland)

10.13 **Tutorial 13:** Data insights from machine learning with applications to biomedical data

Organizer(s): Paulo Lisboa (Liverpool John Moores Univ.)

10.14 **Tutorial 14:** Time-Evolving Data Streams Learning and Short-Term Urban Traffic Flow Forecasting

Organizer(s): Francesco Masulli (Univ. di Genoa)

10.15 **Tutorial 15:** Deep multiview representation learning: methods and applications

Organizer(s): Raman Arora and Kevin Duh (Johns Hopkins University)

10.16 **Tutorial 16:** Advanced Neural Network Applications for Smart Grid Operations

Organizer(s): G. Kumar Venayagamoorthy (Clemson Univ.)

10.17 **Tutorial 17:** From Complex Systems Theory to Systems Neuroscience

Organizer(s): Péter Érdi (Kalamazoo College)

10.18 **Tutorial 18:** Event-Related Potentials: Cognition in Brain-Computer

Organizer(s): Interfaces João Luís Garcia Rosa (Universidade de São Paulo)

10.19 **Tutorial 19:** Towards the Ultimate Brain Computer Hardware Designs of Artificial and Spiking Neural Networks

Organizer(s): Jae-sun Seo (Arizona State Univ.), Bipin Rajendran (New Jersey Institute of Technology)

10.20 **Tutorial 20:** Cutting heuristics in Computational Intelligence with Visual Data Mining

Organizer(s): Boris Kovalerchuk (Centreal Washington Univ.)

11 Workshops

11.1 **Workshop 1:** Developmental Plasticity and Evolutionary Robotics

Friday Morning

- Organizers: Angel P. del Pobil and Fumiya Iida
- Description: This workshop will address the impact that developmental plasticity can have on evolutionary robotics from a multidisciplinary perspective. Given its fundamental role in driving diversification and speciation, this emerging and growing area of research can possibly contribute to a new paradigm in developmental and evolutionary robotics. We will discuss how developmental (phenotypic) plasticity can play a major role in emerging paradigms in evolutionary robotics. Recent progress in evolutionary biology suggests that the interplay between robotics research and the current understanding of the plasticity mechanisms underlying the development of living organisms is a very promising track to be followed. Interaction between the two fields is useful for both evolutionary robotics, which can take inspiration from biological solutions to engineering problems, and evolutionary biology, that can benefit from artificial emulation of biological mechanisms which can prove the validity of research hypothesis.
- Details: http://robinlab.uji.es/cfp-ijcnn-2017-workshop-developmental-plasticity-and-evolutionary-robotics-anchorage-may-19-2017

11.2 **Workshop 2:** Deep Learning for Music

Thursday Afternoon – Friday Morning

- Organizers: Dorien Herremans and Ching-Hua Chuan
- Description: There has been tremendous interest in deep learning across many fields of study. Recently, these techniques have gained popularity in the field of music. Projects such as Magenta (Google's Brain Team's music generation project), Jukedeck and others testify to their potential. While humans can rely on their intuitive understanding of musical patterns and the relationships between them, it remains a challenging task for computers to capture and quantify musical structures. Recently, researchers have attempted to use deep learning models to learn features and relationships that allow us to accomplish tasks in music transcription, audio feature extraction, emotion recognition, music recommendation, and automated music generation. With this workshop we aim to advance the state-of-the-art in machine intelligence for music by bringing together researchers in the field of music and deep learning. This will enable us to critically review and discuss cutting-edge-research so as to identify grand challenges, effective methodologies, and potential new applications. Papers and abstracts on the application of deep learning techniques on music are welcomed, including but not limited to:
  - Deep learning applications for computational music research
  - Modeling hierarchical and long term music structures using deep learning
  - Modeling ambiguity and preference in music
  - Software frameworks and tools for deep learning in music
- Details: `http://dorienherremans.com/dlm2017`

11.3 **Workshop 3:** Computational Aspects of Pattern Recognition and Computer Vision with Neural Systems

Thursday Afternoon

- Organizers: Boguslaw Cyganek and Michal Wozniak
- Description: Computational requirements on information processing systems are nowadays enormous - not only huge amounts of data needs to be processed and classified but also the systems need to deal with massive data usually in the form of data streams and frequently real-time processing requirements. On the other hand, neural systems proved their great potential, especially in pattern recognition and computer vision. However, all of the above rely heavily on efficient algorithms and continuously improved implementations. Therefore computational aspects become a key issue in pattern recognition and computer vision.

  In this workshop we wish to collect researchers and practitioners to share interesting research topics and ideas especially in the area of computational aspects of pattern recognition and computer vision processed on all types of neural systems, starting from algorithm design and up to implementations and applications, encountered in computer vision and pattern recognition computer vision for information mining, especially form from massive data streams and new neural architectures.
- Details: `http://capri.kssk.pwr.edu.pl/`

11.4 **Workshop 4:** Canceled

Canceled.

11.5 **Workshop 5:** Machine Learning for Large-Scale Networks

Thursday Afternoon – Friday Morning

- Organizers: Izabela Moise and Nino Antulov-Fantulin
- Description:

Scope of the Workshop Modern Big Data increasingly appears in the form of complex networks and graphs. Examples include social networks, citation networks, communication networks, the World Wide Web. Researchers make use of network-based solutions for solving problems for diverse disciplines, including social mining, transportation, bioinformatics, computational science, health care and intelligence analysis. However, the massive sizes, multiple types of entities (users, documents, items etc.), user behaviours and relations between entities that nowadays characterise most networks, have increased the challenge of methodologies that analyse and mine complex networks. To address these challenges, machine learning models are often used for analysing and mining large-scale networks. Furthermore, machine learning techniques enable novel methods of describing generative models for networks structures, dynamics and communities.

The workshop will be co-located with the International Joint Conference on Neural Networks IJCNN 2017. The workshop intends to facilitate the exchange of ideas between different research communities from both academia and industry, working at the intersection of machine learning and (social/complex) networks. The workshop focus will encompass machine learning algorithms for building and analysing large-scale networks, such as social networks, citation networks, etc. The workshop will host two keynote speakers (one from academia and one from industry), which will be announced at a later date.

Topics We are soliciting novel and original research contributions related to machine learning-based approaches to building, analysing and mining complex networks. In particular, topics of interest include but are not limited to:

- Machine learning approaches to building and mining social networks
- Clustering and ranking methods for big networks
- Large-scale link prediction algorithms
- User influence analysis
- Community detection in large-scale networks
- Machine learning applications and challenges in mining big networks
- Distributed deep learning
- Deep learning with neural networks and TensorFlow

- Details: `http://mlln-2017.inn.ac/`

11.6 **Workshop 6:** Advances in Learning from/with Multiple Learners (ALML)

Thursday Afternoon

- Organizers: Matei Basarab, Younès Bennani, Guénael Cabanes, Nistor Grozavu, and Nicoleta Rogovschi, Jérémie Sublime

- Description: AIMS AND SCOPE

  This workshop will cover original and pioneering contributions, theory as well as applications on creating and combining learning models, and aim at an inspiring discussion on the recent progress and the future developments. Learners based on different paradigms can be combined for improved accuracy. Each learning method presupposes some model of the world that comes with a set of assumptions which may lead to error if they do not hold. Learning is an ill-posed problem and with finite data each algorithm converges to a different solution and fails under various circumstances. In learning models combinations, it is possible to make a distinction between two main modes: ensemble and modular. For an ensemble approach, several solutions to the same task, or task component, are combined to yield a more reliable estimate. In the modular approach, particular aspects of a task are dealt with by specialist components before being recombined to form a global solution. In this workshop, the reasons for combining learning models and the main methods for creating and combining them will be presented. Also, the effectiveness of these methods will be discussed considering the concepts of diversity and selection of these approaches. The workshop will strive to bring together the practitioners of these approaches in an attempt to study a unified framework under which these interactions can be studied, understood, and formalized. The following is a partial list of relevant topics (not limited to) for the workshop:

  - Bagging approaches
  - Boosting techniques
  - Collaborative clustering
  - Collaborative learning

  - Cooperative learning
  - Ensemble methods
  - Hybrid systems
  - Mixtures of distributions
  - Mixtures of experts
  - Modular approaches
  - Multi-task learning
  - Multi-view learning
  - Task decomposition
  - Transfer learning with multiple sources
  - Learning from data streams
  - Data aggregation

- Details: `http://www-lipn.univ-paris13.fr/~grozavu/ALML2017/default.html`

12 Demos

12.1 Demo 1: Privacy-preserving Distributed Genomic Data Analysis using Software Guard Extension

Abstract: Genomic data privacy is becoming a big concern to the public. On one hand, directly sharing or disseminating unprotected genomic data can put sensitive information at risk. Many existing research studies have demonstrated these vulnerabilities, such as the re-identification of patients in datasets, inferring personal information (e.g., surname and face appearance) or even leaking information of blood relatives. On the other hand, biomedical research studies, especially studies of rare diseases, which usually have limited samples at a single institution, can benefit significantly from data sharing. Therefore, there is an urgent need to develop a practical mechanism for researchers to support collaborative studies in a secure and efficient manner. However, existing secure computing solutions (e.g., homomorphic encryption based secure outsourcing or garbled circuit/secret sharing based secure multiparty computation) lack both sufficient flexibility to support complicated genomic data analysis tasks and efficiency to handle large-scale genomic data. In this demonstration, we will present a novel solution based on the latest Intel Software Guard Extensions (SGX). In the proposed framework, analyses of sensitive human genomic data are protected by a secure computing unit called Enclave within the SGX- enable CPU, demonstrating efficient collaboration on rare disease studies using genomic data across different countries. More specifically, the use case in our demonstration is built on our recently published work on human genomic data analysis tasks using Transmission Disequilibrium Test (TDT). In comparison to other solutions (i.e., homomorphic encryption and garbled circuit), the proposed framework shows high efficiency, accuracy as well as security protection in sensitive and distributed genomic data analysis.

12.2 Demo 2: BigDL: Distributed Deep Learning with Apache Spark

Abstract: Intel recently released BigDL, an open source distributed Deep Learning framework for Apache Spark (`https://github.com/intel-analytics/BigDL`). It brings native support for deep learning functionalities to Spark, provides orders of magnitude speedup over other out-of-the-box open source DL frameworks (e.g., Caffe/Torch/TensorFlow) and efficiently scales out deep learning workloads based on Spark architecture. In addition, it allows data scientists to perform distributed deep learning analysis on big data using familiar tools such as Python, notebook, etc. The presentation provides a brief introduction to BigDL and gives practical examples of how Big Data users and data scientists can leverage BigDL for their deep learning analysis on large amounts of data in a distributed fashion. Through the use of traditional deep learning examples (image recognition, object detection, NLP), we will show how an existing Spark/Hadoop Big Data cluster can be used as a unified data analytics platform for data storage, data processing and mining, feature engineering, traditional machine learning, and deep learning workloads.

12.3 Demo 3 To be announced

13 Program Overview

See the tables in the following pages.

Sunday, May 14th, 2017

Time	**La Perouse:**	**Arteaga:**	**Parallel 1 (Cook):**	**Parallel 2 (Room #1+13+14):**	**Parallel 3 (Room #2+11+12):**	**Parallel 4 (Room #3+10+9):**	**Parallel 5 (Room #4+7+8):**	**Parallel 6 (Room #5+6):**
8:00AM				**T7:** Tutorial 7: Topological and graph based clustering: Recent algorithmic advances	**T4:** Tutorial 4: Information theoretic learning in pattern classification	**T6:** Tutorial 6: Deep Learning Using Multi-Layer Perceptron and Improving its Performance	**T12:** Tutorial 12: Monte Carlo Tree Search and other Simulation Optimization Methods	**T13:** Tutorial 13: Data insights from machine learning with applications to biomedical data
10:00AM	Break							
10:20AM				**T1:** Tutorial 1: Interactive Machine Learning: From Classifiers to Robotics	**T5:** Tutorial 5: Change and Anomaly Detection in Data Streams	**T10:** Tutorial 10: Deep Learning for Face Recognition	**T17:** Tutorial 17: From Complex Systems Theory to Systems Neuroscience	**T16:** Tutorial 16: Advanced Neural Network Applications for Smart Grid Operations
12:20PM	Break							
1:30PM				**T2:** Tutorial 2: Physics of the mind	**T8:** Tutorial 8: Advanced Methodologies for Predictive Learning	**T15:** Tutorial 15: Deep multiview representation learning: methods and applications	**T19:** Tutorial 19: Towards the Ultimate Brain Computer - Hardware Designs of Artificial and Spiking Neural Networks	**T14:** Tutorial 14: Time-Evolving Data Streams Learning and Short-Term Urban Traffic Flow Forecasting
3:30PM	Break							
3:50PM				**T3:** Tutorial 3: Brain-Inspired Turing Machine Logic in Neural Networks for Vision, Speech, and Natural Languages	**T20:** Tutorial 20: Cutting edge heuristics in Computational Intelligence with Visual Data Mining	**T9:** Tutorial 9: Deep Learning for EEG Signal Processing and Health Informatics	**T18:** Tutorial 18: Event-Related Potentials: Cognition in Brain-Computer Interfaces	**T11:** Tutorial 11: Graphical Probabilistic Modeling and Machine Learning for Multimedia Content Analysis
5:50PM	Break							
6:30pm	**Opening Reception:** Le Perouse							
8:30PM	End of Day							

Monday, May 15th, 2017

Time	**La Perouse:**	**Arteaga:**	**Parallel 1 (Cook):**	**Parallel 2 (Room #1+13+14):**	**Parallel 3 (Room #2+11+12):**	**Parallel 4 (Room #3+10+9):**	**Parallel 5 (Room #4+7+8):**	**Parallel 6 (Room #5+6):**
8:00AM	**Plen1** : Plenary session 1: Jose C. Principe (La Perouse)							
9:00AM	Break							
9:20AM			**S19:** Large datasets and big data analytics: Theory, methods, and applications	**S07:** Cognition and development	**eeg:** EEG Analysis	**rand:** Randomized and noise-based learning	**deep1:** Deep learning 1: theory	**theory1:** Theory 1
10:40AM	Break							
11:00AM			**S01a:** Advanced data analytics for large-scale complex data environment 2	**S25:** Mind, Brain, and Cognitive Algorithms	**gene:** Genetic and molecular applications	**prob:** Probabilistic methods	**deep2:** Deep learning 2: theory	**theory 2:** Theory 2
12:20PM	Break							
1:30PM	**Plen2** : Plenary session 2: Hava Siegelmann (La Perouse)							
2:30PM	Break							
2:50PM	**Panel1:** Cutting edge neural network research		**S01b:** Advanced data analytics for large-scale complex data environment 1	**S23:** Machine learning methods applied to vision and robotics (MLMVR) 1	**interf:** Behavior and user interfaces	**fac:** Matrix factorization and feature discovery	**deep3 :** Deep learning 3: theory	**theory3:** Theory 3
4:30PM	Break							
4:40PM			**recom:** Recommender systems and graph analysis	**S06:** Biologically inspired neural networks and learning systems for robotics	**sensory:** Sensory processing: Vision, audition, and olfaction	**syst:** Software and systems	**deep4:** Deep learning 4: Applications	**theory4:** Theory 4
6:20PM	Break							
7:30pm	**Poster Session P1:** Arteaga							
9:00PM	End of Day							

Tuesday, May 16th, 2017

Time	**La Perouse:**	**Arteaga:**	**Parallel 1 (Cook):**	**Parallel 2 (Room #1+13+14):**	**Parallel 3 (Room #2+11+12):**	**Parallel 4 (Room #3+10+9):**	**Parallel 5 (Room #4+7+8):**	**Parallel 6 (Room #5+6):**
8:00AM	**Plen3** : Plenary session 3: Alex Graves (La Perouse)							
9:00AM	Break							
9:20AM	**CP1a:** AIML Contest Panel (1): Awards and Contest Presentations		**S09a:** Concept drift, domain adaptation, and learning in dynamic environments 1	**S11:** Data mining and knowledge discovery in cyberphysical systems	**S15a:** Extreme learning machines	**spike1:** Spiking neurons: adaptation 1	**deep5:** Deep learning 5: Applications	**theory5:** Theory 5
10:40AM	Break							
11:00AM	**CP1b:** AIML Contest Panel (2): AIML Contest 2017 Engine Download and Introductions		**S09b:** Concept drift, domain adaptation, and learning in dynamic environments 2	**S30:** Optimizing neural networks via evolutionary computation and swarm intelligence	**S15b:** Extreme learning machines	**spike2:** Spiking neurons: adaptaion 2	**deep6:** Deep learning 6: Applications	**theory6:** Theory 6
12:20PM	Break							
1:30PM	**Plen4** : Plenary session 4: Paul Werbos (La Perouse)							
2:30PM	Break							
2:50PM	**Panel2:** Cybersecurity Intelligence		**S12+29:** Datastream Mining	**lang:** Natural language processing	**S32a:** Reservoir computing in hardware 1	**spike3:** Spiking neuron: hardware	**deep7:** Deep learning 7: Applications	**theory7:** Theory 7
4:30PM	Break							
4:40PM			**time:** Temporal processing	**text:** Text and document processing	**S32b:** Reservoir computing in hardware 2	**spike4:** Spiking neurons	**convnet1:** Convolutional neural networks 1	**theory8:** Theory 8
6:20PM	Break							
7:30pm	**Poster Session P2:** Arteaga							
9:00PM	End of Day							

Wednesday, May 17th, 2017

Time	**La Perouse:**	**Arteaga:**	**Parallel 1 (Cook):**	**Parallel 2 (Room #1+13+14):**	**Parallel 3 (Room #2+11+12):**	**Parallel 4 (Room #3+10+9):**	**Parallel 5 (Room #4+7+8):**	**Parallel 6 (Room #5+6):**
8:00AM	**Plen5** : Plenary session 5: Stephen Grossberg (La Perouse)							
9:00AM	Break							
9:20AM			**S08:** Computational intelligence algorithms for digital audio applications	**text2:** Text and document processing 2	**S27a:** Neuro-inspired computing with nanoelectronic devices 1	**cortex:** Cortical modeling and simulation	**convnet2:** Convolutional neural networks 2	**theory9:** Theory 9
10:40AM	Break							
11:00AM			**S20:** Machine learning for business analytics	**S14+18:** Explainability and Interpretability in Machine Learning	**S27b:** Neuro-inspired computing with nanoelectronic devices 2	**mixture:** Mixture models	**semisup:** Semisuper-vised learning	**neuro:** Computational neuroscience
12:20PM	Break							
1:30PM	**Plen6** : Plenary session 6: Christof Koch (La Perouse)							
2:30PM	Break							
2:50PM	**Panel3:** INNS 30th anniversary		**S10+24:** Cybersecurity Analytics	**clst1:** Clustering 1	**hw:** Neuromorphic engineering	**ensemble:** Ensemble learning	**rl:** Reinforcement learning	**behav:** Behavior analaysis
4:30PM	Break							
4:40PM	**Panel4:** New opportunities in neural network funding		**security:** Security and risk assessment	**clst2:** Clustering 2	**robot:** Robotics	**img:** Image analysis	**rl-ctrl:** Reinforcement learning and control	**pred:** Prediction and forecasting
6:20PM	Break							
7:00PM	**Banquet:** Arteaga							
9:00PM	End of Day							

Thursday, May 18th, 2017

Time	**La Perouse:**	**Arteaga:**	**Parallel 1 (Cook):**	**Parallel 2 (Room #1+13+14):**	**Parallel 3 (Room #2+11+12):**	**Parallel 4 (Room #3+10+9):**	**Parallel 5 (Room #4+7+8):**	**Parallel 6 (Room #5+6):**
8:00AM	**Plen7** : Plenary session 7: Odest Chadwicke Jenkins (La Perouse)							
9:00AM	Break							
9:20AM			**self-org:** Self-organization	**S17:** Intelligent vehicle and transport systems	**att:** Attention and emotion	**med:** Medical and health applications	**scene:** Scene analysis	**rnn:** Recurrent neural networks
10:40AM	Break							
11:00AM			**dyn:** Neurodynamics	**S22:** Machine learning methods applied to medicine	**brain:** Brain imaging and analysis	**health:** Health applications	**feature:** Feature selection	**sync:** Circuits and synchrony
12:20PM	Break							
1:30PM				**WS2a:** Workshop 2: Deep Learning for Music	**WS3:** Workshop 3: Computational Aspects of Pattern Recognition and Computer Vision with Neural Systems	**WS4:** Workshop 4: Canceled	**WS5a:** Workshop 5: Machine Learning for Large-Scale Networks	**WS6:** Workshop 6: Advances in Learning from/with Multiple Learners (ALML)
6:30PM	End of Day							

Friday, May 19th, 2017

Time	**La Perouse:**	**Arteaga:**	**Parallel 1 (Cook):**	**Parallel 2 (Room #1+13+14):**	**Parallel 3 (Room #2+11+12):**	**Parallel 4 (Room #3+10+9):**	**Parallel 5 (Room #4+7+8):**	**Parallel 6 (Room #5+6):**
9:00AM			**WS1:** Workshop 1: Developmental Plasticity and Evolutionary Robotics	**WS2b:** Workshop 2: Deep Learning for Music			**WS5b:** Workshop 5: Machine Learning for Large-Scale Networks	
End	End of Day							

14 Program

IJCNN 2017 Program

Tutorial T7: Tutorial 7: Topological and graph based clustering: Recent algorithmic advances
Sunday, May 14, 8:00AM-10:00AM, Room: Parallel 2 (Room #1+13+14), Instructor: Nistor Grozavu

Tutorial T4: Tutorial 4: Information theoretic learning in pattern classification
Sunday, May 14, 8:00AM-10:00AM, Room: Parallel 3 (Room #2+11+12), Instructor: Bao-Gang Hu

Tutorial T6: Tutorial 6: Deep Learning Using Multi-Layer Perceptron and Improving its Performance
Sunday, May 14, 8:00AM-10:00AM, Room: Parallel 4 (Room #3+10+9), Instructor: B. Chandra

Tutorial T12: Tutorial 12: Monte Carlo Tree Search and other Simulation Optimization Methods
Sunday, May 14, 8:00AM-10:00AM, Room: Parallel 5 (Room #4+7+8), Instructor: Michael C. Fu

Tutorial T13: Tutorial 13: Data insights from machine learning with applications to biomedical data
Sunday, May 14, 8:00AM-10:00AM, Room: Parallel 6 (Room #5+6), Instructor: Paulo Lisboa

Tutorial T1: Tutorial 1: Interactive Machine Learning: From Classifiers to Robotics
Sunday, May 14, 10:20AM-12:20PM, Room: Parallel 2 (Room #1+13+14), Instructor: Brad Hayes

Tutorial T5: Tutorial 5: Change and Anomaly Detection in Data Streams
Sunday, May 14, 10:20AM-12:20PM, Room: Parallel 3 (Room #2+11+12), Instructor: Giacomo Broacchi

Tutorial T10: Tutorial 10: Deep Learning for Face Recognition
Sunday, May 14, 10:20AM-12:20PM, Room: Parallel 4 (Room #3+10+9), Instructor: Richa Singh; Mayank Vatsa

Tutorial T17: Tutorial 17: From Complex Systems Theory to Systems Neuroscience
Sunday, May 14, 10:20AM-12:20PM, Room: Parallel 5 (Room #4+7+8), Instructor: Peter Erdi

Tutorial T16: Tutorial 16: Advanced Neural Network Applications for Smart Grid Operations
Sunday, May 14, 10:20AM-12:20PM, Room: Parallel 6 (Room #5+6), Instructor: G. Kumar Venayagamoorthy

Tutorial T2: Tutorial 2: Physics of the mind
Sunday, May 14, 1:30PM-3:30PM, Room: Parallel 2 (Room #1+13+14), Instructor: Leonid Perlovsky

Tutorial T8: Tutorial 8: Advanced Methodologies for Predictive Learning
Sunday, May 14, 1:30PM-3:30PM, Room: Parallel 3 (Room #2+11+12), Instructor: Vladimir Cherkassky

Tutorial T15: Tutorial 15: Deep multiview representation learning: methods and applications
Sunday, May 14, 1:30PM-3:30PM, Room: Parallel 4 (Room #3+10+9), Instructor: Raman Arora; Kevin Duh

Tutorial T19: Tutorial 19: Towards the Ultimate Brain Computer - Hardware Designs of Artificial and Spiking Neural Networks
Sunday, May 14, 1:30PM-3:30PM, Room: Parallel 5 (Room #4+7+8), Instructor: Jae-sun Seo and Bipin Rajendran

Tutorial T14: Tutorial 14: Time-Evolving Data Streams Learning and Short-Term Urban Traffic Flow Forecasting
Sunday, May 14, 1:30PM-3:30PM, Room: Parallel 6 (Room #5+6), Instructor: Francesco Masulli

Tutorial T3: Tutorial 3: Brain-Inspired Turing Machine Logic in Neural Networks for Vision, Speech, and Natural Languages
Sunday, May 14, 3:50PM-5:50PM, Room: Parallel 2 (Room #1+13+14), Instructor: Juyang Weng

Tutorial T20: Tutorial 20: Cutting heuristics in Computational Intelligence with Visual Data Mining
Sunday, May 14, 3:50PM-5:50PM, Room: Parallel 3 (Room #2+11+12), Instructor: Boris Kovalerchuk

Tutorial T9: Tutorial 9: Deep Learning for EEG Signal Processing and Health Informatics
Sunday, May 14, 3:50PM-5:50PM, Room: Parallel 4 (Room #3+10+9), Instructor: Francesco Carlo Morabito

Tutorial T18: Tutorial 18: Event-Related Potentials: Cognition in Brain-Computer Interfaces
Sunday, May 14, 3:50PM-5:50PM, Room: Parallel 5 (Room #4+7+8), Instructor: Joao Luis Garcia Rosa

Tutorial T11: Tutorial 11: Graphical Probabilistic Modeling and Machine Learning for Multimedia Content Analysis

Sunday, May 14, 3:50PM-5:50PM, Room: Parallel 6 (Room #5+6), Instructor: Xiao-Ping (Steven) Zhang and Zhu Liu

Special Track Recep: Welcome Reception
Sunday, May 14, 6:30PM-8:30PM, Room: La Perouse, Chair: Yoonsuck Choe

Session Plen1: Plenary session 1: Jose C. Principe
Monday, May 15, 8:00AM-9:00AM, Room: La Perouse, Chair: Cesare Alippi

8:00AM A Cognitive Architecture for Object Recognition in Video

Jose C. Principe

Special Session S19: Large datasets and big data analytics: Theory, methods, and applications
Monday, May 15, 9:20AM-10:40AM, Room: Parallel 1 (Cook), Chair: Nicolo Navarin

9:20AM Simple and Efficient Parallelization for Probabilistic Temporal Tensor Factorization [#267]

Guangxi Li, Zenglin Xu, Linnan Wang, Jinmian Ye, Irwin King and Michael Lyu

9:40AM Exploiting Sparsity to Improve the Accuracy of Nyström-based Large-scale Spectral Clustering [#770]

Mahesh Mohan and Claire Monteleoni

10:00AM Brazil's Bolsa Familia and Young Adult Workers: A Parallel RDD Approach to Large Datasets [#308]

Aloisio Dourado, Rommel Carvalho, Donald Pianto and Gustavo van Erven

10:20AM Advanced Pseudo-inverse Linear Discriminants for the Improvement of Classification Accuracies [#736]

Zhichao Jin, Lili Guo and Daqi Gao

Special Session S07: Cognition and development
Monday, May 15, 9:20AM-10:40AM, Room: Parallel 2 (Room #1+13+14), Chair: Yoonsuck Choe

9:20AM A Self-Organizing Model for Affective Memory [#334]

Pablo Barros and Stefan Wermter

9:40AM Hyperarticulation Aids Learning of New Vowels in a Developmental Speech Acquisition Model [#623]

Anja Philippsen, Felix Reinhart, Britta Wrede and Petra Wagner

10:00AM Neurorobotic Simulations on the Degradation of Multiple Column Liquid State Machines [#76]

Ricardo de Azambuja, Daniel Garcia, Martin Stoelen and Angelo Cangelosi

10:20AM The art of scaling up : a computational account on action selection in basal ganglia [#481]

Bhargav Teja Nallapu, Bapi Raju Surampudi and Nicolas P. Rougier

Session eeg: EEG Analysis
Monday, May 15, 9:20AM-10:40AM, Room: Parallel 3 (Room #2+11+12), Chair: Chaomin Luo

9:20AM EEG Classification Based On Sparse Representation [#326]

Hongwei Mo, Chaomin Luo and Gene Eu Jan

9:40AM Stochastic and Deterministic Stationarity Analysis of EEG Data [#359]

Daniel Moreira Cestari and Joao Luis Garcia Rosa

10:00AM Enhanced Detection of Movement Onset in EEG through Deep Oversampling [#606]

Noura Al Moubayed, Bashar Awwad Shiekh Hasan and Andrew Stephen McGough

10:20AM Investigating the possibility of applying EEG lossy compression to EEG-based user authentication [#795]

Binh Nguyen, Dang Nguyen, Wanli Ma and Dat Tran

Session rand: Randomized and noise-based learning
Monday, May 15, 9:20AM-10:40AM, Room: Parallel 4 (Room #3+10+9), Chair: Khan Iftekharuddin

9:20AM Single-Cell Based Random Neural Network for Deep Learning [#72]

Yonghua Yin and Erol Gelenbe

9:40AM Efficient k-means++ with Random Projection [#176]

Jan Y. K. Chan and Alex Po Leung

10:00AM A Two-Phase Representation Based Face Recognition Method With 'Random-Filtering' Virtual Samples [#383]

Deyan Tang, Siwang Zhou, Wenjuan Yang and Yonghe Liu

10:20AM Using Noise to Speed Up Video Classification with Recurrent Backpropagation [#931]

Bart Kosko and Olaoluwa Adigun

Session deep1: Deep learning 1: theory
Monday, May 15, 9:20AM-10:40AM, Room: Parallel 5 (Room #4+7+8), Chair: Jinglu Hu

9:20AM DeepRecon: Dynamically Reconfigurable Architecture for Accelerating Deep Neural Networks [#892]

Tayyar Rzayev, Saber Moradi, David Albonesi and Rajit Manohar

9:40AM A Robust Adaptive Stochastic Gradient Method for Deep Learning [#670]

Caglar Gulcehre, Jose Sotelo, Marcin Moczulski and Yoshua Bengio

10:00AM Data-centric Computation Mode for Convolution in Deep Neural Networks [#792]

Peiqi Wang, Zhenyu Liu, Haixia Wang and Dongsheng Wang

10:20AM A Multilayer Gated Bilinear Classifier: from Optimizing a Deep Rectified Network to a Support Vector Machine [#178]

Weite Li and Jinglu Hu

Session theory1: Theory 1
Monday, May 15, 9:20AM-10:40AM, Room: Parallel 6 (Room #5+6), Chair: Giacomo Boracchi

9:20AM Selective and Cooperative Potentiality Maximization for Improving Interpretation and Generalization [#65]

Ryotaro Kamimura

9:40AM Neural Networks Between Integer and Rational Weights [#77]

Jiri Sima

10:00AM Weibull Partition Models with Applications to Hidden Semi-Markov Models [#83]

Youwei Lu, Shogo Okada and Katsumi Nitta

10:20AM A Model based Search Method for Prediction in Model-free Markov Decision Process [#174]

Ajin George Joseph and Shalabh Bhatnagar

Special Session S01a: Advanced data analytics for large-scale complex data environment 2
Monday, May 15, 11:00AM-12:20PM, Room: Parallel 1 (Cook), Chair: Yang Li; Xiaobo Liu

11:00AM Deeply-Supervised CNN for Prostate Segmentation [#243]

Zhu Qikui, Du Bo, Turkbey Baris, Choyke Peter L . and Yan Pingkun

11:20AM A Weighted-resampling based Transfer Learning Algorithm [#137]

Xiaobo Liu, Zhentao Liu, Guangjun Wang, Zhihua Cai and Harry Zhang

11:40AM Fitness with Diversity Information for Selection of Evolutionary Algorithms [#134]

Yang Li, Chengjun Li, Gang Liu and Wei Long

12:00PM A Kernel-based adaptive Fuzzy C-Means algorithm for M-FISH image segmentation [#335]

Alan William Dougherty and Jane You

Special Session S25: Mind, Brain, and Cognitive Algorithms
Monday, May 15, 11:00AM-12:20PM, Room: Parallel 2 (Room #1+13+14), Chair: Leonid Perlovsky

11:00AM Neural Network Modeling of Business Decision Making [#197]

Daniel Levine, Kay-Yut Chen and Bakur AlQaudi

11:20AM Actions as Contexts [#837]

Xiang Wu and Juyang Weng

11:40AM "Hard Science" of Psychology, Physics of the Mind [#938]

Leonid Perlovsky

12:00PM Resting State Neural Networks and Energy Metabolism [#769]

Raymond Noack, Manjesh Chetan, Ruszinko Miklos, Siegelmann Hava and Kozma Robert

Session gene: Genetic and molecular applications
Monday, May 15, 11:00AM-12:20PM, Room: Parallel 3 (Room #2+11+12), Chair: Marley Vellasco

11:00AM Accurate Classification of Immunomodulatory RNA Sequences [#526]

Hugo A. Guillen-Ramirez, Jose Colbes, Carlos A. Brizuela and Israel M. Martinez-Perez

11:20AM Structural Damage Assessment Using Artificial Immune Systems and Wavelet Decomposition [#878]

Arthur Shi and Xiao-Hua Yu

11:40AM Feature importance calculation and protein quality assessment on the decoy discrimination problem [#914]

Edwin Tavara, Marley Vellasco, Bruno Horta and Fabio Custodio

12:00PM Convex Local Sensitive Low Rank Matrix Approximation [#782]

Chongya Li, Lin Zhu, Wenzheng Bao, Yongli Jiang, Changan Yuan and De-Shuang Huang

Session prob: Probabilistic methods
Monday, May 15, 11:00AM-12:20PM, Room: Parallel 4 (Room #3+10+9), Chair: Barbara Hammer

11:00AM Adaptive Blocked Gibbs Sampling for Inference in Probabilistic Graphical Models [#376]

Mohammad Maminur Islam, Khan Mohammad Al Farabi and Venugopal Deepak

11:20AM Probabilistic Matrix Factorization from Quantized Measurements [#379]

Giulio Bottegal and Johan A.K. Suykens

11:40AM Probabilistic Matching: Causal Inference under Measurement Errors [#493]

Fani Tsapeli, Peter Tino and Mirco Musolesi

12:00PM Bayesian Optimization for Conditional Hyperparameter Spaces [#510]

Julien-Charles Levesque, Audrey Durand, Christian Gagne and Robert Sabourin

Session deep2: Deep learning 2: theory
Monday, May 15, 11:00AM-12:20PM, Room: Parallel 5 (Room #4+7+8), Chair: Nicolo Navarin

11:00AM Unsupervised Deep Kernel for High Dimensional Data [#815]

Ying Xie, Linh Le and Jie Hao

11:20AM Margin Maximization for Robust Classification using Deep Learning [#898]

Alexander Matyasko and Chau Lap-Pui

11:40AM Variational methods for Conditional Multimodal Deep Learning [#125]

Gaurav Pandey and Ambedkar Dukkipati

12:00PM Deep Graph Node Kernels: a Convex Approach [#759]

Luca Oneto, Nicolo Navarin, Alessandro Sperduti and Davide Anguita

Session theory 2: Theory 2
Monday, May 15, 11:00AM-12:20PM, Room: Parallel 6 (Room #5+6), Chair: George Cavalcanti

11:00AM Cooperative Learning: Decentralized Data Neural Network [#856]

Noah Lewis, Sergey Plis and Vince Calhoun

11:20AM On the Characterization of the Oracle for Dynamic Classifier Selection [#80]

Mariana A. Souza, George D. C. Cavalcanti, Rafael M. O. Cruz and Robert Sabourin

11:40AM Data Analysis in Weitzenbock Space [#240]

Stephen Marsland and Carole Twining

12:00PM Simple, Fast and Accurate Hyper-parameter Tuning in Gaussian-kernel SVM [#266]

Guangliang Chen, Wilson Florero-Salinas and Dan Li

Session Plen2: Plenary session 2: Hava Siegelmann
Monday, May 15, 1:30PM-2:30PM, Room: La Perouse, Chair: Chrisina Jayne

1:30PM How brain architecture leads to abstract thought

Hava Siegelmann

Panel Session Panel1: Cutting edge neural network research
Monday, May 15, 2:50PM-4:30PM, Room: La Perouse, Chair: Asim Roy; Robert Kozma; Yoonsuck Choe

Special Session S01b: Advanced data analytics for large-scale complex data environment 1
Monday, May 15, 2:50PM-4:30PM, Room: Parallel 1 (Cook), Chair: Yang Li; Xiaobo Liu

2:50PM An output-based knowledge transfer approach and its application in bladder cancer prediction [#167]

Guanjin Wang, Guangquan Zhang, Kup-Sze Choi, Kin-Man Lam and Jie Lu

3:10PM Relational Autoencoder for Feature Extraction [#292]

Qinxue Meng, Daniel Catchpoole, David Skillicorn and Paul Kennedy

3:30PM Metric learning for multi-instance classification with collapsed bags [#146]

Li Dewei, Xu Dongkuan, Tang Jingjing and Tian Yingjie

3:50PM First-order Causal Process for Causal Modelling with Instantaneous and Cross-temporal Relations [#524]

Fujin Zhu, Guangquan Zhang, Jie Lu and Donghua Zhu

4:10PM Universal Network Representation for Heterogeneous Information Networks [#236]

Ruiqi Hu, Celina Ping Yu, Sai-Fu Fung, Shirui Pan, Haishuai Wang and Guodong Long

Special Session S23: Machine learning methods applied to vision and robotics (MLMVR) 1
Monday, May 15, 2:50PM-4:30PM, Room: Parallel 2 (Room #1+13+14), Chair: Enrique Dominguez

2:50PM Panoramic Background Modeling for PTZ Cameras with Competitive Learning Neural Networks [#564]

Karl Thurnhofer-Hemsi, Ezequiel Lopez-Rubio, Enrique Dominguez, Rafael Marcos Luque-Baena and Miguel A. Molina-Cabello

3:10PM Neural Controller for PTZ cameras based on nonpanoramic foreground detection [#648]

Miguel A. Molina-Cabello, Ezequiel Lopez-Rubio, Rafael Marcos Luque-Baena, Enrique Dominguez and Karl Thurnhofer-Hemsi

3:30PM LonchaNet: A Sliced-based CNN Architecture for Real-time 3D Object Recognition [#421]

Francisco Gomez-Donoso, Alberto Garcia-Garcia, Jose Garcia-Rodriguez, Sergio Orts-Escolano and Miguel Cazorla

3:50PM Prediction of Natural Guidewire Rotation Using an sEMG-based NARX Neural Network [#31]

Xiao-Hu Zhou, Gui-Bin Bian, Xiao-Liang Xie, Zeng-Guang Hou and Jian-Long Hao

4:10PM A Recurrent Neural Network based Schaeffer Gesture Recognition System [#586]

Sergiu-Ovidiu Oprea, Alberto Garcia-Garcia, Jose Garcia-Rodriguez, Sergio Orts-Escolano and Miguel Cazorla

Session interf: Behavior and user interfaces
Monday, May 15, 2:50PM-4:30PM, Room: Parallel 3 (Room #2+11+12), Chair: Nojun Kwak

2:50PM Matching Video Net: Memory-based embedding for video action recognition [#173]

Daesik Kim, Myunggi Lee and Nojun Kwak

3:10PM Haptic Material Classification with a Multi-Channel Neural Network [#356]

Matthias Kerzel, Moaaz Ali, Hwei Geok Ng and Stefan Wermter

3:30PM Variation in Classification Accuracy with Number of Glimpses [#847]

Jayanta Dutta and Bonny Banerjee

3:50PM Fast On-Line Kernel Density Estimation for Active Object Localization [#368]

Anthony Rhodes, Max Quinn and Melanie Mitchell

4:10PM Human Action Recognition using Transfer Learning with Deep Representations [#196]

Allah Bux Sargano, Xiaofeng Wang, Plamen Angelov and Zulfiqar Habib

Session fac: Matrix factorization and feature discovery
Monday, May 15, 2:50PM-4:30PM, Room: Parallel 4 (Room #3+10+9), Chair: Xiaokai Wei

2:50PM Factorization for Projective and Metric Reconstruction via Truncated Nuclear Norm [#407]

Yang Lin, Li Yang, Zhouchen Lin, Tong Lin and Hongbin Zha

3:10PM Robust Nonnegative Matrix Factorization with Ordered Structure Constraints [#128]

Jing Wang, Feng Tian, Chang Hong Liu, Hongchuan Yu, Xiao Wang and Xianchao Tang

3:30PM Nonnegative Matrix Factorization with Adaptive Neighbors [#192]

Shudong Huang, Zenglin Xu and Fei Wang

3:50PM Multi-view Unsupervised Feature Selection by Cross-diffused Matrix Alignment [#854]

Xiaokai Wei, Bokai Cao and Philip S. Yu

4:10PM Distance Metric Learning with Eigenvalue Fine Tuning [#61]

Wang Wenqun, Zhang Ya and Hu Jinglu

Session deep3 : Deep learning 3: theory
Monday, May 15, 2:50PM-4:30PM, Room: Parallel 5 (Room #4+7+8), Chair: William Severa

2:50PM Deep Reward Shaping from Demonstrations [#403]

Ahmed Hussein, Eyad Elyan, Mohamed Medhat Gaber and Chrisina Jayne

3:10PM Mitigating Fooling with Competitive Overcomplete Output Layer Neural Networks [#343]

Navid Kardan and Kenneth Stanley

3:30PM Neurogenesis Deep Learning: Extending Deep Networks to Accommodate New Classes [#655]

Timothy Draelos, Nadine Miner, Christopher Lamb, Craig Vineyard, Kristofor Carlson, Conrad James, James Aimone, William Severa and Jonathan Cox

3:50PM Fast Feedforward Non-parametric Deep Learning Network with Automatic Feature Extraction [#449]

Plamen Angelov, Xiaowei Gu and Jose Principe

4:10PM The Effects of Output Codes on Transfer Learning in a Deep Convolutional Neural Net [#531]

Steven Gutstein and Ethan Stump

Session theory3: Theory 3
Monday, May 15, 2:50PM-4:30PM, Room: Parallel 6 (Room #5+6), Chair: Ricardo Cerri

2:50PM A Sequential Simplex Algorithm for Automatic Data and Center Selecting Radial Basis Functions [#694]

Xiaofeng Ma, Tomojit Ghosh and Michael Kirby

3:10PM Dictionary Learning with Equiprobable Matching Pursuit [#339]

Fredrik Sandin and Sergio Martin-del-Campo

3:30PM A TCART-M - Tuned CARTesian-based Error Function for Multilabel Classification with the MLP [#283]

Jacek Mandziuk, Adam Zychowski and Lipo Wang

3:50PM A Two-Step Cascade Classification Method [#501]

Eunelson Silva, Alceu S. Britto, Luiz S. Oliveira, Fabricio Enembreck, Robert Sabourin and Alessandro Koerich

4:10PM Incorporating Instance Correlations in Multi-label Classification via Label-Space [#505]

Iuri Bonna Mauricio Abreu, Rafael Gomes Mantovani and Ricardo Cerri

Session recom: Recommender systems and graph analysis
Monday, May 15, 4:40PM-6:20PM, Room: Parallel 1 (Cook), Chair: Liqiang Wang

4:40PM Social Recommendation Using Euclidean Embedding [#467]

Wentao Li, Min Gao, Wenge Rong, Junhao Wen, Qingyu Xiong, Ruixi Jia and Tong Dou

5:00PM Music Recommendation via Heterogeneous Information Graph Embedding [#470]

Dongjing Wang, Guandong Xu and Shuiguang Deng

5:20PM Leveraging Deep Visual Features for Content-based Movie Recommender Systems [#583]

Ralph Rassweiler, Jonatas Wehrmann and Rodrigo Barros

5:40PM Graph-Boosted Convolutional Neural Networks for Semantic Segmentation [#60]

Guangzhen Liu, Peng Han, Yulei Niu, Wenwu Yuan, Zhiwu Lu and Ji-Rong Wen

6:00PM Link Prediction by Exploiting Network Formation Games in Exchangeable Graphs [#212]

Liqiang Wang, Yafang Wang, Bin Liu, Lirong He, Shijun Liu, Gerard de Melo and Zenglin Xu

Special Session S06: Biologically inspired neural networks and learning systems for robotics
Monday, May 15, 4:40PM-6:20PM, Room: Parallel 2 (Room #1+13+14), Chair: Chaomin Luo

4:40PM Teaching Emotion Expressions to a Human Companion Robot using Deep Neural Architectures [#616]

Nikhil Churamani, Matthias Kerzel, Erik Strahl, Pablo Barros and Stefan Wermter

5:00PM A Self-Driving Robot Using Deep Convolutional Neural Networks on Neuromorphic Hardware [#363]

Tiffany Hwu, Jacob Isbell, Nicolas Oros and Jeffrey Krichmar

5:20PM Emergence of Tool Construction in an Articulated Limb Controlled by Evolved Neural Circuits [#918]

Randall Reams and Yoonsuck Choe

5:40PM Neural Based Obstacle Avoidance with CPG Controlled Hexapod Walking Robot [#722]

Petr Cizek, Pavel Milicka and Jan Faigl

6:00PM Predictive Coding for Dynamic Vision: Development of Functional Hierarchy in a Multiple Spatio-Temporal Scales RNN Model [#119]

Minkyu Choi and Jun Tani

Session sensory: Sensory processing: Vision, audition, and olfaction
Monday, May 15, 4:40PM-6:20PM, Room: Parallel 3 (Room #2+11+12), Chair: A. Ravishankar Rao

4:40PM Visual Entity Linking [#788]

Neha Tilak, Sunil Gandhi and Tim Oates

5:00PM Simulations Support the Simple Hypothesis that Persistent Coupling of Electrochemical Activity in Recurrent Network Neurons Is an Objective Signature of Visual Object Unity [#78]

Raymond Pavloski and Charles Lamb

5:20PM Audio Visual Speech Recognition With Multimodal Recurrent Neural Networks [#259]

Weijiang Feng, Naiyang Guan, Yuan Li, Xiang Zhang and Zhigang Luo

5:40PM Perception Space Analysis: From Color Vision to Odor Perception [#585]

Amir Madany Mamlouk, Martin Haker and Thomas Martinetz

6:00PM The modulation of synchronization by tuning functions and its effect on multi-sensory perception [#382]

A. Ravishankar Rao

Session syst: Software and systems
Monday, May 15, 4:40PM-6:20PM, Room: Parallel 4 (Room #3+10+9), Chair: Christina Kluever

4:40PM Using Regularized Fisher Discriminant Analysis To Improve The Performance Of Gaussian Supervector In Session And Device Identification [#313]

Yuechi Jiang and Frank H. F. Leung

5:00PM Machine Learning Approaches to Predict Learning Outcomes in Massive Open Online Courses [#332]

Raghad Al-Shabandar, Abir Hussain, Andy Laws, Robert Keight, Janet Lunn and Naeem Rad

5:20PM Analyzing and Predicting Concurrency Bugs in Open Source Systems [#361]

Paolo Ciancarini, Francesco Poggi, Davide Rossi and Alberto Sillitti

5:40PM A Self-Enforcing Neural Network as Decision Support System for Air Traffic Control based on probabilistic Weather Forecasts [#392]

Christina Kluever, Juergen Kluever and Dirk Zinkhan

6:00PM Structure Embedding for Knowledge Base Completion and Analytics [#560]

Zili Zhou, Guandong Xu, Wenhao Zhu, Jinyan Li and Wu Zhang

Session deep4: Deep learning 4: Applications
Monday, May 15, 4:40PM-6:20PM, Room: Parallel 5 (Room #4+7+8), Chair: David Fagan

4:40PM Deep Learning based Frameworks for Image Super-Resolution and Noise-Resilient Super-Resolution [#307]

Manoj Sharma, Santanu Chaudhury and Brejesh Lall

5:00PM CAS-CNN: A Deep Convolutional Neural Network for Image Compression Artifact Suppression [#391]

Lukas Cavigelli, Pascal Hager and Luca Benini

5:20PM Learning of Binocular Fixations using Anomaly Detection with Deep Reinforcement Learning [#639]

Francois de La Bourdonnaye, Celine Teuliere, Jochen Triesch and Thierry Chateau

5:40PM Abstraction Hierarchy in Deep Learning Neural Networks [#657]

Roman Ilin, Thomas Watson and Robert Kozma

6:00PM Deep Learning through Evolution: A Hybrid Approach to Scheduling in a Dynamic Environment [#302]

David Fagan, Michael Fenton, David Lynch, Stepan Kucera, Holger Claussen and Michael O'Neill

Session theory4: Theory 4
Monday, May 15, 4:40PM-6:20PM, Room: Parallel 6 (Room #5+6), Chair: Bill Howell

4:40PM Octonion-Valued Bidirectional Associative Memories [#43]

Calin-Adrian Popa

5:00PM Hyperellipsoidal Neuron [#58]

Carlos Villasenor, Nancy Arana-Daniel, Alma Y. Alanis and Carlos Lopez-Franco

5:20PM Dendrite Ellipsoidal Neuron [#453]

Fernando Arce, Erik Zamora and Humberto Sossa

5:40PM Neuro-inspired Quantum Associative Memory Using Adiabatic Hamiltonian Evolution [#814]

Yoshihiro Osakabe, Shigeo Sato, Hisanao Akima, Mitsunaga Kinjo and Masao Sakuraba

6:00PM Matrix Variate RBM Model with Gaussian Distributions [#320]

Simeng Liu, Yanfeng Sun, Yongli Hu, Junbin Gao, Fujiao Ju and Baocai Yin

Plenary Poster Session P1: Poster session #1
Monday, May 15, 7:30PM-9:00PM, Room: Arteaga, Chair: Richard Duro

P101 Complex-Valued Convolutional Neural Networks for Real-Valued Image Classification [#38]

Calin-Adrian Popa

P102 Evolutionary Optimization of On-line Multilayer Perceptron for Similarity-Based Access Control [#86]

Andrii Shalaginov

P103 Modeling Direction Selective Visual Neural Network with ON and OFF Pathways for Extracting Motion Cues from Cluttered Background [#228]

Qinbing Fu and Shigang Yue

P104 A dynamic neural controller for adaptive optimal control of permanent magnet DC motors [#437]

Yinyan Zhang, Shuai Li, Xin Luo and Ming-sheng Shang

P105 LSTM with Working Memory [#222]

Andrew Pulver and Siwei Lyu

P106 Critical echo state network dynamics by means of Fisher information maximization [#936]

Filippo Maria Bianchi, Lorenzo Livi, Robert Jenssen and Cesare Alippi

P107 Learning to Reproduce Stochastic Time Series Using Stochastic LSTM [#416]

Sadaf Gulshad, Dick Sigmund and Jong-Hwan Kim

P108 Parameter Compression of Recurrent Neural Networks and Degradation of Short-term Memory [#663]

Jonathan Cox

P109 Improving Learning Efficiency of Recurrent Neural Network through Adjusting Weights of All Layers in a Biologically-inspired Framework [#783]

Xiao Huang, Wei Wu, Peijie Yin and Hong Qiao

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P210 Adaptive Incremental Ensemble of Extreme Learning Machines for Fault Diagnosis in Induction Motors [#522]

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P211 Multi-Layer Neural Networks for Quality of Service oriented Server-State Classification in Cloud Servers [#580]

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A. Ravishankar Rao and Daniel Clarke

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Daniel Urda, Rafael Marcos Luque Baena, Noelia Sanchez, Leonardo Franco and Jose Manuel Jerez Aragones

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Vinay Karagod and Kaushik Sinha

P217 Exploring the consequences of distributed feature selection in DNA microarray data [#152]

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P218 Assessment of the repeatability in an automatic methodology for hyperemia grading in the bulbar conjunctiva [#41]

Luisa Sanchez Brea, Noelia Barreira Rodriguez, Antonio Mosquera Gonzalez and Katharine Evans

P219 Power infrastructure monitoring and damage detection using drone captured images [#899]

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P220 Towards Real-Time Robot Simulation on Uneven Terrain Using Neural Networks [#827]

Daniel Cook and Andrew Vardy

P221 Extremely Parallel Memristor Crossbar Architecture for Convolutional Neural Network Implementation [#819]

Chris Yakopcic, Zahangir Alom and Tarek Taha

P222 Methods for High Resolution Programming in Lithuim Niobate Memristors for Neuromorphic Hardware [#923]

Chris Yakopcic, Shu Wang, Weisong Wang, Eunsung Shin, Guru Subramanyam and Tarek Taha

P223 Non-negative Pyramidal Neural Network for Parts-based Learning [#627]

Milla Ferro, Bruno Fernandes and Carmelo Bastos-Filho

P224 Performance Optimization of Echo State Networks Through Principal Neuron Reinforcement [#826]

Hsiao-Tien Fan, Wei Wang and Zhanpeng Jin

P225 Dynamic Island Model based on Spectral Clustering in Genetic Algorithm [#155]

Qinxue Meng, Jia Wu, John Ellis and Paul Kennedy

Session Plen3: Plenary session 3: Alex Graves
Tuesday, May 16, 8:00AM-9:00AM, Room: La Perouse, Chair: Barbara Hammer

8:00AM Frontiers in recurrent neural network research

Alex Graves

Panel Session CP1a: AIML Contest Panel (1): Awards and Contest Presentations
Tuesday, May 16, 9:20AM-10:40AM, Room: La Perouse, Chair: Juyang (John) Weng and Juan Castro-Garcia

Special Session S09a: Concept drift, domain adaptation, and learning in dynamic environments 1
Tuesday, May 16, 9:20AM-10:40AM, Room: Parallel 1 (Cook), Chair: Giacomo Boracchi

9:20AM Uniform Histograms for Change Detection in Multivariate Data [#744]

Giacomo Boracchi, Cristiano Cervellera and Danilo Maccio

9:40AM LEVELIW: Learning Extreme Verification Latency with Importance Weighting [#850]

Mohammad Umer, Christopher Frederickson and Robi Polikar

10:00AM Label-Noise-Tolerant Classification for Streaming Data [#55]

Benoit Frenay and Barbara Hammer

10:20AM Transfer Learning in Classification based on Manifold Models and its Relation to Tangent Metric Learning [#489]

Sascha Saralajew and Thomas Villmann

Special Session S11: Data mining and knowledge discovery in cyberphysical systems
Tuesday, May 16, 9:20AM-10:40AM, Room: Parallel 2 (Room #1+13+14), Chair: Tang Bo

9:20AM NotiFi: A Ubiquitous WiFi-based Abnormal Activity Detection System [#400]

Dali Zhu, Na Pang, Gang Li and Shaowu Liu

9:40AM Policy Gradient Methods with Gaussian Process Modelling Acceleration [#120]

Dong Li, Dongbin Zhao, Qichao Zhang and Chaomin Luo

10:00AM Detecting changes at the sensor level in Cyber-Physical Systems: Methodology and Technological Implementation [#423]

Cesare Alippi, Viviana D'Alto, Mirko Falchetto, Danilo Pau and Manuel Roveri

10:20AM A Hybrid Machine Learning Approach to Automatic Plant Phenotyping for Smart Agriculture [#922]

So Yahata, Tetsu Onishi, Kanta Yamaguchi, Seiichi Ozawa, Jun Kitazono, Takenao Ohkawa, Takeshi Yoshida, Murakami Noriyuki and Hiroyuki Tsuji

Special Session S15a: Extreme learning machines
Tuesday, May 16, 9:20AM-10:40AM, Room: Parallel 3 (Room #2+11+12), Chair: Philip de Chazal

9:20AM A Theoretical Study of The Relationship Between An ELM Network and Its Subnetworks [#25]

Enmei Tu, Guanghao Zhang, Lily Rachmawati, Eshan Rajabally, Shangbo Mao and Guang-Bin Huang

9:40AM Regularized Training of the Extreme Learning Machine using the Conjugate Gradient Method [#773]

Philip de Chazal and Mark McDonnell

10:00AM Reconstruction of Bifurcation Diagrams Using an Extreme Learning Machine with a Pruning Algorithm [#166]

Yoshitaka Itoh and Masaharu Adachi

10:20AM A Low-Dimensional Vector Representation for Words using an Extreme Learning Machine [#731]

Paula Lauren, Guangzhi Qu, Guang-Bin Huang, Paul Watta and Amaury Lendasse

Session spike1: Spiking neurons: adaptation 1
Tuesday, May 16, 9:20AM-10:40AM, Room: Parallel 4 (Room #3+10+9), Chair: Timoleon Moraitis

9:20AM Fatiguing STDP: Learning from Spike-Timing Codes in the Presence of Rate Codes [#879]

Timoleon Moraitis, Abu Sebastian, Irem Boybat, Manuel Le Gallo, Tomas Tuma and Evangelos Eleftheriou

9:40AM Spike Timing-Dependent Conduction Delay Learning Model Classifying Spatio-Temporal Spike Patterns [#164]

Takashi Matsubara

10:00AM Unsupervised Learning of Event-Based Image Recordings using Spike-Timing-Dependent Plasticity [#290]

Laxmi Iyer and Arindam Basu

10:20AM Spike Timing Dependent Plasticity Based Enhanced Self-Learning for Efficient Pattern Recognition in Spiking Neural Networks [#719]

Gopalakrishnan Srinivasan, Sourjya Roy, Vijay Raghunathan and Kaushik Roy

Session deep5: Deep learning 5: Applications
Tuesday, May 16, 9:20AM-10:40AM, Room: Parallel 5 (Room #4+7+8), Chair: Jian Zhang

9:20AM Deep Learning Approach to Link Weight Prediction [#92]

Yuchen Hou and Lawrence Holder

9:40AM Deep Boltzmann Machines for Robust Fingerprint Spoofing Attack Detection [#223]

Gustavo Souza, Daniel Santos, Rafael Pires, Aparecido Marana and Joao Papa

10:00AM Classification of Android Apps and Malware Using Deep Neural Networks [#547]

Robin Nix and Jian Zhang

10:20AM Context Preference-based Deep Adaptive Resonance Theory: Integrating User Preferences into Episodic Memory Encoding and Retrieval [#305]

Dick Sigmund, Gyeong-Moon Park and Jong-Hwan Kim

Session theory5: Theory 5
Tuesday, May 16, 9:20AM-10:40AM, Room: Parallel 6 (Room #5+6), Chair: Michael Potter

9:20AM Neural Networks and the Search for a Quadratic Residue Detector [#447]

Michael Potter, Leon Reznik and Stanislaw Radziszowski

9:40AM Stochastic Diagonal Approximate Greatest Descent in Neural Networks [#568]

Hong Hui Tan, King Hann Lim and Hendra Gunawan Harno

10:00AM Nesterov's Accelerated Gradient and Momentum as approximations to Regularised Update Descent [#673]

Botev Aleksandar, Lever Guy and Barber David

10:20AM On improving Recurrent Neural Network for Image Classification [#27]

Chandra B. and Rajeshkumar Sharma

Panel Session CP1b: AIML Contest Panel (2): AIML Contest 2017 Engine Download and Introductions
Tuesday, May 16, 11:00AM-12:20PM, Room: La Perouse, Chair: Juyang (John) Weng and Juan Castro-Garcia

Special Session S09b: Concept drift, domain adaptation, and learning in dynamic environments 2
Tuesday, May 16, 11:00AM-12:20PM, Room: Parallel 1 (Cook), Chair: Robi Polikar

11:00AM Incremental Learning with the Minimum Description Length Principle [#891]

Pierre-Alexandre Murena, Antoine Cornuejols and Jean-Louis Dessalles

11:20AM BLPA: Bayesian Learn-Predict-Adjust Method for Online Detection of Recurrent Changepoints [#774]

Alexandr Maslov, Mykola Pechenizkiy, Yulong Pei, Indre Zliobaite, Alexander Shklyaev, Tommi Karkkainen and Jaakko Hollmen

11:40AM An Incremental Ensemble Classifier Learning by Means of a Rule-Based Accuracy and Diversity Comparison [#460]

Md Asafuddoula, Brijesh Verma and Mengjie Zhang

12:00PM Pattern Classification with Meta-Cognition and Online Sequential Learning Algorithm [#469]

Skanda S. Bharadwaj, R. Chandan Kumar, B. N. Sumukha and Koshy George

Special Session S30: Optimizing neural networks via evolutionary computation and swarm intelligence
Tuesday, May 16, 11:00AM-12:20PM, Room: Parallel 2 (Room #1+13+14), Chair: Wei-Chang Yeh

11:00AM Investigation of Long Short-Term Memory Networks to Temperature Prediction for Permanent Magnet Synchronous Motors [#28]

Oliver Wallscheid, Wilhelm Kirchgaessner and Joachim Boecker

11:20AM Improved Performance of Face Recognition using CNN with Constrained Triplet Loss Layer [#408]

Henry Wing Fung Yeung, Jiaxi Li and Yuk Ying Chung

11:40AM A Novel Stacked Denoising Autoencoder with Swarm Intelligence Optimization for Stock Index Prediction [#757]

Jiaxi Li, Guang Liu, Henry Wing Fung Yeung, Yuk Ying Chung, Junfu Yin and Xiaoming Chen

12:00PM An evolutionary method for creating ensembles with adaptive size neural networks for predicting hourly solar irradiance [#260]

Raka Jovanovic, Luis Pomares, Yasir Mohieldeen, Daniel Perez-Astudillo and Dunia Bachour

Special Session S15b: Extreme learning machines
Tuesday, May 16, 11:00AM-12:20PM, Room: Parallel 3 (Room #2+11+12), Chair: Philip de Chazal

11:00AM Semi-supervised Convolutional Extreme Learning Machine [#776]

Mahmood Yousefi-Azar and Mark D. McDonnell

11:20AM Objective Cost-Sensitive-Boosting-WELM for Handling Multi Class Imbalance Problem [#582]

Liu Zhen, Tang Deyu, Li Jincheng and Wang Ruoyu

11:40AM Online Recurrent Extreme Learning Machine and its Application to Time-series Prediction [#880]

Jin-Man Park and Jong-Hwan Kim

12:00PM Extreme Learning Machines to Approximate Low Dimensional Spaces for Helicopter Load Signal and Fatigue Life Estimation [#508]

Julio J. Valdes, Catherine Cheung and Alejandro Lehman-Rubio

Session spike2: Spiking neurons: adaptaion 2
Tuesday, May 16, 11:00AM-12:20PM, Room: Parallel 4 (Room #3+10+9), Chair: Meghan Galiardi

11:00AM Stable Spike-Timing Dependent Plasticity Rule for Multilayer Unsupervised and Supervised Learning [#754]

Amar Shrestha, Khadeer Ahmed, Yanzhi Wang and Qinru Qiu

11:20AM Calcium-Modulated Supervised Spike-Timing-Dependent Plasticity for Readout Training and Sparsification of the Liquid State Machine [#901]

Yingyezhe Jin and Peng Li

11:40AM Optimization-based Computation with Spiking Neurons [#194]

Stephen Verzi, Craig Vineyard, Eric Vugrin, Meghan Galiardi, Conrad James and James Aimone

12:00PM Multi-Layer Unsupervised Learning in a Spiking Convolutional Neural Network [#245]

Amirhossein Tavanaei and Anthony Maida

Session deep6: Deep learning 6: Applications
Tuesday, May 16, 11:00AM-12:20PM, Room: Parallel 5 (Room #4+7+8), Chair: Bill Howell

11:00AM Action Unit Selective Feature Maps in Deep Networks for Facial Expression Recognition [#628]

Yuqian Zhou and Bertram Shi

11:20AM How to Get Pavement Distress Detection Ready for Deep Learning? A Systematic Approach [#660]

Markus Eisenbach, Ronny Stricker, Daniel Seichter, Karl Amende, Klaus Debes, Maximilian Sesselmann, Dirk Ebersbach, Ulrike Stoeckert and Horst-Michael Gross

11:40AM Deep Neural Networks for Kitchen Activity Recognition [#723]

Juarez Monteiro, Roger Granada, Rodrigo Barros and Felipe Meneguzzi

12:00PM Deep Convolutional Neural Networks for Pedestrian Detection with Skip Pooling [#491]

Jie Liu, Xingkun Gao, Nianyuan Bao, Jie Tang and Gangshan Wu

Session theory6: Theory 6
Tuesday, May 16, 11:00AM-12:20PM, Room: Parallel 6 (Room #5+6), Chair: Ulf Johansson

11:00AM Balanced Self-Paced Learning with Feature Corruption [#270]

Yazhou Ren, Peng Zhao, Zenglin Xu and Dezhong Yao

11:20AM Model-Agnostic Nonconformity Functions for Conformal Classification [#485]

Ulf Johansson, Henrik Linusson, Tuve Lofstrom and Henrik Bostrom

11:40AM DropIn: Making Reservoir Computing Neural Networks Robust to Missing Inputs by Dropout [#629]

Davide Bacciu, Francesco Crecchi and Davide Morelli

12:00PM Information-Theoretic Dataset Selection for Fast Kernel Learning [#598]

Antonio Paiva

Session Plen4: Plenary session 4: Paul Werbos
Tuesday, May 16, 1:30PM-2:30PM, Room: La Perouse, Chair: Robert Kozma

1:30PM Backpropagation in the Brain and More Advanced Learning Systems

Paul Werbos

Panel Session Panel2: Cybersecurity Intelligence
Tuesday, May 16, 2:50PM-4:30PM, Room: La Perouse, Chair: Catherine Huang

Special Session S12+29: Datastream Mining
Tuesday, May 16, 2:50PM-4:30PM, Room: Parallel 1 (Cook), Chair: Plamen Angelov

2:50PM Power Plant Performance Modeling with Concept Drift [#640]

Rui Xu, Yunwen Xu and WeiZhong Yan

3:10PM Concept Drift Learning with Alternating Learners [#509]

Yunwen Xu, Rui Xu, Weizhong Yan and Paul Ardis

3:30PM Parametric System Identification Using Deep Convolutional Neural Networks [#745]

Sahika Genc

3:50PM Online Query by Committee for Active Learning from Drifting Data Streams [#860]

Bartosz Krawczyk and Michal Wozniak

4:10PM Sub-Event Detection from Tweets [#735]

Satya Katragadda, Ryan Benton and Vijay Raghavan

Session lang: Natural language processing
Tuesday, May 16, 2:50PM-4:30PM, Room: Parallel 2 (Room #1+13+14), Chair: Minho Lee

2:50PM Symbolic Manipulation Based on Deep Neural Networks and its Application to Axiom Discovery [#20]

Cheng-Hao Cai, Dengfeng Ke, Yanyan Xu and Kaile Su

3:10PM Significance of neural phonotactic models for large-scale spoken language identification [#169]

Brij Mohan Lal Srivastava, Hari Krishna Vydana, Anil Kumar Vuppala and Manish Shrivastava

3:30PM Temporal Hierarchies in Multilayer Gated Recurrent Neural Networks for Language Models [#861]

Dennis Singh Moirangthem and Minho Lee

3:50PM Convolution Neural Network Based Syntactic and Semantic Aware Paraphrase Identification [#129]

Xiang Zhang, Wenge Rong, Jingshuang Liu, Chuan Tian and Zhang Xiong

4:10PM Alleviating Overfitting for Polysemous Words for Word Representation Estimation Using Lexicons [#562]

Yuanzhi Ke and Masafumi Hagiwara

Special Session S32a: Reservoir computing in hardware 1
Tuesday, May 16, 2:50PM-4:30PM, Room: Parallel 3 (Room #2+11+12), Chair: Cory Merkel

2:50PM Hardware Implementation of Echo State Networks using Memristor Double Crossbar Arrays [#820]

Amr M. Hassan, Hai (Helen) Li and Yiran Chen

3:10PM Reservoir Computing in materio: A Computational Framework for in materio Computing [#304]

Matthew Dale, Susan Stepney, Martin Trefzer and Julian Miller

3:30PM Design of a Time Delay Reservoir Using Stochastic Logic: A Feasibility Study [#708]

Cory Merkel

3:50PM Structure Optimization of Dynamic Reservoir Ensemble Using Genetic Algorithm [#822]

Wei Wang, Hsiao-Tien Fan and Zhanpeng Jin

4:10PM Linear Dynamical Based Models for Sequential Domains [#738]

Luca Pasa, Alessandro Sperduti and Peter Tino

Session spike3: Spiking neuron: hardware
Tuesday, May 16, 2:50PM-4:30PM, Room: Parallel 4 (Room #3+10+9), Chair: Johannes Schemmel

2:50PM Robustness from structure: Inference with hierarchical spiking networks on analog neuromorphic hardware [#695]

Mihai A. Petrovici, Anna Schroeder, Oliver Breitwieser, Andreas Gruebl, Johannes Schemmel and Karlheinz Meier

3:10PM An Accelerated Analog Neuromophic Hardware System Emulating NMDA- and Calcium-Based Non-Linear Dendrites [#621]

Johannes Schemmel, Laura Kriener, Paul Mueller and Karlheinz Meier

3:30PM Neuromorphic Hardware In The Loop: Training a Deep Spiking Network on the BrainScaleS Wafer-Scale System [#730]

Sebastian Schmitt, Johann Klaehn, Guillaume Bellec, Andreas Gruebl, Maurice Guettler, Andreas Hartel, Stephan Hartmann, Dan Husmann, Kai Husmann, Vitali Karasenko, Mitja Kleider, Christoph Koke, Christian Mauch, Eric Mueller, Paul Mueller, Johannes Partzsch, Mihai A. Petrovici, Stefan Schiefer, Stefan Scholze, Bernhard Vogginger, Robert Legenstein, Wolfgang Maass, Christian Mayr, Johannes Schemmel and Karlheinz Meier

3:50PM Compositional Neural-Network Modeling of Complex Analog Circuits [#420]

Ramin M. Hasani, Dieter Haerle, Christian F. Baumgartner, Alessio R. Lomuscio and Radu Grosu

4:10PM Navigating Mobile Robots to Target in Near Shortest Time using Reinforcement Learning with Spiking Neural Networks [#438]

Amarnath Mahadevuni and Peng Li

Session deep7: Deep learning 7: Applications
Tuesday, May 16, 2:50PM-4:30PM, Room: Parallel 5 (Room #4+7+8), Chair: Rodrigo Barros

2:50PM Scalable Deep Traffic Flow Neural Networks for Urban Traffic Congestion Prediction [#841]

Mohammadhani Fouladgar, Mostafa Parchami, Ramez Elmasri and Amir Ghaderi

3:10PM Deep Learning of Texture and Structural Features for Multiclass Alzheimer's Disease Classification [#686]

Chester Dolph, Mahbubul Alam, Zeina Shboul, Manar Samad and Khan Iftekharuddin

3:30PM Virtual Guide Dog: An Application to Support Visually-Impaired People through Deep Convolutional Neural Networks [#696]

Juarez Monteiro, Joao Paulo Aires, Roger Granada, Rodrigo Barros and Felipe Meneguzzi

3:50PM Vertex Reconstruction of Neutrino Interactions using Deep Learning [#739]

Adam Terwilliger, Gabriel Perdue, David Isele, Robert Patton and Steven Young

4:10PM Learning Deep Representations with Diode Loss for Quantization-based Similarity Search [#46]

Shicong Liu and Hongtao Lu

Session theory7: Theory 7
Tuesday, May 16, 2:50PM-4:30PM, Room: Parallel 6 (Room #5+6), Chair: Tharun Reddy

2:50PM Using Information Fractal Dimension as Temperature in Restricted Boltzmann Machine [#821]

Muhammad Salman Khan, Sana Siddiqui and Ken Ferens

3:10PM HJB Equation Based Learning Scheme for Neural Networks [#337]

Vipul Arora, Laxmidhar Behera, Tharun Reddy and Ajay Yadav

3:30PM Supervised Classification via Constrained Subspace and Tensor Sparse Representation [#380]

Liang Liao, Stephen Maybank, Yanning Zhang and Xin Liu

3:50PM Parallel Dynamic Search Fireworks Algorithm with Linearly Decreased Dimension Number Strategy for Solving Conditional Nonlinear Optimal Perturbation [#472]

Bin Mu, Junhui Zhao, Shijin Yuan and Jinghao Yan

4:10PM Parametric Identification of Stochastic Interaction Networks [#39]

Hana Baili

Session time: Temporal processing
Tuesday, May 16, 4:40PM-6:20PM, Room: Parallel 1 (Cook), Chair: Seif-Eddine Benkabou (tentative)

4:40PM State Initialization for Recurrent Neural Network Modeling of Time-Series Data [#127]

Nima Mohajerin and Steven Waslander

5:00PM A Framework for Benchmarking Machine Learning Methods Using Linear Models for Univariate Time Series Prediction [#177]

Rebecca Salles, Laura Assis, Gustavo Guedes, Eduardo Bezerra, Fabio Porto and Eduardo Ogasawara

5:20PM Adaptive Learning Method of Recurrent Temporal Deep Belief Network to Analyze Time Series Data [#525]

Takumi Ichimura and Shin Kamada

5:40PM L2-Type Regularization-based Unsupervised Anomaly Detection from Temporal Data [#397]

Seif-Eddine Benkabou, Khalid Benabdeslem and Canitia Bruno

6:00PM Spatio-Temporal Cellular Automata-Based Filtering for Image Sequence Denoising [#398]

Blanca Priego, Abraham Prieto, Richard J. Duro and Jocelyn Chanussot

Session text: Text and document processing
Tuesday, May 16, 4:40PM-6:20PM, Room: Parallel 2 (Room #1+13+14), Chair: Giacomo Boracchi

4:40PM Tightly-coupled Convolutional Neural Network with Spatial-temporal Memory for Text Classification [#557]

Shiyao Wang and Zhidong Deng

5:00PM Ensemble Application of Convolutional and Recurrent Neural Networks for Multi-label Text Categorization [#160]

Guibin Chen, Deheng Ye, Zhenchang Xing, Jieshan Chen and Erik Cambria

5:20PM A Character-based Convolutional Neural Network for Language-Agnostic Twitter Sentiment Analysis [#793]

Jonatas Wehrmann, Willian Becker, Henry Cagnini and Rodrigo Barros

5:40PM Sentiment Analysis with the Exploration of Overall Opinion Sentences [#902]

Xiaojia Pu, Gangshan Wu and Chunfeng Yuan

6:00PM A Model of Extended Paragraph Vector for Document Categorization and Trend Analysis [#482]

Pengfei Liu, King Keung Wu and Helen Meng

Special Session S32b: Reservoir computing in hardware 2
Tuesday, May 16, 4:40PM-6:20PM, Room: Parallel 3 (Room #2+11+12), Chair: Nathan McDonald

4:40PM Photonic Reservoir Computer With Output Feedback for Chaotic Time Series Prediction [#224]

Piotr Antonik, Michiel Hermans, Marc Haelterman and Serge Massar

5:00PM Robustness of a Memristor Based Liquid State Machine [#687]

Nicholas Soures, Lydia Hays and Dhireesha Kudithipudi

5:20PM A Digital Neuromorphic Architecture Efficiently Facilitating Complex Synaptic Response Functions Applied to Liquid State Machines [#818]

Michael Smith, Aaron Hill, Kristofor Carlson, Craig Vineyard, Jonathon Donaldson, David Follett, Pamela Follett, John Naegle, Conrad James and James Aimone

5:40PM Reservoir Computing and Extreme Learning Machines using Pairs of Cellular Automata Rules [#646]

Nathan McDonald

6:00PM Maximizing Memory Capacity of Echo State Networks with Orthogonalized Reservoirs [#561]

Igor Farkas and Peter Gergel

Session spike4: Spiking neurons
Tuesday, May 16, 4:40PM-6:20PM, Room: Parallel 4 (Room #3+10+9), Chair: Arunava Banerjee

4:40PM Learning Deterministic Spiking Neuron Feedback Controllers [#636]

Tae Seung Kang and Arunava Banerjee

5:00PM INXS: Bridging the Throughput and Energy Gap for Spiking Neural Networks [#867]

Surya Narayanan, Ali Shafiee and Rajeev Balasubramonian

5:20PM Image Segmentation with Stochastic Magnetic Tunnel Junctions and Spiking Neurons [#532]

Chamika Liyanagedera, Parami Wijesinghe, Akhilesh Jaiswal and Kaushik Roy

5:40PM BrainGrid+Workbench: High-Performance/High-Quality Neural Simulation [#135]

Michael Stiber, Fumitaka Kawasaki, Delmar Davis, Hazeline Asuncion, Jewel Lee and Destiny Boyer

6:00PM Generalized Model of Biological Neural Networks: Progressive Operational Perceptrons [#37]

Kiranyaz Serkan, Ince Turker, Iosifidis Alexandros and Gabbouj Moncef

Session convnet1: Convolutional neural networks 1
Tuesday, May 16, 4:40PM-6:20PM, Room: Parallel 5 (Room #4+7+8), Chair: Thomas Martinetz

4:40PM Recursive Autoconvolution for Unsupervised Learning of Convolutional Neural Networks [#170]

Boris Knyazev, Erhardt Barth and Thomas Martinetz

5:00PM FxpNet: Training a Deep Convolutional Neural Network in Fixed-Point Representation [#373]

Xi Chen, Xiaolin Hu, Hucheng Zhou and Ningyi Xu

5:20PM Accelerating Convolutional Neural Networks by Group-wise 2D-filter Pruning [#374]

Niange Yu, Shi Qiu, Xiaolin Hu and Jianmin Li

5:40PM Exploring Optimized Accelerator Design for Binarized Convolutional Neural Networks [#592]

Kodai Ueyoshi, Kota Ando, Kentaro Orimo, Masayuki Ikebe, Tetsuya Asai and Masato Motomura

6:00PM Transfer Learning for Automated Optical Inspection [#855]

Seunghyeon Kim, Wooyoung Kim, Yung-Kyun Noh and Frank Park

Session theory8: Theory 8
Tuesday, May 16, 4:40PM-6:20PM, Room: Parallel 6 (Room #5+6), Chair: Liang Zhao

4:40PM Low and High Level Classification using Stacking [#513]

Thiago Covoes and Liang Zhao

5:00PM Improving the Performance of Neural Networks in Regression Tasks Using Drawering [#520]

Konrad Zolna

5:20PM Top-down Strategies for Hierarchical Classification of Transposable Elements with Neural Networks [#527]

Felipe Kenji Nakano, Walter Jose Pinto, Gisele Lobo Pappa and Ricardo Cerri

5:40PM Ternary Neural Networks for Resource-Efficient AI Applications [#652]

Hande Alemdar, Vincent Leroy, Adrien Prost-Boucle and Frederic Petrot

6:00PM Manifold Learning with Iterative Dimensionality Photo-Projection [#611]

Daniel Lueckehe, Stefan Oehmcke and Oliver Kramer

Plenary Poster Session P2: Poster session #2
Tuesday, May 16, 7:30PM-9:00PM, Room: Arteaga, Chair: Richard Duro

P301 Hexpo: A Vanishing-Proof Activation Function [#115]

Shumin Kong and Masahiro Takatsuka

P302 Potential Layer-Wise Supervised Learning for Training Multi-Layered Neural Networks [#64]

Ryotaro Kamimura

P303 A Quotient Gradient Method to Train Artificial Neural Networks [#47]

Hamid Khodabandehlou and Mohammad Sami Fadali

P304 ABiRCNN with Neural Tensor Network for Answer Selection [#98]

Xingwei He and Hua Xu

P305 Three-Step DTZNN Algorithm for Time-Varying Linear Matrix Inequality Solving [#540]

Dongsheng Guo, Aifen Li, Xinjie Lin, Feng Xu and Zhaozhu Su

P306 On the Memory Properties of Recurrent Neural Models [#54]

Arthur Jack Russell, Emmanouil Benetos and Artur d'Avila Garcez

P307 An Alternative Approach for Binary and Categorical Self-Organizing Maps [#781]

Alessandra Santana, Alessandra Morais and Marcos Quiles

P308 On Self-Organizing Maps for Orienteering Problems [#209]

Jan Faigl

P309 Are Recurrent Associative Memories Good Models of Decision Making? Modelling discrimination decisions from different perspectives [#211]

Bradley Harding, Marc-Andre Goulet, Denis Cousineau and Sylvain Chartier

P310 EnsembleSNN: Distributed Assistive STDP Learning for Energy-Efficient Recognition in Spiking Neural Networks [#514]

Priyadarshini Panda, Gopalakrishnan Srinivasan and Kaushik Roy

P311 The Effect of Biologically-Inspired Mechanisms in Spiking Neural Networks for Neuromorphic Implementation [#395]

Catherine Schuman

P312 Comparison of Echo State Network Output Layer Classification Methods on Noisy Data [#490]

Ashley Prater

P313 Impact of biased mislabeling on learning with deep networks. [#711]

Farzaneh S. Fard, Paul Hollensen, Stuart Mcilory and Thomas Trappenberg

P314 A Class-specific Copy Network for Handling the Rare Word Problem in Neural Machine Translation [#497]

Feng Wang, Wei Chen, Zhen Yang, Xiao Wei Zhang, Shuan Xu and Bo Xu

P315 Transforming Sensor Data to the Image Domain for Deep Learning - an Application to Footstep Detection [#874]

Monit Shah Singh, Vinaychandran Pondenkandath, Bo Zhou, Paul Lukowicz and Marcus Liwicki

P316 Convolutional Neural Networks with Multi-valued Neurons [#458]

Yuki Kominami, Hideki Ogawa and Kazuyuki Murase

P317 Noisy Deep Dictionary Learning: Application to Alzheimer's Disease Classification [#440]

Vanika Singhal and Angshul Majumdar

P318 Improvement of Learning for CNN with ReLU Activation by Sparse Regularization [#289]

Hidenori Ide and Takio Kurita

P319 Optimization and evaluation of deep architectures for ambient awareness on a sidewalk [#794]

Faruk Ahmed and Mohammed Yeasin

P320 Deep Learning and Block Go [#369]

Shi-Jim Yen, Chingnung Lin, Guan-Lun Cheng and Jr-Chang Chen

P321 The RNN-ELM Classifier [#32]

Athanasios Vlontzos

P322 A Neuron-Output-Significant-Index-based Self-organization Pruning Algorithm for S-LINN [#789]

Lizhen Dai, Gang Yang and Hui Yang

P323 Adaptive Filtering Based on Extended Kernel Recursive Maximum Correntropy [#676]

Shengyang Luan, Tianshuang Qiu and Jose Principe

P324 ADL: Active Dictionary Learning for Sparse Representation [#263]

Bo Tang, Jin Xu, Haibo He and Hong Man

P325 A Web-based Tool for Segmentation and Automatic Transcription of Historical Documents [#612]

Fouad Slimane, Andrea Mazzei, Orlin Topalov, Greta Verzi and Frederic Kaplan

P326 Low n-Rank Tensor Log-Linear Models for Classification [#750]

Caleb Nelson, Yulo Leake and Brian Hutchinson

P327 Machine Learning Approaches for the Prediction of Obesity using Publicly Available Genetic Profiles [#312]

Casimiro Aday Curbelo, Paul Fergus, Abir Jaafar Hussain, Dhiya Al-Jumeily, Basma Abdulaimma, Hind Jade and Radi Naeem

P328 FEMaR: A Finite Element Machine for Regression Problems [#91]

Danillo Pereira, Joao Papa and Andre Souza

P329 Adversarial Learning Games with Deep Learning Models [#81]

Aneesh Sreevallabh Chivukula and Wei Liu

P330 Towards the Discrimination of Primary and Secondary Headache: An Intelligent Systems Approach [#226]

Robert Keight, Dhiya Al-Jumeily, Abir Hussain, Mohammed Al-Jumeily and Mallucci Conor

P331 HMM-based Gesture Recognition Sytem Using Kinect Sensor for Improvised Human-Computer Interaction [#550]

Sriparna Saha, Rimita Lahiri, Amit Konar, Bonny Banerjee and Atulya K. Nagar

P332 Projected Clustering via Robust Orthogonal Least Square Regression with Optimal Scaling [#101]

Rui Zhang, Feiping Nie and Xuelong Li

P333 Multi-View Hard C-Means with Automated Weighting of Views and Variables [#122]

Rodrigo de Araujo, Francisco de Carvalho and Yves Lechevallier

P334 Interpreting Multivariate Membership Degrees of Fuzzy Clustering Methods: a Strategy [#198]

Bruno Pimentel, Marcilio de Souto and Renata de Souza

P335 A Neuro-based Network for On-line Topological Map Building and Dynamic Path Planning [#834]

Wei Hong Chin, Azhar Aulia Saputra and Naoyuki Kubota

P336 The LICORS Cabinet: Nonparametric Light Cone Methods for Spatio-Temporal Modeling [#13]

George Montanez and Cosma Shalizi

P337 Mobile Robot Control Based on Hybrid Neuro-Fuzzy Value Gradient Reinforcement Learning [#771]

Seaar Al-Dabooni and Donald Wunsch

P338 Towards Enabling Deep Learning Techniques for Adaptive Dynamic Programming [#543]

Zhen Ni, Malla Naresh and Zhong Xiangnan

P339 Deep Convolutional and Recurrent Writer [#325]

Sadaf Gulshad and Jong-Hwan Kim

P340 An Efficient Semi-Supervised SVM for Anomaly Detection [#367]

Junae Kim and Paul Montague

P341 Two Improved Continuous Bag-of-Word Models [#168]

Qi Wang, Jungang Xu, Hong Chen and Ben He

P342 OMKT: Projection Based Bounded On-line Multiple Kernel Tracker [#823]

Prabhash Kumarasinghe and Suresh Sundaram

P343 Recent Advances in Video-Based Human Action Recognition using Deep Learning: A Review [#578]

Di Wu, Nabin Sharma and Michael Blumenstein

P344 Object Recognition using Cellular Simultaneous Recurrent Networks and Convolutional Neural Network [#933]

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P345 Random Fourier Feature Kernel Recursive Least Squares [#229]

Zhengda Qin, Badong Chen and Nanning Zheng

P346 Relevance Effect: Exploiting Bayesian Networks to Improve Supervised Learning [#247]

Ardavan S. Nobandegani, Jad Kabbara and Ioannis N. Psaromiligkos

P347 Kernel Group Sparse Representation based Classifier for Multimodal Biometrics [#843]

Gaurav Goswami, Mayank Vatsa, Richa Singh and Angshul Majumdar

P348 Pose Invariance Through Registration for Hierarchical Feature Based Pattern Recognition Systems [#883]

Noel Khan, David Elizondo, Benjamin Passow and Pamela Hardaker

P349 Feature Selection for Biometric Recognition Based on Electrocardiogram Signals [#749]

Felipe G. Silva Teodoro, Sarajane M. Peres and Clodoaldo Lima

P350 EMNIST: extending MNIST to handwritten letters [#706]

Gregory Cohen, Saeed Afshar, Jonathan Tapson and Andre van Schaik

P351 Improved maximum inner product search with better theoretical guarantees [#618]

Omid Keivani, Kaushik Sinha and Parikshit Ram

P352 SVRG with Adaptive Epoch Size [#801]

Erxue Min, Yawei Zhao, Jun Long, Chengkun Wu, Kuan Li and Jianping Yin

P353 Temporal Progression in Functional Connectivity Determines Individual Differences in Working memory Capacity [#455]

Pouya Bashivan, Gavin Bidelman and Yeasin Mohammed

P354 A Chaotic Ring Neural Oscillator of Three Nonmonotonic Neurons [#539]

Yo Horikawa

P355 The Use of One-Class Classifiers for Differentiating Healthy from Epileptic EEG Segments [#499]

Jefferson Oliva and Joao Luis Rosa

P356 Signal Coding and Reconstruction Using Deterministic Spiking Neurons [#747]

Gokhan Kaya and Arunava Banerjee

P357 Training a Two-choice Decision-making Model with Environment Feedback [#121]

Hui Wei and Yijie Bu

P358 Deteriorating neural connectivity of the hippocampal episodic memory network in mTBI patients: a cohort study [#88]

Hao Yan, Chuanzhu Sun, Xiaocui Wang and Lijun Bai

P359 Dynamic Control Using Feedforward Networks with Adaptive Delay and Facilitating Neural Dynamics [#461]

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P360 Ensemble of Classifiers Applied to Motor Imagery Task Classification for BCI Applications [#753]

Alimed Celecia, Rene Gonzalez, Marley Vellasco and Pedro Vellasco

P361 A Wireless Steady State Visually Evoked Potential-based BCI Eating Assistive System [#465]

Ching-Yu Chiu, Avinash Kumar Singh, Yu-Kai Wang, Jung-Tai King and Chin-Teng Lin

P362 Brewing the first ever automatic memory management utility for SpiNNaker: Real-Time Garbage Collection for STDP simulations [#62]

Mantas Mikaitis and David R. Lester

P363 Exploiting the Use of Recurrent Neural Networks for Driver Behavior Profiling [#210]

Eduardo Carvalho, Bruno Ferreira, Jair Ferreira Junior, Cleidson de Souza, Hanna Carvalho, Yoshihiko Suhara, Alex Pentland and Gustavo Pessin

P364 In vivo Classification of Inflammation in Blood Vessels with Convolutional Neural Networks [#805]

Stuart Mcilroy, Yoshimasa Kubo, James Toguri, Christian Lehmann and Thomas Trappenberg

P365 An Investigation of High-Resolution Modeling Units of Deep Neural Networks for Acoustic Scene Classification [#298]

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P366 Detection of Motorcyclists without Helmet in Videos using Convolutional Neural Network [#394]

C. Vishnu, Dinesh Singh, C. Krishna Mohan and Ch. Sobhan Babu

P367 Fast Diagnosis of Bowel Activities [#275]

Yi Huang, Song Insu, Priyanka Rana and Guan Koh

P368 A comparative study of complexity of handwritten Bharati characters with that of major Indian scripts [#426]

Manali Naik and V. Srinivasa Chakravarthy

P369 The Classification of Periodic Light Curves from non-survey optimized observational data through Automated Extraction of Phase-based Visual Features [#342]

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P370 Weighted Numerical and Categorical Attribute Clustering in Data Streams [#905]

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P371 Toward Virtual Data Scientist with Visual Means [#796]

Boris Kovalerchuk and Michael Kovalerchuk

P372 Phonetic State Relation Graph Regularized Deep Neural Network for Robust Acoustic Model [#147]

Hoon Chung, Yoo Rhee Oh, Sung Joo Lee and Jeon Gue Park

P373 Small-footprint convolutional neural network for spoofing detection [#144]

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P375 Biologically Inspired Reinforcement Learning for Mobile Robot Collision Avoidance [#662]

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P381 Structural Superpixel Descriptor for Visual Tracking [#102]

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P382 Wavelet transform and adaptive arithmetic coding techniques for EEG lossy compression [#798]

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Frank Z. Xing, Erik Cambria and Xiaomei Zou

P386 Information and Knowing When to Forget It [#517]

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He Jiang and Haibo He

P388 Symbolic representations of time series applied to biometric recognition based on ECG signals [#242]

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P389 Aspect-Based Sentiment Analysis Using ABPCS Model and SVMperf in Chinese Reviews [#157]

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P390 Text Clustering using Enhanced PLSA with Word Correlation [#762]

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P391 Fuzzy controlled VSC of battery storage system for seamless transition of microgrid between grid-tied and islanded mode [#199]

Chinmay Shah, Heidar Malki and Mehdi Abolhassani

P392 Prediction of Residual Power Peaks in Industrial Microgrids using Artificial Neural Networks [#881]

Thorsten Vogt, Daniel Weber, Oliver Wallscheid and Joachim Boecker

P393 A First Approach using Neural Network to Estimating Soil Bulk Density of Urucu Basin in Central Amazon-Brazil [#712]

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P395 Regression-forests-based Estimation of Blood Pressure using the Pulse Transit Time Obtained by Facial Photoplethysmogram [#414]

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P397 Integrative Computing Method for the Prediction of Zinc-binding Sites in Proteins [#183]

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P398 Investigating the Effects of Class Imbalance in Learning the Claim Authorization Process in the Brazilian Health Care Market [#614]

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P400 Learning User Distance from Multiple Social Networks [#280]

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P401 Clickthrough Refinement for Improved Graph Ranking [#654]

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P402 Deep Learning Inspired Prognostics Scheme for Applications Generating Big Data [#729]

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Komla Folly, Paul Olulope and Ganesh Venayagamoorthy

P404 Constrained versus Unconstrained Learning in Generalized Recurrent Network for Image Processing [#434]

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P406 Acoustic Novelty Detection with Adversarial Autoencoders [#338]

Emanuele Principi, Fabio Vesperini, Stefano Squartini and Francesco Piazza

P407 Domain Adaptation of POS Taggers without Handcrafted Features [#812]

Irving Rodrigues, Eraldo Fernandes and Cicero dos Santos

P408 Scaling Up Deep Reinforcement Learning for Multi-Domain Dialogue Systems [#474]

Heriberto Cuayahuitl, Seunghak Yu, Ashley Williamson and Jacob Carse

P409 Kernel and Random Extreme Learning Machine applied to Submersible Motor Pump Fault Diagnosis [#108]

Thomas W. Rauber, Thiago Oliveira-Santos, Francisco de Assis Boldt, Flavio M. Varejao, Alexandre Rodrigues and Marcos Pellegrini Ribeiro

P410 A Multistage Collaborative Filtering Algorithm for Fall Detection [#184]

Tao Xie, Yiqiang Chen, Lisha Hu, Chenlong Gao, Chunyu Hu and Jianfei Shen

P411 Piecewise Multi-linear Fuzzy Extreme Learning Machine for the Implementation of Intelligent Agents [#650]

Ines del Campo, Victoria Martinez, Flavia Orosa, Javier Echanobe, Estibalitz Asua and Koldo Basterretxea

P412 Extreme Learning Machine as a Generalizable Classification Engine [#347]

Abdullah M. Zyarah and Dhireesha Kudithipudi

P413 Cellular Computational Extreme Learning Machine Network Based Frequency Predictions in a Power System [#778]

Iroshani Jayawardene and Ganesh K. Venayagamoorthy

P414 A Robust Method for the Interpretation of Genomic Data [#355]

Jade Hind, Paulo Lisboa, Abir Hussain, Dhiya Al-Jumeily, Casimiro Aday Curbelo Montanez and Basma Abdulaimma

P415 A Support Vector Machine Approach to Identification of Proteins Relevant to Learning in a Mouse Model of Down Syndrome [#768]

Tara Eicher and Kaushik Sinha

P416 Short-Term Plasticity in a Liquid State Machine Biomimetic Robot Arm Controller [#75]

Ricardo de Azambuja, Frederico Klein, Samantha Adams, Martin Stoelen and Angelo Cangelosi

P417 STDP-based Unsupervised Learning of Memristive Spiking Neural Network by Morris-Lecar Model [#494]

Amirali Amirsoleimani, Majid Ahmadi and Arash Ahmadi

P418 Computational Paradigms using Oscillatory Networks based on State-Transition Devices [#803]

Abhinav Parihar, Nikhil Shukla, Matthew Jerry, Suman Datta and Arijit Raychowdhury

P419 A Randomized Neural Network for Data Streams [#310]

Mahardhika Pratama, Plamen P. Angelov, Jie Lu, Edwin Lughofer, Mukesh Prasad, Manjeevan Seera and Chee Peng Lim

P420 Structure-based Fitness Prediction for the Variable-structure DANNA Neuromorphic Architecture [#896]

Aleksander Klibisz, Grant Bruer, Catherine Schuman and James Plank

P421 Analog Hardware Implementation of Spike-Based Delayed Feedback Reservoir Computing System [#765]

Jialing Li, Chenyuan Zhao, Kian Hamedani and Yang Yi

P422 Paving the way for providing teaching feedback in automatic evaluation of open response assignments [#85]

Veronica Bolon-Canedo, Jorge Diez, Oscar Luaces, Antonio Bahamonde and Amparo Alonso-Betanzos

P423 Prediction of Graduation Delay Based on Student Performance [#886]

Tushar Ojha, Gregory Heileman, Manel Martinez-Ramon and Ahmad Slim

Session Plen5: Plenary session 5: Stephen Grossberg
Wednesday, May 17, 8:00AM-9:00AM, Room: La Perouse, Chair: Daniel Levine

8:00AM Towards Solving the Hard Problem of Consciousness: The Varieties of Brain Resonances and the Conscious Experiences that they Support

Stephen Grossberg

Special Session S08: Computational intelligence algorithms for digital audio applications
Wednesday, May 17, 9:20AM-10:40AM, Room: Parallel 1 (Cook), Chair: Emanuele Principi

9:20AM Convolutional Gated Recurrent Neural Network Incorporating Spatial Features for Audio Tagging [#633]

Yong Xu, Qiuqiang Kong, Qiang Huang, Wenwu Wang and Mark D. Plumbley

9:40AM Deep Recurrent Music Writer: Memory-enhanced Variational Autoencoder-based Musical Score Composition and an Objective Measure [#602]

Romain Sabathe, Eduardo Coutinho and Bjoern Schuller

10:00AM Audio Event and Scene Recognition: A Unified Approach using Strongly and Weakly Labeled Data [#95]

Anurag Kumar and Bhiksha Raj

10:20AM On the Use of Deep Recurrent Neural Networks for Detecting Audio Spoofing Attacks [#410]

Simone Scardapane, Lucas Stoffl, Florian Rohrbein and Aurelio Uncini

Session text2: Text and document processing 2
Wednesday, May 17, 9:20AM-10:40AM, Room: Parallel 2 (Room #1+13+14), Chair: Frank Wood

9:20AM Multi-Sense Based Neural Machine Translation [#111]

Zhen Yang, Wei Chen, Feng Wang and Bo Xu

9:40AM Learning from Semantically Dependent Multi-Tasks [#256]

Bin Liu, Zenglin Xu, Bo Dai, Haoli Bai, Xianghong Fang, Yazhou Ren and Shandian Zhe

10:00AM Incorporating Loose-Structured Knowledge into Conversation Modeling via Recall-Gate LSTM [#314]

Zhen Xu, Bingquan Liu, Baoxun Wang, Chengjie Sun and Xiaolong Wang

10:20AM Using Synthetic Data to Train Neural Networks is Model-Based Reasoning [#751]

Tuan Anh Le, Atilim Gunes Baydin, Robert Zinkov and Frank Wood

Special Session S27a: Neuro-inspired computing with nanoelectronic devices 1
Wednesday, May 17, 9:20AM-10:40AM, Room: Parallel 3 (Room #2+11+12), Chair: Saibal Mukhopadhyay

9:20AM Enabling Bio-Plausible Multi-level STDP using CMOS Neurons with Dendrites and Bistable RRAMs [#215]

Xinyu Wu and Vishal Saxena

9:40AM On-chip Training of Memristor Based Deep Neural Networks [#727]

Raqibul Hasan, Tarek Taha and Chris Yakopcic

10:00AM Interpretability of Artificial Hydrocarbon Networks for Breast Cancer Classification [#523]

Hiram Ponce and Ma de Lourdes Martinez-Villasenor

10:20AM Cognitive Domain Ontologies on the TrueNorth Neurosynaptic System [#824]

Nayim Rahman, Tanvir Atahary, Tarek Taha and Scott Douglass

Session cortex: Cortical modeling and simulation
Wednesday, May 17, 9:20AM-10:40AM, Room: Parallel 4 (Room #3+10+9), Chair: Bryan Tripp (tentative)

9:20AM Similarities and Differences Between Stimulus Tuning in the Inferotemporal Visual Cortex and Convolutional Networks [#872]

Bryan Tripp

9:40AM Odor Recognition in an Attractor Network Model of the Mammalian Olfactory Cortex [#645]

Pawel Herman, Simon Benjaminsson and Anders Lansner

10:00AM Collective Discovery of Brain Networks with Unknown Groups [#244]

Xinyue Liu, Xiangnan Kong and Philip Yu

10:20AM A biologically inspired neuronal model of reward prediction error computation [#478]

Pramod Kaushik, Maxime Carrere, Frederic Alexandre and Bapi Raju Surampudi

Session convnet2: Convolutional neural networks 2
Wednesday, May 17, 9:20AM-10:40AM, Room: Parallel 5 (Room #4+7+8), Chair: Hui Jiang

9:20AM A Fast Method for Saliency Detection by Back-Propagating A Convolutional Neural Network and Clamping Its Partial Outputs [#143]

Hengyue Pan and Hui Jiang

9:40AM Identifying Spatial Relations in Images using Convolutional Neural Networks [#839]

Mandar Haldekar, Ashwinkumar Ganesan and Tim Oates

10:00AM Connecting Deep Neural Networks with Symbolic Knowledge [#370]

Arjun Kumar and Tim Oates

10:20AM Convolutional Sparse Coding on Neurosynaptic Cognitive System [#785]

Md Zahangir Alom, Brian Van Essen, Adam T. Moody, David Peter Widemann and Tarek M. Taha

Session theory9: Theory 9
Wednesday, May 17, 9:20AM-10:40AM, Room: Parallel 6 (Room #5+6), Chair: Junpei Zhong

9:20AM Label Confidence based AdaBoost Algorithm [#51]

Zhe Luo, Xin Dang and Yixin Chen

9:40AM Toward Abstraction from Multi-modal Data: Empirical Studies on Multiple Time-scale Recurrent Models [#156]

Junpei Zhong, Angelo Cangelosi and Tetsuya Ogata

10:00AM Self-Training with Adaptive Regularization for S3VM [#191]

Edward Cheung and Yuying Li

10:20AM Universum Learning for SVM Regression [#366]

Sauptik Dhar and Vladimir Cherkassky

Special Session S20: Machine learning for business analytics
Wednesday, May 17, 11:00AM-12:20PM, Room: Parallel 1 (Cook), Chair: Chul Sung

11:00AM Improving Recommendation Accuracy using Networks of Substitutable and Complementary Products [#274]

Tong Zhao, Julian McAuley, Mengya Li and Irwin King

11:20AM Cold-start, Warm-start and Everything in Between: An Autoencoder based Approach to Recommendation [#563]

Anant Jain and Angshul Majumdar

11:40AM Evaluating Deep Learning in Churn Prediction for Everything-as-a-Service in the Cloud [#848]

Chul Sung, Chunhui Higgins, Bo Zhang and Yoonsuck Choe

12:00PM It's About Time! Modeling Customer Behaviors as the Secretary Problem in Daily Deal Websites [#284]

Tong Zhao, Mantian Hu, Razieh Rahimi and Irwin King

Special Session S14+18: Explainability and Interpretability in Machine Learning
Wednesday, May 17, 11:00AM-12:20PM, Room: Parallel 2 (Room #1+13+14), Chair: Isabelle Guyon; Michael Biehl

11:00AM Can we Explain Natural Language Inference Decisions taken with Neural Networks? Inference Rules in Distributed Representations [#90]

Fabio Massimo Zanzotto and Lorenzo Ferrone

11:20AM Design of an Explainable Machine Learning Challenge for Video Interviews [#331]

Hugo Jair Escalante, Isabelle Guyon, Sergio Escalera, Julio Jaques Jr., Xavier Baro, Evelyne Viegas, Yagmur Gucluturk, Umut Guclu, Marcel A. J. van Gerven, Rob van Lier, Meysam Madadi and Stephane Ayache

11:40AM Classification of sparsely and irregularly sampled time series: a learning in model space approach [#845]

Yuan Shen, Peter Tino and Krasimira Tsaneva-Atanasova

12:00PM Marker Selection for the Detection of Trisomy 21 Using Generalized Matrix Learning Vector Quantization [#605]

Andreas Neocleous, Costas Neocleous, Christos N. Schizas, Michael Biehl and Nicolai Petkov

Special Session S27b: Neuro-inspired computing with nanoelectronic devices 2
Wednesday, May 17, 11:00AM-12:20PM, Room: Parallel 3 (Room #2+11+12), Chair: Kaushik Roy (tentative)

11:00AM Exponential-Weight Multilayer Perceptron [#388]

Farnood Merrikh Bayat, Xinjie Guo and Dmitri Strukov

11:20AM On-Chip Training of Recurrent Neural Networks with Limited Numerical Precision [#829]

Taesik Na, Jong Hwan Ko, Jaeha Kung and Saibal Mukhopadhyay

11:40AM Neuromorphic System with Phase-Change Synapses for Pattern Learning and Feature Extraction [#231]

Stanislaw Wozniak, Angeliki Pantazi, Yusuf Leblebici and Evangelos Eleftheriou

12:00PM Flight Dynamics Modeling and Recognition using Finite State Machine for Automatic Insect Recognition [#816]

Kan Li and Jose Principe

Session mixture: Mixture models
Wednesday, May 17, 11:00AM-12:20PM, Room: Parallel 4 (Room #3+10+9), Chair: Weite Li (tentative)

11:00AM Non-Local Information for a Mixture of Multiple Linear Classifiers [#149]

Weite Li, Peifeng Liang, Xin Yuan and Jinglu Hu

11:20AM A Mixture of Multiple Linear Classifiers with Sample Weight and Manifold Regularization [#552]

Weite Li, Benhui Chen, Bo Zhou and Jinglu Hu

11:40AM Generative Mixture of Networks [#704]

Ershad Banijamali, Ali Ghodsi and Pascal Poupart

12:00PM Generalized Mixture Representations and Combinations for Additive Fuzzy Systems [#935]

Bart Kosko

Session semisup: Semisupervised learning
Wednesday, May 17, 11:00AM-12:20PM, Room: Parallel 5 (Room #4+7+8), Chair: Alex Fedorov

11:00AM Truncated Variational EM for Semi-Supervised Neural Simpletrons [#682]

Dennis Forster and Jorg Lucke

11:20AM Zero-Shot Learning with a Partial Set of Observed Attributes [#377]

Yaqing Wang, James T. Kwok, Quanming Yao and Lionel M. Ni

11:40AM End-to-end learning of brain tissue segmentation from imperfect labeling [#877]

Alex Fedorov, Jeremy Johnson, Eswar Damaraju, Alexei Ozerin, Vince Calhoun and Sergey Plis

12:00PM Joint Optimization of Feature Transform and Instance Weighting for Domain Adaptation [#238]

Masato Ishii and Atsushi Sato

Session neuro: Computational neuroscience
Wednesday, May 17, 11:00AM-12:20PM, Room: Parallel 6 (Room #5+6), Chair: Mayank Vatsa

11:00AM Synaptic Efficacy Mosaics and the Impact of Morphology [#937]

Nicolangelo Iannella and Thomas Launey

11:20AM A Synaptic Plasticity Rule Providing a Unified Approach to Supervised and Unsupervised Learning. [#362]

Mikhail Kiselev

11:40AM Region-specific fMRI Dictionary for Decoding Face Verification in Humans [#840]

Daksha Yadav, Naman Kohli, Shruti Nagpal, Maneet Singh, Prateekshit Pandey, Mayank Vatsa, Richa Singh, Afzel Noore, Gokulraj Prabhakaran and Harsh Mahajan

12:00PM Neural Computation with Non-uniform Population Codes [#9]

Brian Fischer

Session Plen6: Plenary session 6: Christof Koch
Wednesday, May 17, 1:30PM-2:30PM, Room: La Perouse, Chair: Irwin King

1:30PM Big Science, Team Science, Open Science for Neuroscience

Christof Koch

Panel Session Panel3: INNS 30th anniversary
Wednesday, May 17, 2:50PM-4:30PM, Room: La Perouse, Chair: David Brown

Special Session S10+24: Cybersecurity Analytics
Wednesday, May 17, 2:50PM-4:30PM, Room: Parallel 1 (Cook), Chair: Catherine Huang; Hongmei He

2:50PM Network Intrusion Detection for Cyber Security on Neuromorphic Computing System [#791]

Md Zahangir Alom and Tarek M. Taha

3:10PM Empowering Convolutional Networks for Malware Classification and Analysis [#381]

Bojan Kolosnjaji, Ghadir Eraisha, George Webster, Apostolis Zarras and Claudia Eckert

3:30PM The Object Class Intrinsic Filter Conjecture [#258]

Michael Kounavis

3:50PM Autoencoder-based Feature Learning for Cyber Security Applications [#576]

Mahmood Yousefi-Azar, Vijay Varadharajan, Len Hamey and Uday Tupakula

4:10PM A New Semantic Attribute Deep Learning with a Linguistic Attribute Hierarchy for Spam Detection [#409]

Hongmei He, Tim Watson, Carsten Maple, Jorn Mehnen and Ashutosh Tiwari

Session clst1: Clustering 1
Wednesday, May 17, 2:50PM-4:30PM, Room: Parallel 2 (Room #1+13+14), Chair: Max Vladymyrov

2:50PM Fast, Accurate Spectral Clustering Using Locally Linear Landmarks [#148]

Max Vladymyrov and Miguel Carreira-Perpinan

3:10PM Trajectory Clustering via Deep Representation Learning [#181]

Yao Di, Zhang Chao, Zhu Zhihua, Huang Jianhui and Bi Jingping

3:30PM Mini-Batch Spectral Clustering [#190]

Han Yufei and Filippone Maurizio

3:50PM A Deep Learning Enabled Subspace Spectral Ensemble Clustering Approach for Web Anomaly Detection [#566]

Yuan Guiqin, Li Bo, Yao Yiyang and Zhang Simin

4:10PM A Spectral Clustering Approach for Online and Streaming Applications [#684]

Antonio Robles-Kelly and Ran Wei

Session hw: Neuromorphic engineering
Wednesday, May 17, 2:50PM-4:30PM, Room: Parallel 3 (Room #2+11+12), Chair: Rohit Shukla

2:50PM C. elegans Neuromorphic Neural Network Exhibiting Undulating Locomotion [#553]

Nikita Agarwal, Neil Mehta, Alice Parker and Karam Ashouri

3:10PM Quadratic Unconstrained Binary Optimization (QUBO) on Neuromorphic Computing System [#831]

Md Zahangir Alom, Brian Van Essen, Adam T. Moody, David Peter Widemann and Tarek M. Taha

3:30PM An FPGA Distributed Implementation Model for Embedded SOM with On-Line Learning [#444]

Miguel Angelo de Abreu Sousa and Emilio Del-Moral-Hernandez

3:50PM Evaluating Hopfield-network-based linear solvers for hardware constrained neural substrates [#852]

Rohit Shukla, Erik Jorgensen and Mikko Lipasti

4:10PM A Power-Efficient Biomimetic Intra-Branch Dendritic Adder [#249]

Pezhman Mamdouh and Alice Parker

Session ensemble: Ensemble learning
Wednesday, May 17, 2:50PM-4:30PM, Room: Parallel 4 (Room #3+10+9), Chair: Jeremiah Deng

2:50PM Sensitivity and Similarity Regularization in Dynamic Selection of Ensembles of Neural Networks [#57]

Babak Keshavarz-Hedayati and Nikitas Dimopoulos

3:10PM Analyzing different prototype selection techniques for dynamic classifier and ensemble selection [#138]

Rafael Menelau Oliveira e Cruz, Robert Sabourin and George Darmiton da Cunha Cavalcanti

3:30PM A Multi-agent Metaheuristic Hybridization to the Automatic Design of Ensemble Systems [#786]

Antonino Feitosa Neto, Anne Canuto, Joao Carlos Xavier-Junior and Cephas Barreto

3:50PM A kernel-based ensemble classifier for evolving stream of trees with double concept drifting reaction [#873]

Valerio Grossi and Alessandro Sperduti

4:10PM A Streaming Ensemble Classifier with Multi-Class Imbalance Learning for Activity Recognition [#875]

Ahmad Shahi, Jeremiah Deng and Brendon Woodford

Session rl: Reinforcement learning
Wednesday, May 17, 2:50PM-4:30PM, Room: Parallel 5 (Room #4+7+8), Chair: Juyang Weng

2:50PM Bounds for Off-policy Prediction in Reinforcement Learning [#365]

Ajin George Joseph and Shalabh Bhatnagar

3:10PM Training Neural Networks with Policy Gradient [#870]

Sourabh Bose and Manfred Huber

3:30PM Can A Reinforcement Learning Agent Practice Before It Starts Learning? [#457]

Minwoo Lee and Charles Anderson

3:50PM A Sandpile Model for Reliable Actor-Critic Reinforcement Learning [#518]

Yiming Peng, Gang Chen, Mengjie Zhang and Shaoning Pang

4:10PM Online Reinforcement with Exploration for Distributed Control [#637]

Vignesh Narayanan and Jagannathan Sarangapani

Session behav: Behavior analysis
Wednesday, May 17, 2:50PM-4:30PM, Room: Parallel 6 (Room #5+6), Chair: tentative

2:50PM Dynamic Adaptation of User Migration Policies in Distributed Virtual Environments [#16]

David Vengerov

3:10PM Semi-wildlife gait patterns classification using Statistical Methods and Artificial Neural Networks [#669]

Daniel Gutierrez-Galan, Juan Pedro Dominguez-Morales, Lourdes Miro-Amarante, Francisco Gomez-Rodriguez, Manuel Jesus Dominguez-Morales, Manuel Rivas-Perez, Angel Jimenez-Fernandez and Alejandro Linares-Barranco

3:30PM Improving Point-based AIS Trajectory Classification with Partition-wise Gated Recurrent Units [#697]

Xiang Jiang, Xuan Liu, Erico N de Souza, Baifan Hu, Daniel L. Silver and Stan Matwin

3:50PM Pedestrian Detection with Dilated Convolution, Region Proposal Network and Boosted Decision Trees [#483]

Jiqian Li, Yan Wu, Junqiao Zhao, Linting Guan, Chen Ye and Tao Yang

4:10PM A Learning based Approach for Social Force Model Parameter Estimation [#533]

Zhiqiang Wan, Xuemin Hu, Haibo He and Yi Guo

Panel Session Panel4: New opportunities in neural network funding
Wednesday, May 17, 4:40PM-6:20PM, Room: La Perouse, Chair: Hava Siegelmann

Session security: Security and risk assessment
Wednesday, May 17, 4:40PM-6:20PM, Room: Parallel 1 (Cook), Chair: Tatiana Tambouratzis

4:40PM An Investigation of the Hoeffding Adaptive Tree for the Problem of Network Intrusion Detection [#587]

Diego Guarnieri Correa, Fabricio Enembreck and Carlos N. Silla Jr.

5:00PM Computational Intelligence Approach for Estimation of Vehicle Insurance Risk Level [#638]

Kristina Vassiljeva, Tepljakov Aleksei, Petlenkov Eduard and Netsajev Eduard

5:20PM A Compressive Multi-Kernel Method for Privacy-Preserving Machine Learning [#746]

Thee Chanyaswad, J. Morris Chang and S. Y. Kung

5:40PM How Systematic is the Environmental Sustainability Index 2002 as a Tool for Grouping Countries in Terms of Their Environmental Sustainability? [#658]

Tatiana Tambouratzis and Nikos Hatziethimiou

6:00PM Side-Channel Analysis and Machine Learning: A Practical Perspective [#702]

Stjepan Picek, Annelie Heuser, Alan Jovic, Simone Ludwing, Sylvain Guilley, Domagoj Jakobovic and Nele Mentens

Session clst2: Clustering 2
Wednesday, May 17, 4:40PM-6:20PM, Room: Parallel 2 (Room #1+13+14), Chair: Nistor Grozavu

4:40PM Signal-Based Autonomous Clustering for Relational Data [#664]

Parisa Rastin, Basarab Matei, Guenael Cabanes and Ibtissame El baghdadi

5:00PM Collaborative Clustering between Different Topological Partitions [#674]

Antoine Lachaud, Nistor Grozavu, Matei Basarab and Younes Bennani

5:20PM Integrating distance metric learning and cluster-level constraints in semi-supervised clustering [#718]

Bruno Nogueira, Yuri Tomas and Ricardo Marcacini

5:40PM Analysis of the influence of diversity in collaborative and multi-view clustering [#8]

Jeremie Sublime, Basarab Matei and Pierre-Alexandre Murena

6:00PM Improving Load Forecasting Based on Deep Learning and K-shape Clustering [#52]

Fateme Fahiman, Sarah M.Erfani, Sutharshan Rajasegarar, Marimuthu Palaniswami and Christopher Leckie

Session robot: Robotics
Wednesday, May 17, 4:40PM-6:20PM, Room: Parallel 3 (Room #2+11+12), Chair: Chelsea Sabo

4:40PM Transfer Learning of Shared Latent Spaces between Robots with Similar Kinematic Structure [#853]

Brian Delhaisse, Domingo Esteban, Leonel Rozo and Darwin Caldwell

5:00PM Learning Multisensory Neural Controllers for Robot Arm Tracking [#890]

Lakshitha Wijesinghe, Marco Antonelli, Jochen Triesch and Bertram Shi

5:20PM Multi-robot Cooperative Planning by Consensus Q-learning [#910]

Arup Kumar Sadhu, Amit Konar, Bonny Banerjee and Atulya K. Nagar

5:40PM Nonlinearly-Activated Noise-Tolerant Zeroing Neural Network for Distributed Motion Planning of Multiple Robot Arms [#436]

Long Jin, Shuai Li, Xin Luo and Ming-sheng Shang

6:00PM An Inexpensive Flying Robot Design for Embodied Robotics Research [#683]

Chelsea Sabo, Esin Yavuz, Alex Cope, Kevin Gurney, Eleni Vasilaki, Thomas Nowotny and James Marshall

Session img: Image analysis
Wednesday, May 17, 4:40PM-6:20PM, Room: Parallel 4 (Room #3+10+9), Chair: Alex Hocking (tentative)

4:40PM Mining Hubble Space Telescope Images [#130]

Alex Hocking, Yi Sun, James Geach and Neil Davey

5:00PM Image Completion with Global Structure and Weighted Nuclear Norm Regularization [#200]

Mingli Zhang and Christian Desrosiers

5:20PM Two-dimensional Spectral Image Calibration Based on Feed-forward Neural Network [#333]

Mingze Li, Hasitieer Haerken, Fuqing Duan, Qian Yin, Xin Zheng and Ping Guo

5:40PM Genetic Algorithm-based Optimization of ELM for On-line Hyperspectral Image Classification [#595]

Javier Echanobe, Ines Del Campo, Koldo Basterretxea and Victoria Martinez

6:00PM Restricted Exhaustive Search for Frequency Band Selection in Motor Imagery Classification [#756]

Paul Bustios and Joao Rosa

Session rl-ctrl: Reinforcement learning and control
Wednesday, May 17, 4:40PM-6:20PM, Room: Parallel 5 (Room #4+7+8), Chair: Stephen Piche

4:40PM Batch Reinforcement Learning on the Industrial Benchmark: First Experiences [#608]

Daniel Hein, Steffen Udluft, Michel Tokic, Alexander Hentschel, Thomas Runkler and Volkmar Sterzing

5:00PM Time Delays in a HyperNEAT Network to Improve Gait Learning for Legged Robots [#507]

Oscar Silva, Pascal Sigel and Maria-Jose Escobar

5:20PM Robust Optimal Control for Time-Delay Systems with Dynamic Uncertainties via ADP [#554]

Lu Dong, Jun Li, Wankou Yang and Changyin Sun

5:40PM Active disturbance rejection control based on differential neural networks [#19]

Ivan Salgado, Manuel Mera and Isaac Chairez

6:00PM Gain Confidence of a Neural Network used for Model Based Control [#232]

Steve Piche and Jason Grimm

Session pred: Prediction and forecasting
Wednesday, May 17, 4:40PM-6:20PM, Room: Parallel 6 (Room #5+6), Chair: Filippo Maria Bianchi

4:40PM Cellular Computational Generalized Neuron Network with Cooperative PSO for Power Systems [#721]

Md Rahman, Yawei Wei and Ganesh Venayagamoorthy

5:00PM Solar Power Prediction Using Weather Type Pair Patterns [#748]

Zheng Wang, Irena Koprinska and Mashud Rana

5:20PM Local Short Term Electricity Load Forecasting: Automatic Approaches [#758]

The-Hien Dang-Ha, Filippo Bianchi and Roland Olsson

5:40PM Temporal Overdrive Recurrent Neural Network [#386]

Filippo Maria Bianchi, Michael Kampffmeyer, Enrico Maiorino and Robert Jenssen

6:00PM Monthly Energy Consumption Forecast: A Deep Learning Approach [#207]

Rodrigo Berriel, Andre Teixeira Lopes, Alexandre Rodrigues, Flavio Miguel Varejao and Thiago Oliveira-Santos

Special Track Banquet: Banquet and Award Ceremony
Wednesday, May 17, 7:00PM-9:00PM, Room: Arteaga, Chair: Chrisina Jayne
Session Plen7: Plenary session 7: Odest Chadwicke Jenkins
Thursday, May 18, 8:00AM-9:00AM, Room: La Perouse, Chair: Yoonsuck Choe

8:00AM Perception of People and Scenes for Robot Learning from Demonstration

Odest Chadwicke Jenkins

Session self-org: Self-organization
Thursday, May 18, 9:20AM-10:40AM, Room: Parallel 1 (Cook), Chair: Ricardo Cerri

9:20AM A Self-Organizing Map-based Method for Multi-Label Classification [#427]

Gustavo Giordano Colombini, Iuri Bonna Mauricio Abreu and Ricardo Cerri

9:40AM From CPU to FPGA - Acceleration of Self-Organizing Maps for Data Mining [#475]

Jan Lachmair, Thomas Mieth, Rene Griessl, Jens Hagemeyer and Mario Porrmann

10:00AM Adaptive Density Estimation Based on Self-Organizing Incremental Neural Network using Gaussian Process [#772]

Xiaoyu Wang and Osamu Hasegawa

10:20AM Self-Organising Temporal Pooling [#888]

Daniel Slack, Brendan McCane and Alistair Knott

Special Session S17: Intelligent vehicle and transport systems
Thursday, May 18, 9:20AM-10:40AM, Room: Parallel 2 (Room #1+13+14), Chair: Yi Murphey

9:20AM Neural-Based Model Predictive Control for Tackling Steering Delays of Autonomous Cars [#227]

Ranik Guidolini, Alberto F. De Souza, Filipe Mutz and Claudine Badue

9:40AM Following the Leader using a Tracking System based on Pre-trained Deep Neural Networks [#825]

Filipe Mutz, Vinicius Cardoso, Thomas Teixeira, Luan F. R. Jesus, Michael A. Golcalves, Ranik Guidolini, Josias Oliveira, Claudine Badue and Alberto F. De Souza

10:00AM Unsupervised Learning for Surveillance Planning with Team of Aerial Vehicles [#732]

Jan Faigl and Petr Vana

10:20AM Long-Range Navigation by Path Integration and Decoding of Grid Cells in a Neural Network [#710]

Vegard Edvardsen

Session att: Attention and emotion
Thursday, May 18, 9:20AM-10:40AM, Room: Parallel 3 (Room #2+11+12), Chair: Soheil Keshmiri

9:20AM Designing an Adaptive Attention Mechanism for Relation Classification [#45]

Pengda Qin, Weiran Xu and Jun Guo

9:40AM Classification of Radiology Reports Using Neural Attention Models [#700]

Bonggun Shin, Falgun H. Chokshi, Timothy Lee and Jinho D. Choi

10:00AM Emotional State Estimation Using a Modified Gradient-Based Neural Architecture with Weighted Estimates [#112]

Soheil Keshmiri, Hidenobu Sumioka, Junya Nakanishi and Hiroshi Ishiguro

10:20AM Typicality effect on N400 ERP in categories despite differences in semantic processing [#300]

Mansoureh Fahimi Hnazaee and Marc Van Hulle

Session med: Medical and health applications
Thursday, May 18, 9:20AM-10:40AM, Room: Parallel 4 (Room #3+10+9), Chair: Danilo Mandic (tentative)

9:20AM Complexity science for sleep stage classification from EEG [#487]

Takashi Nakamura, Tricia Adjei, Yousef Alqurashi, David Looney, Mary Morrell and Danilo Mandic

9:40AM Temporal-Specific Roles of Fractality in EEG Signal of Alzheimer's Disease [#544]

Sou Nobukawa, Teruya Yamanishi, Haruhiko Nishimura, Yuji Wada, Mitsuru Kikuchi and Tetsuya Takahashi

10:00AM Robust Greedy Deep Dictionary Learning for ECG Arrhythmia Classification [#18]

Majumdar Angshul and Ward Rabab

10:20AM An intelligent learning-based watermarking scheme for outsourced biomedical time series data [#690]

Trung Duy Pham, Dat Tran and Wanli Ma

Session scene: Scene analysis
Thursday, May 18, 9:20AM-10:40AM, Room: Parallel 5 (Room #4+7+8), Chair: Clive Cheong Took

9:20AM On Making Sense of Neural Networks in Road Analysis [#175]

Daniel Morris, Andreas Antoniades and Clive Cheong Took

9:40AM Grassmann Matching Kernels for Scene Representation and Recognition [#477]

Bisser Raytchev, Miku Koujiba, Toru Tamaki and Kazufumi Kaneda

10:00AM 3D CNN Based Phantom Object Removing from Mobile Laser Scanning Data [#653]

Balazs Nagy and Csaba Benedek

10:20AM Comparison of Semantic Segmentation Approaches for Horizon/Sky Line Detection [#741]

Touqeer Ahmad, Pavel Campr, Martin Cadik and George Bebis

Session rnn: Recurrent neural networks
Thursday, May 18, 9:20AM-10:40AM, Room: Parallel 6 (Room #5+6), Chair: Stefan Oehmcke

9:20AM Convolving over Time via Recurrent Connections for Sequential Weight Sharing in Neural Networks [#691]

Jason Allred and Kaushik Roy

9:40AM Compressing Recurrent Neural Network with Tensor Train [#579]

Andros Tjandra, Sakriani Sakti and Satoshi Nakamura

10:00AM Recurrent Neural Networks and Exponential PAA for Virtual Marine Sensors [#656]

Stefan Oehmcke, Oliver Zielinski and Oliver Kramer

10:20AM Structural adaptation for sparsely connected MLP using Newton's method [#830]

Parastoo Kheirkhah, Kanishka Tyagi, Son Nguyen and Michael T. Manry

Session dyn: Neurodynamics
Thursday, May 18, 11:00AM-12:20PM, Room: Parallel 1 (Cook), Chair: Isaac Chairez

11:00AM Global Asymptotic Stability for Matrix-Valued Recurrent Neural Networks with Time Delays [#79]

Calin-Adrian Popa

11:20AM Connection Sparsity versus Orbit Stability in Dynamic Binary Neural Networks [#445]

Ryuji Sato, Shunsuke Aoki and Toshimichi Saito

11:40AM A novel gene network model based on nonlinear dynamics of asynchronous cellular automaton [#924]

Ryota Araki, Hiroyuki Torikai and Takuya Yoshimoto

12:00PM Two-layer dynamic neural field learning law based on controlled Lyapunov functions [#500]

Jorge-Luis Garcia, Ivan Salgado and Isaac Chairez

Special Session S22: Machine learning methods applied to medicine
Thursday, May 18, 11:00AM-12:20PM, Room: Parallel 2 (Room #1+13+14), Chair: Veronica Bolon-Canedo

11:00AM The Fused Lasso Penalty for Learning Interpretable Medical Scoring Systems [#213]

Nataliya Sokolovska, Yann Chevaleyre, Karine Clement and Jean-Daniel Zucker

11:20AM Supervised Context-Aware Non-Negative Matrix Factorization to Handle High-Dimensional High-Correlated Imbalanced Biomedical Data [#273]

Ali Braytee, Wei Liu and Paul Kennedy

11:40AM Objective Quality Assessment of Retinal Images Based on Texture Features [#221]

Beatriz Remeseiro, Ana Maria Mendonca and Aurelio Campilho

12:00PM Analysis and Optimization of the 13C Octanoic Acid Breath Test [#707]

Vitoantonio Bevilacqua, Marco Riezzo, Antonio Brunetti, Francesco Russo, Benedetta D'Attoma and Giuseppe Riezzo

12:20PM Microcalcification Detection Using Self Organizing Neuro Glia Network Classifier [#761]

Shems Bertegi and Kirmene Marzouki

Session brain: Brain imaging and analysis
Thursday, May 18, 11:00AM-12:20PM, Room: Parallel 3 (Room #2+11+12), Chair: Vasiliki-Maria Katsageorgiou

11:00AM MiPAL: Multiple-instance Passive Aggressive Learning for Identification of Attention Deficit Hyperactive Disorder from fMRI [#714]

K.V.D.J.Prabhash Kumarasinghe, Suresh Sundaram and Subbaraju Vigneshwaran

11:20AM Data-driven Study of Mouse Sleep-stages using Restricted Boltzmann Machines [#596]

Vasiliki-Maria Katsageorgiou, Matteo Zanotto, Valter Tucci, Vittorio Murino and Diego Sona

11:40AM Performance Analysis and Benchmarking of All-Spin Spiking Neural Networks [#846]

Abhronil Sengupta, Aayush Ankit and Kaushik Roy

12:00PM Metastability of Cortical BOLD Signals in Maturation and Senescence [#634]

Shruti Naik, Subbareddy Oota, Arpan Banerjee, Dipanjan Roy and Raju S. Bapi

Session health: Health applications
Thursday, May 18, 11:00AM-12:20PM, Room: Parallel 4 (Room #3+10+9), Chair: Raka Jovanovic

11:00AM Localized Sampling for Hospital Re-admission Prediction with Imbalanced Sample Distributions [#828]

Xingquan Zhu, Jose Hurtado and Haicheng Tao

11:20AM An Algorithm for Automated Segmentation for Bleeding Detection in Endoscopic Images [#868]

Eva Tuba, Milan Tuba and Raka Jovanovic

11:40AM A Method for Intelligent Support to Medical Diagnosis in Emergency Cardiac Care [#624]

Luis Alberto Souto Maior Neto, Robson Pequeno de Sousa, Carlos de Almeida, Katia Galdino, Fabricia Martins Silva and Antonio Venancio de Moura Lacerda Filho

12:00PM Latent Topic Ensemble Learning for Hospital Readmission Cost Reduction [#717]

Christopher Baechle, Ankur Agarwal, Ravi Behara and Xingquan Zhu

Session feature: Feature selection
Thursday, May 18, 11:00AM-12:20PM, Room: Parallel 5 (Room #4+7+8), Chair: Ali Minai

11:00AM Feature Selection using Multiple Auto-Encoders [#755]

Xinyu Guo, Ali Minai and Long Lu

11:20AM A Fast Information-Theoretic Approximation of Joint Mutual Information Feature Selection [#817]

Heng Liu and Gregory Ditzler

11:40AM Early Stabilizing Feature Importance for TensorFlow Deep Neural Networks [#110]

Jeff Heaton, Steven McElwee, James Cannady and James Fraley

12:00PM Video-Based Face Recognition Using Ensemble of Haar-Like Deep Convolutional Neural Networks [#699]

Mostafa Parchami, Saman Bashbaghi and Eric Granger

Session sync: Circuits and synchrony
Thursday, May 18, 11:00AM-12:20PM, Room: Parallel 6 (Room #5+6), Chair: Jeremie Cabessa

11:00AM Spatio-Temporal Pattern Recognition in Neural Circuits with Memory-Transistor-Driven Memristive Synapses [#466]

Kurtis Cantley, Robert Ivans, Anand Subramaniam and Eric Vogel

11:20AM Emulation of Finite State Automata with Networks of Synfire Rings [#301]

Jeremie Cabessa and Paolo Masulli

11:40AM Vibrated Synchronization Features Neural Network [#591]

Kakemoto Yoshitsugu and Nakasuka Shinichi

12:00PM A Software-equivalent SNN Hardware using RRAM-array for Asynchronous Real-time Learning [#897]

Aditya Shukla, Vinay Kumar and Udayan Ganguly

Workshop WS2a: Workshop 2: Deep Learning for Music
Thursday, May 18, 1:30PM-6:30PM, Room: Parallel 2 (Room #1+13+14), Chair: Dorien Herremans; Ching-Hua Chuan

Workshop WS3: Workshop 3: Computational Aspects of Pattern Recognition and Computer Vision with Neural Systems
Thursday, May 18, 1:30PM-6:30PM, Room: Parallel 3 (Room #2+11+12), Chair: Boguslaw Cyganek; Michal Wozniak

Workshop WS4: Workshop 4: Canceled
Thursday, May 18, 1:30PM-6:30PM, Room: Parallel 4 (Room #3+10+9), Chair: Canceled

Workshop WS5a: Workshop 5: Machine Learning for Large-Scale Networks
Thursday, May 18, 1:30PM-6:30PM, Room: Parallel 5 (Room #4+7+8), Chair: Izabela Moise; Nino Antulov-Fantulin

Workshop WS6: Workshop 6: Advances in Learning from/with Multiple Learners (ALML)
Thursday, May 18, 1:30PM-6:30PM, Room: Parallel 6 (Room #5+6), Chair: Matei Basarab; Younes Bennani, Guenael Cabanes, Nistor Grozavu; Nicoleta Rogovschi; Jeremie Sublime

Workshop WS1: Workshop 1: Developmental Plasticity and Evolutionary Robotics
Friday, May 19, 9:00AM-12:20PM, Room: Parallel 1 (Cook), Chair: Angel P. del Pobil and Fumiya Iida

Workshop WS2b: Workshop 2: Deep Learning for Music
Friday, May 19, 9:00AM-12:20PM, Room: Parallel 2 (Room #1+13+14), Chair: Dorien Herremans; Ching-Hua Chuan

Workshop WS5b: Workshop 5: Machine Learning for Large-Scale Networks
Friday, May 19, 9:00AM-12:20PM, Room: Parallel 5 (Room #4+7+8), Chair: Izabela Moise; Nino Antulov-Fantulin

15 Author index

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- The index only includes authors of papers that appear in the proceedings.

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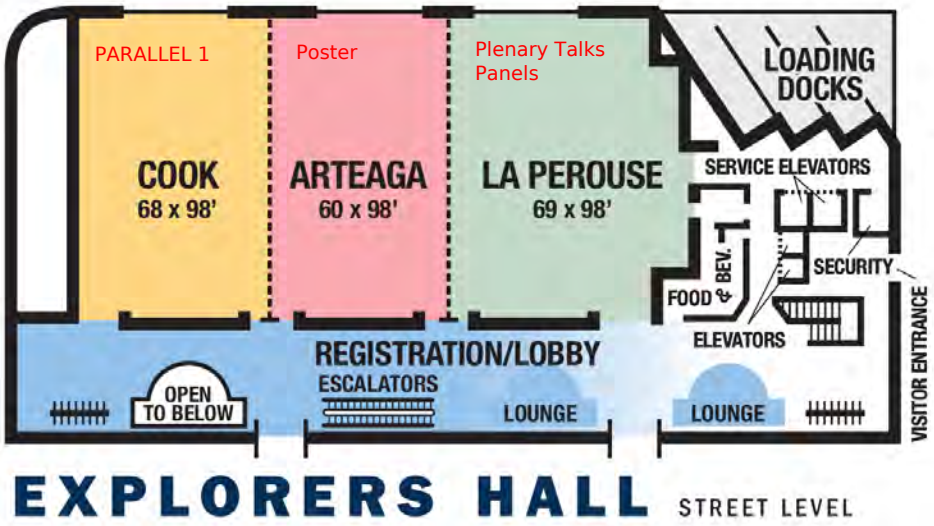
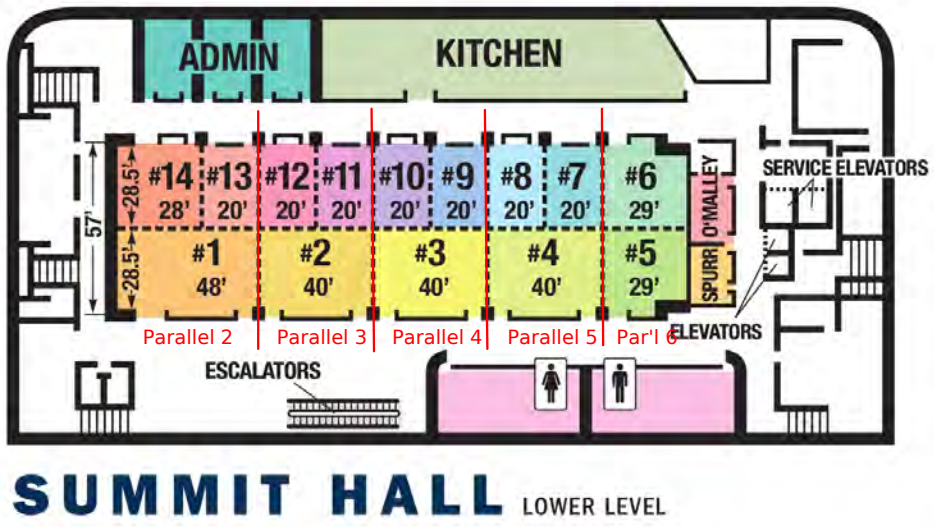
16 Venue Floor Plan





Parallel sessions:

- Parallel 1: Cook
- Parallel 2: Rooms #1 + 13 + 14
- Parallel 3: Rooms #2 + 11 + 12
- Parallel 4: Rooms #3 + 10 + 9
- Parallel 5: Rooms #4 + 7 + 8
- Parallel 6: Rooms #5 + 6

Note: Parallel 2 to 6 will be in combined rooms where the internal walls are removed to make a single large room.

17 Advertisements (following pages)

IEEE World Congress on Computational Intelligence
08-13 July 2018, Rio de Janeiro, Brazil
www.ieee-wcci.org

IEEE WCCI 2018
Rio de Janeiro Brazil

The IEEE World Congress on Computational Intelligence (IEEE WCCI) is the largest technical event in the field of computational intelligence. The IEEE WCCI 2018 will host three conferences: The 2018 International Joint Conference on Neural Networks (IJCNN 2018), the 2018 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE 2018), and the 2018 IEEE Congress on Evolutionary Computation (IEEE CEC 2018) under one roof. It encourages cross-fertilization of ideas among the three big areas and provides a forum for intellectuals from all over the world to discuss and present their research findings on computational intelligence.

IEEE WCCI 2018 will be held at the Windsor Barra Convention Centre, Rio de Janeiro, Brazil. Rio de Janeiro is a wonderful and cosmopolitan city, ideal for international meetings. Rio boasts fantastic weather, savory cuisine, hospitable people, and modern infrastructure. Rio is the first city to receive the Certificate of World Heritage for its Cultural Landscape, recently conferred by UNESCO.

IJCNN is the flagship conference of the International Neural Network Society and the IEEE Computational Intelligence Society. It covers a wide range of topics in the field of neural networks, from biological neural network modeling to artificial neural computation.

FUZZ-IEEE is the foremost conference in the field of fuzzy systems. It covers all topics in fuzzy systems, from theory to applications.

IEEE CEC is the leading event in the field of evolutionary computation, and covers all topics in evolutionary computation from theory to applications.

Call for Papers

Papers for IEEE WCCI 2018 should be submitted electronically using the Congress website www.ieee-wcci.org and will be refereed by experts in the fields and ranked based on the criteria of originality, significance, quality and clarity.

Call for Tutorials

IEEE WCCI 2018 will feature pre-Congress tutorials, covering fundamental and advanced topics in computational intelligence. A tutorial proposal should include title, outline, expected enrollment, and presenter/organizer biography. Inquiries regarding tutorials should be addressed to Tutorials Chairs.

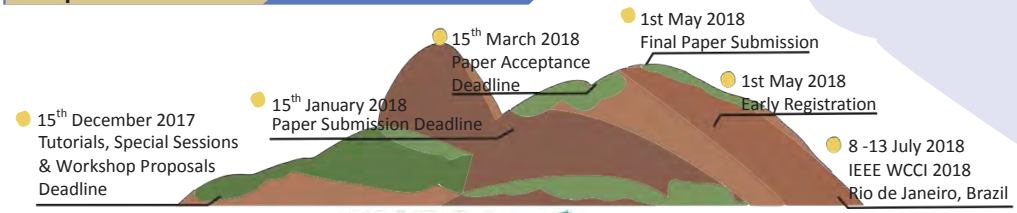
Call for Special Session Proposals

IEEE WCCI 2018 solicits proposals for special sessions within the technical scope of the three conferences. Special sessions to be organized by internationally recognized experts, aim to bring together researchers in special focused topics. Cross-fertilization of the three technical disciplines and newly emerging research are strongly encouraged. Inquiries regarding special sessions and proposals should be addressed to Special Sessions Chairs.

Call for Competition Proposals

IEEE WCCI 2018 will host competitions to stimulate research in computational intelligence. A competition proposal should include descriptions of the problem(s) addressed, evaluation procedures, and a biography of the organizers. Inquiries regarding competitions should be addressed to the Competitions Chairs.

Important Dates



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AIML Contest

Important dates:
Monday March 27, 2017: deadline for recommendation of contest learning engines
Monday April 10, 2017: deadline for application for admission and application for BMI fellowship. Students must get admitted first.
Monday April 24, 2017: deadline for advance registration of BMI courses and AIML Contest entries
May 16, 2917: AIML Contest Panel during IJCNN 2017: 2016 awards, 1st place: $10,000, presentations, and Contest 2017 kick-off
May 29 - June 16, 2017 (three weeks): distance learning course BMI 831 Cognitive Science
June 19 - July 7, 2017 (three weeks): distance learning course BMI 861 Brain Automata
July 10 - July 28, 2017 (three weeks): distance learning course BMI 871 Computational Brain-Mind
July 31 - Aug. 11, 2017: Contest workshops: Hands on contest engines (free for one person of each AIML Contest entry)
Dec. 4, 2017: results from contest entries due by noon
Date TBD, 2018: AIML Contest 2017 announcements, awards, and contest presentations. First place: $10,000.

The AIML Contest:
Full Automation of Machine Learning

You may be familiar with the phrase "machine learning", but you probably are not familiar with the phrase "full automation of machine learning." Some may think that traditional reinforcement learning and genetic algorithms are fully automatic machine learning, but they are not. This is because they are task-specific: In those algorithms, the programmer must inject task-specific representations. We think that both the poor performance and the high brittleness of traditional machine learning algorithms have to do with the lack of full automation in the machine learning community. The full automation does not mean without-any-teacher. The fully automation is inside the "skull of brain" from embryo to adulthood, while the teachers are in its external environment.

The new AIML Contest promotes full automation of machine learning, like a brain --- a hall mark of Autonomous Mental Development (AMD).

Brain-Mind Talk 1: How Brains Work. Youtube site. Youku site.

Contest web

BMI Summer School and AIML Contest 2017

2017 is the 6th year of BMI summer school, the 2nd year of the AIML Contest.

Visit the three Demo Booths here at IJCNN 2017!