ICANN 2017 Scientific Program

ICANN17

International Conference on Artificial Neural Networks 2017

Alghero, Italy
September 11-14, 2017

Time	Monday 11-Sep-2017		Tuesday 12-Sep-2017	
08:00 08:20 08:40				
09:00 09:20 09:40 10:00 10:20 10:40 11:00 11:20 11:40 12:00 12:20 12:40	**S03. Neural Networks meet Natural and Environmental Sciences (09:30 - 12:30)**	**Tutorial - Capabilities of Shallow and Deep Networks** Vera Kurkova (Institute of Computer Science, Czech Academy of Sciences)	Brain Imaging	**Boltzmann Machines and Phase Transitions**
			Elisabeth André - Emotional and Social Signals: A new challenge for ANN?	
			ENNS Exec Committee	
13:00 13:20 13:40	*Lunch Break (12:20 - 14:00)*		**Lunch Buffet (12:20 - 14:00)**	
14:00 14:20 14:40 15:00 15:20 15:40 16:00	**Opening ICANN**		Recurrent Neural Networks	**S01: Context Information Learning and Self-assessment in advanced machine learning models**
	A1. From Perception to Action 1	Convolutional Neural Networks 1		
16:20 16:40	*Coffee Break (16:20 - 17:00)*		*Coffee Break (16:20 - 17:00)*	
17:00 17:20 17:40	**Marco Gori - The Principle of Least Cognitive Action for Learning and Inference**		**Moshe Abeles - Coding by precise action-potential timing**	
18:00 18:20 18:40 19:00	A2. From Neurons to Networks 1	Games & Strategy	Neuromorphic Hardware	Representation and classification 1
19:20 19:40 20:00 20:20 20:40 21:00 21:20 21:40	**All Posters on display** **Dinner Buffet with Traditional Music and Dances of Sardinia (19:30-22:00)**		**ENNS General Assembly Travel grants**	
22:00				

ICANN Registration Information Desk Open (8:00 - 19:30)

ICANN Desk Open (09:00 - 18:30)

Wednesday 13-Sep-2017	Thursday 14-Sep-2017	Time
		08:00
		08:20
		08:40
ICANN Desk Open (09:00 – 14:00)		**09:00**
		09:20
Brain Topology and Dynamics / **Clustering**		09:40
	ICANN Desk (10:00 – 14:00)	**10:00**
		10:20
		10:40
David Ríos Insua - Adversarial machine learning: An adversarial risk analysis approach	**Synaptic Plasticity & Learning 1** / **S02: Learning From Data Streams and Time Series 1**	**11:00**
		11:20
		11:40
Posters presentation (odd nb)	**Posters presentation (even nb)**	**12:00**
		12:20
		12:40
		13:00
Lunch Buffet & Coffee Break (12:00-14:30)	**Lunch Buffet & Coffee Break (12:00-14:30)**	13:20
		13:40
		14:00
		14:20
	Michele Giugliano- Beyond "frequency-current" curves: probing the dynamical response properties of neocortical neurons	14:40
		15:00
		15:20
		15:40
Boat departs at 15:45	**Awards and Closing Ceremony**	**16:00**
		16:20
		16:40
Visit to the		**17:00**
		17:20
Grotte di Nettuno		17:40
		18:00
		18:20
		18:40
		19:00
		19:20
		19:40
Social Dinner (19:30 - 22:00)		**20:00**
		20:20
		20:40
		21:00
		21:20
		21:40
		22:00

How to get to ICANN 2017

ICANN 2017 is held in the Dipartimento di Architettura, Design e Urbanistica, Università degli Studi di Sassari, Alghero, Sardinia, Italy.
Address:
Bastioni Marco Polo 77, 07041 Alghero (SS), Italy

Directions

NOTE: The instructions below are just indicative! For any transportation option, make sure to double check the timetable a few weeks before your trip.

By air
- Landing in Alghero airport. The airport in Alghero offers mostly domestic destinations and some international destinations during the summer season. It is located around 10km from downtown.
  - Landing in Olbia airport. The Olbia airport lies about 140km away from Alghero. It serves domestic and international destinations. The easiest way to get to ICANN from this airport is the direct coach service Olbia-Alghero (2.5 hours, 20 EUR).
  - Landing in Elmas (Cagliari) airport. This is the main airport on the island, serving several international destinations. It lies further away from ICANN, you should count around 5 hours travel time. You can reach Alghero by train, with a connection in Sassari. It is a good option if you plan to spend a few extra days before or after the conference to explore the beautiful island of Sardinia.

  Another option is to rent a car at the airport and drive to Alghero. Most hotels in Alghero offer parking to their guests.

By ferry Many ferry services connect Northern Sardinia with the mainland. The main port is Porto Torres (around 40km from ICANN), which is connected by ferry with Barcelona, Genoa, Civitavecchia, Marseille, Propriano.

Map of the conference venue and local area

Map of the conference venue and location of the building areas of interest of ICANN 2017.
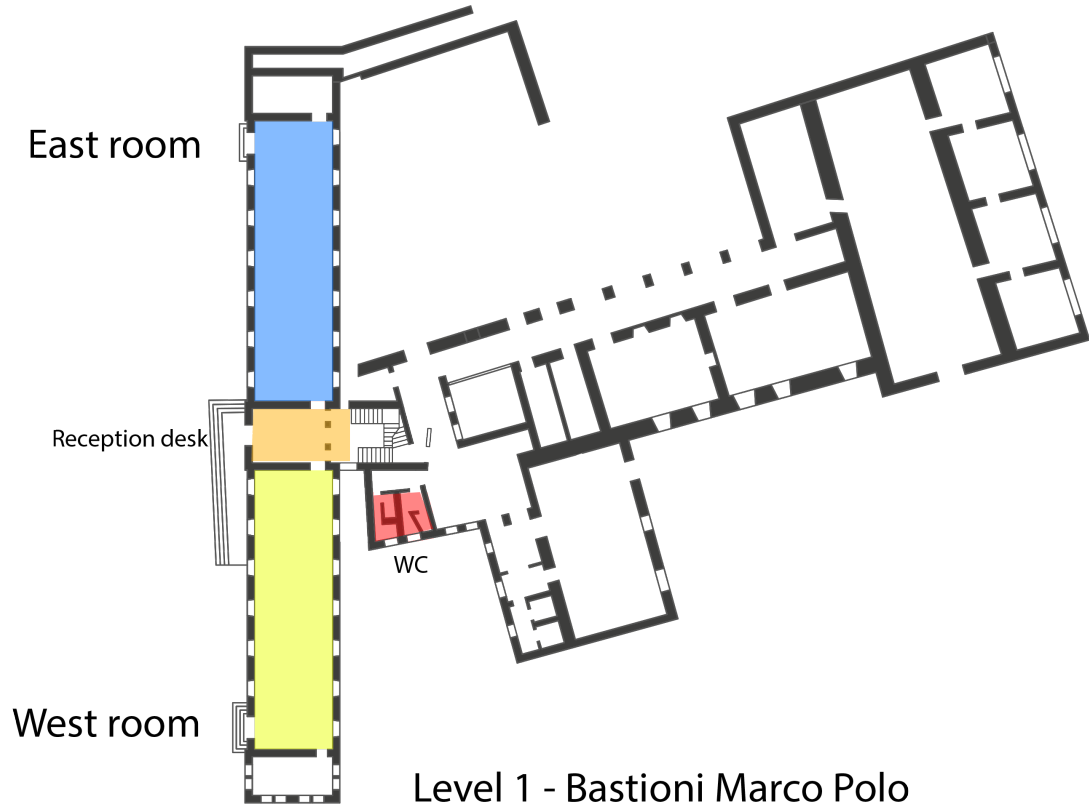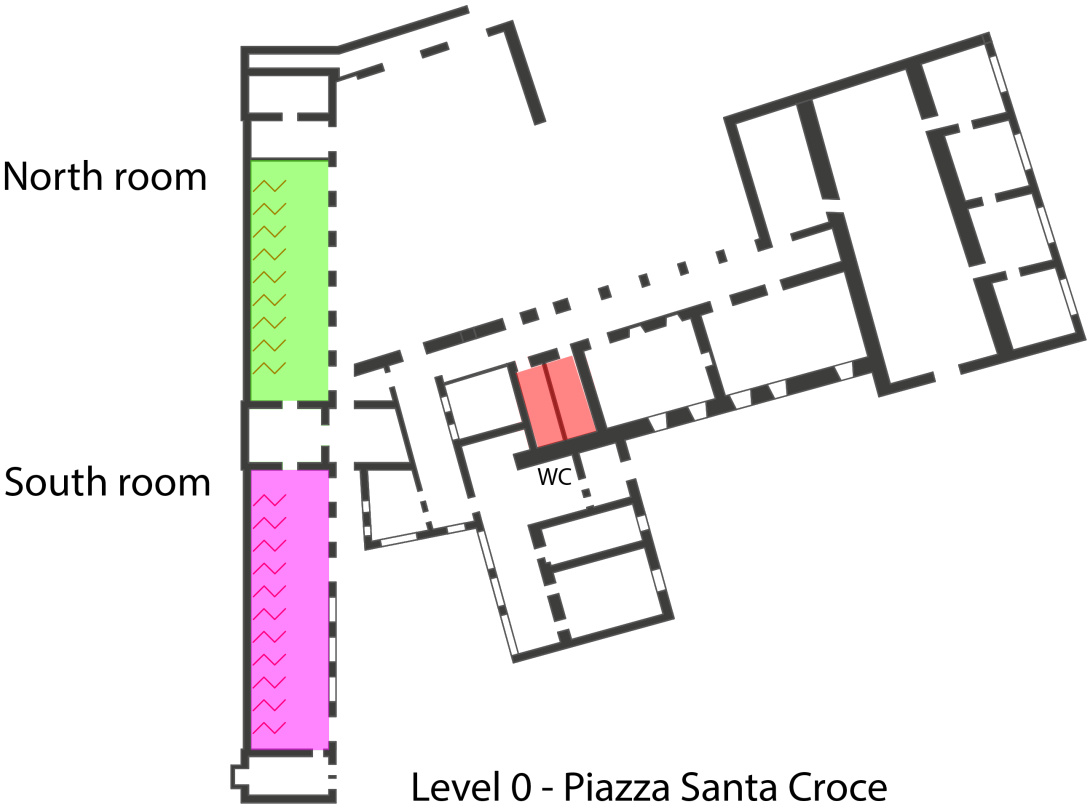

Instructions for speakers and poster presenters

Oral presentations They will take place in the room specified for the assigned session. The speaker is responsible for being present with reasonable time in advance. The rooms are equipped with a projector with standard VGA interface (remember to bring an adapter if your laptop doesn't have a VGA port). The duration of talks is of 15 minutes plus 5 minutes of questions and discussions. Given the tight conference schedule, the total time of 20 minutes for each slot shall not be exceeded. The speakers and the session chairs cooperate to make the conference programme progress as planned.

Posters The posters are on display for the entire duration of the conference in the South Hall and the North Hall. The poster presenters are responsible for hanging their poster at the assigned location and removing it at the end of the conference. Tape and pins will be provided. The presenters shall stand next to their poster during the assigned poster session: **Wednesday** for posters with an odd number, and **Thursday** for posters with an even number (e.g. poster C1.04 should be be presented during the poster session on Thursday).

Conference venue floor plans

North room

South room

WC

Level 0 - Piazza Santa Croce

East room

Reception desk

WC

West room

Level 1 - Bastioni Marco Polo

Monday, 11 September 2017

09:30-12:30 (West Hall)   S03. Neural Networks meet Natural and Environmental Sciences (09:30 - 12:30)

Chair: Antonino Staiano / Giosué Lo Bosco / Giovanni Burgio

S03.1 *Pelagic Species Identification by using a Probabilistic Neural Network and Echo-sounder Data* Ignazio Fontana, Giovanni Giacalone, Angelo Bonanno, Salvatore Mazzola, Gualtiero Basilone, Simona Genovese, salvatore aronica, Antonino Fiannaca, Alessio Langiu, Giosue' Lo Bosco, Massimo La Rosa, Riccardo Rizzo

S03.2 *The impact of ozone on crop yields by combining multi-model results through a Neural Network approach* Angelo Riccio, Stefano Galmarini

S03.3 *Artificial Neural Networks for fault tollerance of an Air pressure Sensor Network* Salvatore Aronica, Gualtiero Basilone, Angelo Bonanno, Ignazio Fontana, Simona Genovese, Giovanni Giacalone, Salvatore Mazzola, Giosue' Lo Bosco, Alessio Langiu, Riccardo Rizzo

S03.4 *Modelling the impact of GM plants and insecticides on arthropod populations of agricultural interest* Alberto Lanzoni, Giovanni Burgio

S03.5 *On the estimation of pollen density on non-target Lepidoptera food plant leaves in Bt-maize exposure models: Open Problems and Possible Solutions* Francesco Camastra, Angelo Ciaramella, Antonino Staiano

S03.6 *Deep Neural Networks for Emergency Detection* Emanuele Cipolla, Riccardo Rizzo, Filippo Vella

09:30-12:00 (East Hall) Tutorial: Capabilities of Shallow and Deep Networks

Instructor: Věra Kůrková, Institute of Computer Science, Czech Academy of Sciences, ENNS President.
Abstract: Although originally biologically inspired neural networks were intro- duced as multilayer computational models, later shallow (one-hidden-layer) architectures became dominant in applications. Recently, interest in archi- tectures with several hidden layers was renewed due to successes of deep convolutional networks. Experimental evidence motivated theoretical re- search aiming to characterize tasks for which deep networks are more suit- able than shallow ones. This tutorial will review recent theoretical results comparing capabilities of shallow and deep networks. In particular, it will focus on complexity requirements of shallow and deep networks performing high-dimensional tasks.

14:00-14:20 (East Hall) Opening address

14:00-14:20 *Welcome address and opening of the conference.* Alessandro E. P. Villa, Věra Kůrková, Alessandra Lintas, Stefano Rovetta, Paul Verschure.

14:20-16:20 (West Hall) A1. A1. From Perception to Action 1

Chair: Stefan Wermter

A1.1 *Inherently Constraint-Aware Control of Many-Joint Robot Arms with Inverse Recurrent Models* Sebastian Otte, Adrian Zwiener, Martin Butz

A1.2 *Mixing Actual and Predicted Sensory States based on Uncertainty Estimation for Flexible and Robust Robot Behavior* Shingo Murata, Wataru Masuda, Saki Tomioka, Tetsuya Ogata, Shigeki Sugano

A1.3 *Neurodynamical model for the coupling of action perception and execution* Mohammad Hovaidi Ardestani, Vittorio Caggiano, Martin Giese

A1.4 *Neural End-to-End Self-learning of Visuomotor Skills by Environment Interaction* Matthias Kerzel, Stefan Wermter

A1.5 *Learning of Labeling Room Space for Mobile Robots Based on Visual Motor Experience* Tatsuro Yamada, Saki Ito, Hiroaki Arie, Tetsuya Ogata

A1.6 *Towards Grasping with SNN for Anthropomorphic Robot Hands* J. Camilo Vasquez Tieck, Heiko Donat, Jacques Kaiser, Igor Peric, Stefan Ulbrich, Arne Roennau, Marius Zöllner, Rüdiger Dillmann

14:20-16:20 (East Hall) B1. Convolutional Neural Networks 1

Chair: Nathan Netanyahu

B1.1 *Spiking Convolutional Deep Belief Networks* JACQUES KAISER, DAVID ZIMMERER, J. CAMILO VASQUEZ TIECK, STEFAN ULBRICH, ARNE ROENNAU, RÜDIGER DILLMANN

B1.2 *EvoCNN: Evolving Deep Convolutional Neural Networks Using Backpropagation-Assisted Mutations* ELI (OMID) DAVID, NATHAN NETANYAHU

B1.3 *Convolutional Neural Network for pixel-wise skyline detection* DARIAN FRAJBERG, PIERO FRATERNALI, ROCIO NAHIME TORRES

B1.4 *1D-FALCON: Accelerating Deep Convolutional Neural Network Inference by Co-optimization of Models and Underlying Arithmetic Implementation* PARTHA MAJI, ROBERT MULLINS

B1.5 *Shortcut Convolutional Neural Networks for Classification of Gender and Texture* TING ZHANG, YUJIAN LI, ZHAOYING LIU

16:20-17:00 Coffee break

17:00-17:50 (West Hall, East Hall) Plenary Lecture 1 "ENNS John G. Taylor Lecture"

L1 *Marco Gori - The Principle of Least Cognitive Action for Learning and Inference*
Abstract: In this talk we propose a computational framework in which the emergence of learning and inference is regarded as the outcome of laws of nature that govern the interactions of intelligent agents in their own environment.We introduce a theory based on the principle of least cognitive action, which is inspired to the related mechanical principle, and to the Hamiltonian framework for modeling the motion of particles. This duality leads to the introduction of the kinetic and potential energy, which provide a surprisingly natural interpretation of learning and inference. In neural-based systems, the kinetic energy reflects the temporal variation of the synaptic connections, while the potential energy is a penalty that describes the degree of satisfaction of the environmental constraints. Finally, we advocate that the proposed theory is very well-suited to model intelligent agents that, instead of being trained and designed in the lab, are born and live in the Web with given purposes.
Chair: Věra Kůrková

18:00-19:20 (West Hall) A2. A2. From Neurons to Networks 1

Chair: Aubin Tchaptchet

A2.1 *Towards an Accurate Identification of Pyloric Neuron Activity with VSDi* FILIPA DOS SANTOS, PETER ANDRS, KP LAM

A2.2 *The Effects of Neuronal Diversity on Network Synchronization* AUBIN TCHAPTCHET, HANS ALBERT BRAUN

A2.3 *Interactions in the Striatal Network with Different Oscillation Frequencies* JOVANA BELIC, ARVIND KUMAR, JEANETTE HELLGREN KOTALESKI

A2.4 *Robot Localization and Orientation Detection based on Place cells and Head-direction Cells* XIAOMAO ZHOU, CORNELIUS WEBER, STEFAN WERMTER

18:00-19:20 (East Hall) B2. Games & Strategy

Chair: Yuko Osana

B2.1 *Learning in Action Game by Profit Sharing using Convolutional Neural Network* KAICHI MURAKAMI, YUKO OSANA

B2.2 *DeepAPT: Nation-State APT Attribution Using End-to-End Deep Neural Networks* ISHAI ROSENBERG, GUILLAUME SICARD, ELI (OMID) DAVID

B2.3 *Deep Learning for Adaptive Playing Strength in Computer Games* ELI (OMID) DAVID, NATHAN NETANYAHU

B2.4 *Estimation of the change of agents behavior strategy using state-action history* ISHII SHIN, SHIGEYUKI OBA, SHIHORI UCHIDA

19:30-22:00 (North Hall, South Hall) Welcome Party and Posters on Display

Dinner Buffet with Traditional Sardinian Music and Dances.
All posters remain on display.

19:30-22:00 (North Hall, South Hall) Welcome Party and Posters on Display

Dinner Buffet with Traditional Sardinian Music and Dances.

Tuesday, 12 September 2017

09:00-11:00 (West Hall) A3. Brain Imaging

Chair: Alessandra Lintas

A3.1 *Event related potentials reveal fairness in willingness-to-share* ALESSANDRA LINTAS, SARAT CHANDRA VYSYARAJU, MANON JAQUEROD, ALESSANDRO VILLA

A3.2 *Gender differences in spontaneous risky decision-making behavior: A hyperscanning study using functional near-infrared spectroscopy* MINGMING ZHANG, TAO LIU, MATTHEW PELOWSKI, DONGCHUAN YU

A3.3 *Individual identification by resting-state EEG using common dictionary learning* TAKASHI NISHIMOTO, YOSHIKI AZUMA, HIROSHI MORIOKA, ISHII SHIN

09:00-11:00 (East Hall) B3. Boltzmann Machines and Phase Transitions

Chair: Arkadiusz Orlowski

B3.1 *Generalising the Discriminative Restricted Boltzmann Machines* SON TRAN, SRIKANTH CHERLA, ARTUR GARCEZ, TILLMAN WEYDE

B3.2 *Extracting M of N Rules from Restricted Boltzmann Machines* SIMON ODENSE, ARTUR D'AVILA GARCEZ

B3.3 *The generalized-entropy cost function in neural network* KRZYSZTOF GAJOWNICZEK, LESZEK CHMIELEWSKI, ARKADIUSZ ORŁOWSKI, TOMASZ ZABKOWSKI

B3.4 *Learning from Noisy Label Distributions* YUYA YOSHIKAWA

B3.5 *Phase Transition Structure of Variational Bayesian Nonnegative Matrix Factorization* MASAHIRO KOHJIMA, SUMIO WATANABE

B3.6 *Link Enrichment for Diffusion-based Graph Node Kernels* DINH TRAN-VAN, ALESSANDRO SPERDUTI, FABRIZIO COSTA

11:00-11:50 (West Hall, East Hall) Plenary Lecture 2

L2 *Elisabeth André - Emotional and Social Signals: A new challenge for ANN?*
Abstract: Equipping a machine with social and emotional intelligence is one of the greatest challenges in human-computer interaction and multimedia computing. Artificial neural networks have shown great potential for multisensorial fusion of social and emotional signals. Unlike conventional fusion approaches, they enable us to capture the temporal dynamics of multiple social and emotional cues and to model the dependencies between them. Under laboratory-like conditions, such approaches provide satisfactory results. However, due to the complex nature of human behavior, they still fail when applied in a "real world" setting. In my talk, I will outline some of the issues that still to be tackled to make progress in the field: 1) capture the dynamics of intra- and interpersonal human behaviors 2) incorporate the situative context to support deep emotion and social modeling and 3) enhance the transparency of the recognition processes and the interpretability of results by appropriate visualization tools.
Chair: Paul Verschure

12:00-12:40 ENNS Executive Committee Meeting

12:20-14:00 Lunch break

14:00-16:20 (West Hall) A4. Recurrent Neural Networks

Chair: Christian Bauckhage

A4.1 *A Neural Network Implementation of Frank-Wolfe Optimization* CHRISTIAN BAUCKHAGE

A4.2 *Inferring Adaptive Goal-Directed Behavior within Recurrent Neural Networks* SEBASTIAN OTTE, THERESA SCHMITT, KARL FRISTON, MARTIN BUTZ

A4.3 *Information Bottleneck in Control Tasks with Recurrent Spiking Neural Networks* MADHAVUN CANDADAI VASU, EDUARDO IZQUIERDO

A4.4 *Neural Computation with Spiking Neural Networks Composed of Synfire Rings* Jérémie Cabessa, Ginette Horcholle-Bossavit, Brigitte Quenet

A4.5 *Exploiting Recurrent Neural Networks in the Forecasting of Bees' Level of Activity* Pedro Alberto Gomes, Eduardo Carvalho, Gustavo Pessin

A4.6 *Semi-Supervised Phoneme Recognition with Recurrent Ladder Networks* Marian Tietz, Tayfun Alpay, Johannes Twiefel, Stefan Wermter

14:00-16:20 (East Hall)   S01: Context Information Learning and Self-assessment in advanced machine learning models

Chair: Lydia Fischer

S01.1 *Classless Association using Neural Networks* Federico Raue, Sebastian Palacio, Andreas Dengel, Marcus Liwicki

S01.2 *Shape from Shading by Model Inclusive Learning Method with Simultaneous Estimation of Parameters* Yasuaki Kuroe, Hajimu Kawakami

S01.3 *Radius-margin ratio optimization for dot-product boolean kernel learning* Ivano Lauriola, Mirko Polato, Fabio Aiolli

S01.4 *Learning a compositional hierarchy of disparity descriptors for 3D orientation estimation in an active fixation setting* Katerina Kalou, Agostino Gibaldi, Andrea Canessa, Silvio P. Sabatini

S01.5 *A priori reliability prediction with meta-learning based on context information* Jennifer Kreger, Lydia Fischer, Stephan Hasler, Thomas H Weisswange, Ute Bauer-Wersing

S01.6 *Benchmarking Reinforcement Learning Algorithms for the Operation of a Multi-Carrier Energy System* Jan Bollenbacher, Beate Rhein

16:20-17:00 Coffee break

17:00-17:50 (West Hall, East Hall) Plenary Lecture 3

L3 *Moshe Abeles - Coding by precise action-potential timing*
Abstract: Cortical neurons communicate with each other and with the rest of the brain by action potentials (AP). When studying activity of a single neuron the most obvious observation is the variable firing rates as measured by the number of APs in a 100 ms window. However, when the activities of several neurons were measured in parallel, precise timing coordination was often found. There are several models explaining how such precise time-coordination may be produced and read-out. Of these the synfire model seems to be most consistent with cortical anatomy and physiology. The synfire chain model is a model of multi-layer neural network with multiple (possibly random) connections between layers. This model shows the property of compositionality by synchronized wave front among two or more chains. Connections that lead to such synchronous activity may be learned by time dependent synaptic plasticity. A system of such associated synfire chains show the properties of associative memory, bottom-up and top-down compositionality. What would be the expression of such activities when measuring non-invasively cortical activity? We report that precise spatio-temporal sequences can be detected in the human brain using Magneto-Encephalo-Grapy (MEG), and relate these events to direct measurements of population activity in non-human primates. Thus, we conclude that finding, specific time-position patterns associated with a cognitive task can be identified. Our method is based on reconstructing the amplitude of cortical current dipoles from MEG recordings. While the spatial resolution of such reconstruction is poor (2 cm), their temporal resolution is high (milliseconds). We show that within such cortical activity one can detect time points of cortical activation by brief amplitude undulations and that sequences of such transients may repeat with a few ms accuracy. The timing of these transients is treated as point processes. We illustrate the feasibility of finding spatio-temporal templates that are specific to the cognitive processes studied. These specific templates involve multiple cortical and cerebellar loci that evolve with a few ms accuracy. This should pave the way for a whole new world of studies on the relationships between brain dynamics and cognition. Supported in part through the I-CORE Program of the Planning and Budgeting Committee and The Israel Science Foundation (grant No. 51/11).
Chair: Alessandro Villa

18:00-19:40 (West Hall) A5. Neuromorphic Hardware

Chair: Angeliki Pantazi

A5.1 *An implementation of a spiking neural network using digital spiking silicon neuron model on a SIMD processor* Sansei Hori, Mireya Zapata, Jordi Madrenas, Takashi Morie, Hakaru TAMUKOH

A5.2 *Hardware implementation of Deep Self-Organizing Map Networks* Yuichiro Tanaka, Hakaru TAMUKOH

A5.3 *Accelerating Training of Deep Neural Networks via Sparse Edge Processing* Sourya Dey, Yinan Shao, Keith Chugg, Peter Beerel

A5.4 *Unsupervised Learning using Phase-Change Synapses and Complementary Patterns* Severin Sidler, Angeliki Pantazi, Stanislaw Wozniak, Yusuf Leblebici, Evangelos Eleftheriou

18:00-19:40 (East Hall) B5. Representation and classification 1

Chair: Sergey Dolenko

B5.1 *Classification of categorical data in the feature space of monotone DNFs* Mirko Polato, Ivano Lauriola, Fabio Aiolli

B5.2 *DeepBrain: Functional Representation of Neural In-Situ Hybridization Images for Gene Ontology Classification Using Deep Convolutional Autoencoders* Ido Cohen, Eli (Omid) David, Nathan Netanyahu, Noa Liscovitch, Gal Chechik

B5.3 *Adaptive Construction of Hierarchical Neural Network Classifiers: New Modification of the Algorithm* Sergey Dolenko, Vsevolod Svetlov, Igor Isaev

19:40-20:40 (West Hall) ENNS General Assembly and Travel Grant Award

Wednesday, 13 September 2017

09:00-11:00 (West Hall) A6. Brain Topology and Dynamics

Chair: Roseli Wedemann

A6.1 *The Variational Coupled Gaussian Process Dynamical Model* Dominik Endres, Dmytro Velychko, Benjamin Knopp

A6.2 *q-Maximum Entropy Distributions and Memory Neural Networks* Roseli Wedemann, A.R. Plastino

A6.3 *Adaptively learning levels of coordination from one's, other's and task related errors through a cerebellar circuit: a dual cart-pole setup* Marti Sanchez-Fibla, giovanni maffei, Paul Verschure

A6.4 *Weighted clique analysis reveals hierarchical neuronal network dynamics* Paolo Masulli, Alessandro Villa

A6.5 *Why the Brain Might Operate Near the Edge of Criticality* Xerxes Arsiwalla, Paul Verschure

A6.6 *Interactive Control of Computational Power in a Model of the Basal Ganglia-Thalamocortical Circuit by a Supervised Attractor-Based Learning Procedure* Jérémie Cabessa, Alessandro Villa

09:00-11:00 (East Hall) B6. Clustering

Chair: Stefano Rovetta

B6.1 *Modularity-driven kernel k-means for community detection* Felix Sommer, François Fouss, Marco Saerens

B6.2 *Measuring clustering model complexity* Stefano Rovetta, Francesco Masulli, Alberto Cabri

B6.3 *Evaluating the Compression Efficiency of the Filters in Convolutional Neural Networks* Kazuki Osawa, Rio Yokota

B6.4 *Two staged Fuzzy SVM Algorithm and Beta-elliptic model for Online Arabic Handwriting Recognition* Ramzi Zouari, Houcine Boubaker, Monji Kherallah

11:00-11:50 (West Hall, East Hall) Plenary Lecture 4

L4 *David Ríos Insua - Adversarial machine learning: An adversarial risk analysis approach*
Abstract: Adversarial machine learning is a relatively new subfield of machine learning focusing on techniques in presence of an opponent trying to fool the problem solver so as to attain a benefit, with typical applications referring to security. The usual methodological emphasis is in game theory. However, the required underlying common knowledge assumptions will not usually be satisfied in practice. We shall present an alternative approach based on adversarial risk analysis, focusing on adversarial classification models for spam detection.
Chair: Stefano Rovetta

12:00-14:30 (North Hall, South Hall) Lunch Buffet and Poster Session 1

Presentation of the posters with an **odd** number. All posters remain on display.

15:30-19:30 Social programme

Excursion to "Grotte di Nettuno" by boat. Departure at 15:45.

19:30-22:00 Social Dinner

Thursday, 14 September 2017

10:00-12:00 (West Hall) A7. Synaptic Plasticity & Learning 1

Chair: Claudius Gros

A7.1 *Model Derived Spike Time Dependent Plasticity* Melissa Johnson, Sylvain Chartier

A7.2 *A Model of Synaptic Normalization and Heterosynaptic Plasticity Based on Competition for a Limited Supply of AMPA Receptors* Anne-Sophie Hafner, Jochen Triesch

A7.3 *Hebbian learning deduced from the stationarity principle leads to balanced chaos in fully adapting autonomously active networks* Claudius Gros, Philip Trapp, Rodrigo Echeveste

A7.4 *Online Representation Learning with Single and Multi-layer Hebbian Networks for Image Classification* Yanis Bahroun, Andrea Soltoggio

A7.5 *Building Efficient Deep Hebbian Networks for Image Classification Tasks* Yanis Bahroun, Eugenie Hunsicker, Andrea Soltoggio

A7.6 *Automatic Recognition of Mild Cognitive Impairment from MRI Images Using Expedited Convolutional Neural Networks* Shuqiang Wang, Yanyan Shen, Wei Chen, Tengfei Xiao, Jinxing Hu

10:00-12:00 (East Hall)   S02: Learning From Data Streams and Time Series 1

Chair: Francesco Masulli/Giovanna Castellano

S02.1 *A Fuzzy Clustering Approach to Non-Stationary Data Streams Learning* Amr Abdullatif, Francesco Masulli, Stefano Rovetta, Alberto Cabri

S02.2 *Data stream classification by adaptive semi-supervised fuzzy clustering* Giovanna Castellano, Anna Maria Fanelli

S02.3 *Dialogue-based neural learning to estimate sentiment of next upcoming utterance* Chandrakant Bothe, Sven Magg, Cornelius Weber, Stefan Wermter

S02.4 *Solar Power Forecasting Using Pattern Sequences* Zheng Wang, Irena Koprinska, Mashud Rana

S02.5 *A New Methodology to Exploit Predictive Power in (Open, High, Low, Close) Data* Andrew Mann, Denise Gorse

12:00-14:30 (North Hall, South Hall) Lunch Buffet and Poster Session 2

Presentation of the posters with an **even** number. All posters remain on display.

14:30-15:20 (West Hall, East Hall) Plenary Lecture 5

L5 *Michele Giugliano- Beyond "frequency-current" curves: probing the dynamical response properties of neo-cortical neurons*
Abstract: Earlier theoretical studies on simplified neuronal models suggested that the cortical ensembles may relay down-stream rapidly varying components of their synaptic inputs, with no attenuation. Information transmission in networks of weakly-coupled model neurons may in fact overcome the limits imposed by the spike refractoriness and the slow integration of individual network cells, effectively extending their input-output bandwidth.
Our lab became interested in testing experimentally such a hypothesis and it was the first to directly probe in vitro the (dynamical) cellular response properties in the rat and in humans pyramidal neurons. To our surprise, not only we confirmed that cortical ensembles track inputs varying in time faster the cut-off imposed by membrane electrical passive properties (10 cycles/s), but we also found that they do it substantially faster (up to 200 cycles/s) than explained by their low ensemble mean firing rates (10 spikes/s). In addition, above 200 cycles/s neurons attenuate their response with a power-law relationship and a linear phase lag.
Such an unexpectedly broad bandwidth of neuronal dynamics relates to the dynamics of the initiation of the action potential, as we found a strong correlation between the action potentials rapidness at onset and the ensemble neuronal bandwidth, over a large set of experiments. As an additional confirmation of such a relationship, we found that human cortical neurons fire much "steeper" action potentials than in rodents and, as a consequence, posses collectively a much broader bandwidth reaching up to 1000 cycles/s, violating the predictions of existing models, and opening intriguing new directions for the phylogenetics

of neuronal dynamics. Earlier theoretical studies on simplified neuronal models suggested that the cortical ensembles may relay downstream rapidly varying components of their synaptic inputs, with no attenuation. Information transmission in networks of weakly-coupled model neurons may in fact overcome the limits imposed by the spike refractoriness and the slow integration of individual network cells, effectively extending their input-output bandwidth.

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Such an unexpectedly broad bandwidth of neuronal dynamics relates to the dynamics of the initiation of the action potential, as we found a strong correlation between the action potentials rapidness at onset and the ensemble neuronal bandwidth, over a large set of experiments. As an additional confirmation of such a relationship, we found that human cortical neurons fire much "steeper" action potentials than in rodents and, as a consequence, posses collectively a much broader bandwidth reaching up to 1000 cycles/s, violating the predictions of existing models, and opening intriguing new directions for the phylogenetics of neuronal dynamics.

Chair: Alessandra Lintas

15:30-16:20 Awards ceremony and closing remarks

Poster Sessions C1-C9 (North Hall, South Hall)

All posters remain on display during the entire duration of the conference in the North Hall and the South Hall with a mandatory presenter standing next to their posters for **odd numbers on Wednesday** and for **even numbers on Thursday**.

(C1) Image Processing & Medical Applications

C1.01 *A novel image tag completion method based on convolutional neural network.* Yanyan Geng, Guohui Zhang, Weizhi Li, Yi Gu, Gaoyuan Liang, Jingbin Wang, Yanbin Wu, Nitin Patil, Jing-Yan Wang

C1.02 *Reducing Unknown Unknowns with Guidance in Image Caption.* Mengjun Ni, Jing Yang, Xin Lin, Liang He

C1.03 *a Novel Method for Ship Detection and Classification on Remote Sensing Images.* Hongyuan cui, Ying Liu

C1.04 *Single Image Super-Resolution by Learned Double Sparsity Dictionaries Combining Boot-strapping Method.* Na Ai, Jinye Peng, Jun Wang, Lin Wang, Jin Qi

C1.05 *Attention Focused Spatial Pyramid Pooling for Boxless Action Recognition in Still Images.* Weijiang Feng, Xiang Zhang, Xuhui Huang, Zhigang Luo

C1.06 *Classification of Quantitative Light-Induced Fluorescence Images Using Convolutional Neural Network.* Sultan Imangaliyev, Monique van der Veen, Catherine Volgenant, Bruno Loos, Bart Keijser, Wim Crielaard, Evgeni Levin

C1.07 *The Impact of Dataset Complexity on Transfer Learning over Convolutional Neural Networks.* Miguel Wanderley, Leonardo Bueno, Cleber Zanchettin, Adriano Oliveira

C1.08 *Real-Time Face Detection Using Artificial Neural Networks.* Pablo S. Aulestia, Jonathan S. Talahua, Víctor H. Andaluz, Marco E. Benalcázar

C1.09 *On the performance of classic and deep neural models in face recognition.* Ricardo García Ródenas, Luis Jiménez Linares, Julio Alberto López Gómez

C1.10 *Winograd Algorithm for 3D Convolution Neural Networks.* Zelong Wang, Qiang Lan, Hongjun He, Chunyuan Zhang

C1.11 *Core Sampling Framework for Pixel Classification.* Manohar Karki, Robert DiBiano, supratik Mukhopadhyay, Saikat Basu

C1.12 *Biomedical Data Augmentation using Generative Adversarial Neural Networks.* Francesco Calimeri, Aldo Marzullo, Claudio Stamile, Giorgio Terracina

C1.13 *Deep Residual Hashing Network for Image Retrieval.* Edwin Jimenez-Lepe, Andres Vazquez

C1.14 *Detection of diabetic retinopathy based on a convolutional neural network using retinal fundus images.* Manasses Antoni Mauricio Condori, Gabriel Enrique García Chávez, Jorge Roberto López Cáceres

C1.15 *A comparison of Machine Learning approaches for classifying Multiple Sclerosis courses using MRSI and brain segmentations.* Adrian Ion-Margineanu, Gabriel Kocevar, Claudio Stamile, Diana Sima, Francoise Durand-Dubief, Sabine Van Huffel, Dominique Sappey-Marinier

C1.16 *Model evaluation improvements for multiclass classification in diagnosis prediction.* Adriana Mihaela Coroiu

C1.17 *MMT: A Multimodal Translator for Image Captioning.* Chang Liu, Fuchun Sun, Changhu Wang

C1.18 *A Multi-Channel and Multi-Scale Convolutional Neural Network for Hand Posture Recognition.* Jiawen Feng, Limin Zhang, Xiangyang Deng

C1.19 *Semi-supervised Model for Feature Extraction and Classification of Fashion Images.* Seema Wazarkar, Bettahally Keshavamurthy, Shitala Prasad

(C2) S01: Context Information Learning and Self-assessment in advanced machine learning models

C2.01 *Attention Aware Semi-Supervised Framework for Sentiment Analysis.* Jingshuang Liu, Wenge Rong, Chuan Tian, Min Gao, Zhang Xiong

C2.02 *Using LSTMs to Model the Java Programming Language.* Brendon Boldt

C2.03 *Analysing event transitions to discover student roles and predict grades in MOOCs.* Ángel Pérez-Lemonche, Gonzalo Martínez-Muñoz, Estrella Pulido-Cañabate

C2.04 *Applying Artificial Neural Networks on Two-Layer Semantic Trajectories for Predicting the Next Semantic Location.* Antonios Karatzoglou, Harun Sentürk, Adrian Jablonski, Michael Beigl

C2.05 *Model-aware Representation Learning for Categorical Data with Hierarchical Couplings.* Jianglong Song, Chengzhang Zhu, Wentao Zhao, Wenjie Liu, Qiang Liu

C2.06 *Perceptron-based Ensembles and Binary Decision Trees for Malware Detection.* Cristina Vatamanu, Doina Cosovan, Dragos Gavrilut, Henri Luchian

C2.07 *Differentiable Oscillators in Recurrent Neural Networks for Gradient-based Sequence Modeling.* Sebastian Otte, Martin Butz

C2.08 *Multi-column deep neural network for Offline Arabic Handwriting Recognition .* Rolla Almodfer, Shengwu Xiong, Mohammed Mudhsh, Pengfei Duan

C2.09 *Empirical study of effect of dropout in online learning.* Kazuyuki Hara

C2.10 *Context Dependent Input Weight Selection for Regression Extreme Learning Machines.* Yara Rizk, Mariette Awad

C2.11 *Solution of Multi-parameter Inverse Problem by Adaptive Methods: Efficiency of Dividing the Problem Space.* Alexander Efitorov, Tatiana Dolenko, Sergey Burikov, Kirill Laptinskiy, Sergey Dolenko

C2.12 *Hopfield auto-associative memory network for content based text-retrieval.* Vandana M. Ladwani, Vaishnavi Y, V Ramasubramanian

(C3) From Neurons to Networks 2

C3.01 *Algorithms for obtaining parsimonious Higher Order Neurons.* Can Eren Sezener, Erhan Oztop

C3.02 *Robust and adaptable motor command representation by sparse coding.* Nobuhiro Hinakawa, Katsunori Kitano

C3.03 *Neural responses as variational messages in a Bayesian network model.* Takashi Sano, Yuuji Ichisugi

C3.04 *Implementation of Learning Mechanisms on a Cat-scale Cerebellar Model and its Simulation.* Wataru Furusho, Tadashi Yamazaki

C3.05 *Neuromorphic Approach Sensitivity Cell Modeling and FPGA Implementation.* Hongjie Liu, Antonio Rios-Navarro, Diederik P. Moeys, Tobias Delbruck, Alejandro Linares-Barranco

C3.06 *Temporal Regions for Activity Recognition.* João Paulo Aires, Juarez Monteiro, Roger Granada, Rodrigo Coelho Barros, Felipe Meneguzzi

C3.07 *Computational capacity of a cerebellum model.* Robin De Gernier, Sergio Solinas, Christian Rössert, Marc Haelterman, Serge Massar

C3.08 *The role of inhibition in selective attention.* Sock Ching Low, Paul Verschure, Riccardo Zucca

C3.09 *Stochasticity, spike-timing, and a layered architecture for finding iterative roots.* Adam Frick, Nicolangelo Iannella

C3.10 *Matching mesoscopic neural models to microscopic neural networks in stationary and non-stationary regimes.* Lara Escuain-Poole, Alberto Hernández-Alcaina, Antonio J. Pons

C3.11 *Hyper-Neurons: A Step Closer to Manlike Machines.* Shabab Bazrafkan, Joseph Lemley, Peter Corcoran

C3.12 *Sparse pattern representation in a realistic recurrent spiking neural network.* Jesus Garrido, Eduardo Ros

(C4) Synaptic Plasticity & Learning 2

C4.01 *Interplay of STDP and Dendritic Plasticity in a Hippocampal CA1 Pyramidal Neuron Model.* Ausra Saudargiene, Rokas Jackevicius, Bruce P. Graham

C4.02 *Enhancements on the Modified Stochastic Synaptic Model The Functional Heterogeneity.* Karim El Laithy, Martin Bogdan

C4.03 *Multicompartment simulations of NMDA receptor based facilitation in an insect target tracking neuron.* Bo Bekkouche, Patrick A. Shoemaker, Joseph Fabian, Elisa Rigosi, Steven D. Wiederman, David O'Carroll

C4.04 *A Granular Cell - Pyramidal Cell Model for Learning and Predicting Trajectories Online.* pierre andry

C4.05 *Single Neurons Can Memorize Precise Spike Trains Immediately: A Computational Approach.* Hubert Loeffler

C4.06 *Learning Stable Recurrent Excitation in Simulated Biological Neural Networks.* Michael Teichmann, Fred Hamker

C4.07 *Speech Emotion Recognition using RNN Compared with SVM and LR.* leila kerkeni, kosai raoof, youssef serrestou, mohamed ali mahjoub, mohamed mbarki, catherine cleder

(C5) From Perception to Action 2

C5.01 *Obstacle Avoidance by Profit Sharing using Self-Organizing Map-based Probabilistic Associative Memory.* Daisuke Temma, Yuko Osana

C5.02 *An ultra-compact low-powered closed-loop device for control of the neuromuscular system.* Davide Polese, Luca Pazzini, Ignacio Delgado-Martínez, Xavier Navarro, Guglielmo Fortunato

C5.03 *Mutual Information as a measure of control.* Sascha Fleer, Helge Ritter

C5.04 *Sensorimotor Prediction with Neural Networks on Continuous Spaces.* Michael Garcia Ortiz

C5.05 *Classifying Bio-Inspired Model in Point-Light Human Motion Using Echo State Network.* Pattreeya Tanisaro, Constantin Lehman

C5.06 *A Prediction and Learning based Network Selection Approach in Dynamic Environments.* Ru Cao, Xiaohong Li, Jianye Hao

C5.07 *Learning a peripersonal space representation as a visuo-tactile prediction task.* Zdenek Straka, Matej Hoffmann

C5.08 *Learning Distance-Behavioural Preferences Using a Single Sensor in a Spiking Neural Network.* Matt Ross, Nareg Berberian, André Cyr, Frédéric Thériault, Sylvain Chartier

C5.09 *Neural networks for adaptive vehicle control.* Jonas Kaste, Jens Hoedt, Kristof Van Ende, Felix Kallmeyer

C5.10 *Brain-computer interface with robot-assisted training for neurorehabilitation.* Roman Rosipal, Natalia Porubcova, Peter Barancok, Barbora Cimrova, Michal Teplan, Igor Farkas

C5.11 *Unsupervised Learning of Factors of Variation in the Sensory Data of a Planar Agent.* Oksana Hagen, Michael Garcia Ortiz

C5.12 *State Dependent Modulation of Perception Based on a Computational Model of Conditioning.* Jordi-Ysard Puigbò Llobet, Miguel Ángel González Ballester, Paul Verschure

C5.13 *Optimal Bases Representation for Embodied Supervised Learning.* Ivan Herreros, Xerxes Arsiwalla, Paul Verschure

C5.14 *Reinforcement Learning for Hybrid Heavy Truck Powertrain Energy Management.* Jonas Hellgren

C5.15 *Performance Comparison of Machine Learning Algorithms for EEG-Signal-based Emotion Recognition.* peng chen, Jianhua Zhang

(C6) S02: Learning From Data Streams and Time Series 2

C6.01 *Recurrent Dynamical Projection for Time Series-based Fraud Detection.* Eric Antonelo, Radu State

C6.02 *Transfer Information Energy: A Quantitative Causality Indicator between Time Series.* Angel Cataron, Razvan Andonie

C6.03 *Improving Bees' Behavior Understanding via Anomaly Detection Techniques.* Fernando Gama, Helder Arruda, Hanna Vitoria Frois de Carvalho, Gustavo Pessin

C6.04 *Applying Bidirectional Long Short-Term Memories (BLSTM) to Performance Data in Air Traffic Management for System Identification.* Stefan Reitmann, Karl Nachtigall

C6.05 *The Discovery of the Relationship on Stock Transaction Data.* Wanwan Jiang, Lingyu Xu, Gaowei Zhang

C6.06 *Confirmation of the Effect of Simultaneous Time Series Prediction with Multiple Horizons at the Example of Electron Daily Fluence in Near-Earth Space.* Irina Myagkova, Sergey Dolenko

C6.07 *A Neural Attention Based Approach for Clickstream Mining.* CHANDRA MOHAN, Balaraman Ravindran

(C7) Representation and classification 2

C7.01 *View-weighted multi-view K-means clustering.* Hong Yu, Yahong LIAN, Shu Li, Jiaxin Chen

C7.02 *Automobile Insurance Claim Prediction using Distributed Driving Behaviour Data on Smartphones.* Chalermpol Saiprasert, Pantaree Phumpuang, Suttipong Thajchayapong

C7.03 *Indefinite Support Vector Regression.* Frank-Michael Schleif

C7.04 *Instance-Adaptive Attention Mechanism for Relation Classification.* Yao Lu, Chunyun Zhang, Weiran Xu

C7.05 *ReForeSt: Random Forests in Apache Spark.* Alessandro Lulli, Luca Oneto, Davide Anguita

C7.06 *Semi-Supervised Multi-View Multi-Label Classification based on Nonnegative Matrix Factorization.* Guangxia Wang, Changqing Zhang, Qinghua Hu, Pengfei Zhu

C7.07 *Masked Conditional Neural Network for Audio Classification.* Fady Medhat, David Chesmore, John Robinson

C7.08 *A Feature Selection Approach Based on Information Theory for Classification Tasks.* Jhoseph Jesus, Anne Canuto, Daniel Araújo

C7.09 *Two-level Neural Network for Multi-label Document Classification.* Ladislav Lenc, Pavel Král

C7.10 *Ontology Alignment with Weightless Neural Networks.* Thais Viana, Carla Delgado, João Carlos Silva, Priscila Lima

C7.11 *Marine Safety and Data Analytics: Vessel Crash Stop Maneuvering Performance Prediction.* Luca Oneto, Andrea Coraddu, Paolo Sanetti, Olena Karpenko, Francesca Cipollini, Toine Cleophas, Davide Anguita

C7.12 *Towards a Smarter Fault Tolerant Indoor Localization System via Recurrent Neural Networks.* Eduardo Carvalho, Bruno Ferreira, Geraldo Filho, Jó Ueyama, Gustavo Pessin

C7.13 *A Simple Spiking Neural Network for Supervised Learning for Energy Efficient Hardware Implementation.* Anmol Biswas, Aditya Shukla, Sidharth Prasad, Sandip Lashkare, Udayan Ganguly

C7.14 *A Highly Efficient Performance and Robustness Evaluation Method for a Hardware Implementable SNN based Recognition Algorithm.* Sidharth Prasad, Anmol Biswas, Aditya Shukla, Udayan Ganguly

C7.15 *Metric Entropy and Rademacher Complexity of Margin Multi-Category Classifiers.* Khadija Musayeva, Fabien Lauer, Yann Guermeur

C7.16 *Combining Word-Level and Character-Level Representations for Relation Classification of Informal Text.* Dongyun Liang, Weiran Xu, Yinge Zhao

C7.17 *On Combining Clusterwise Linear Regression and K-Means with Automatic Weighting of the Explanatory Variables.* Ricardo Moreira da Silva, Francisco de Assis Tenorio de Carvalho

C7.18 *Mental workload classification based on semi-supervised extreme learning machine.* Li jianrong, Jianhua Zhang

C7.19 *GNMF Revisited: Joint Robust k-NN Graph and Reconstruction-based Graph Regularization for Image Clustering.* Feng Gu, Wenju Zhang, Xiang Zhang, Chenxu Wang, Zhigang Luo

C7.20 *From Deep Multi-lingual Graph Representation Learning to History Understanding.* sima sharifirad

(C8) Advances in Machine Learning

C8.01 *Parallel-pathway Generator for Generative Adversarial Networks to generate high-resolution natural images.* Yuya Okadome, Wenpeng Wei, Toshiko Aizono

C8.02 *Using Echo State Networks for Cryptography.* Rajkumar Ramamurthy, Christian Bauckhage, Krisztian Buza, Stefan Wrobel

C8.03 *Two Alternative Criteria For A Split-Merge MCMC on Dirichlet Process Mixture Models.* tikara hosino

C8.04 *FP-MRBP: Fine-grained Parallel MapReduce Back Propagation Algorithm.* Gang Ren, Pan Deng, Chao Yang

C8.05 *IQNN: Training Quantized Neural Networks with Iterative Optimizations.* Shuchang Zhou, He Wen, Taihong Xiao, Xinyu Zhou

C8.06 *Compressing Neural Networks by Applying Frequent Item-set Mining.* Zi-Yi Dou

C8.07 *Applying the Heavy-tailed Kernel to the Gaussian Process Regression for Modeling Point of Sale Data.* Rui Yang, Yukio Ohsawa

C8.08 *Chaotic Associative Memory with Adaptive Scaling Factor.* Tatsuya Okada, Yuko Osana

C8.09 *Identification of differential flat systems with artifical neural networks.* Jens Hoedt, Jonas Kaste, Kristof Van Ende, Felix Kallmeyer

C8.10 *Adaptive Weighted Multiclass Linear Discriminant Analysis.* Haifeng Zhao, Wei He, Feiping Nie

C8.11 *Efficient Graph Construction through Constrained Data Self-Representativeness.* Libo Weng, Fadi Dornaika, Zhong Jin

C8.12 *Dynamic Feature Selection Based on Clustering Algorithm and Individual Similarity.* Carine Dantas, Anne Canuto, Romulo Nunes, Joao Carlos Xavier Junior

(C9) Convolutional neural Networks 2

C9.01 *Word Embedding Dropout and Variable-length Convolution Window in Convolutional Neural Network for Sentiment Classification.* Shangdi Sun, Xiaodong Gu

C9.02 *Reducing Overfitting in Deep Convolutional Neural Networks Using Redundancy Regularizer.* Bingzhe Wu, Zhichao Liu, Zhihang Yuan, Guangyu Sun

C9.03 *An Improved Convolutional Neural Network for Sentence Classification Based on Term Frequency and Segmentation.* Qi Wang, Jungang Xu, Ben He

C9.04 *Parallel Implementation of a Bug Report Assignment Recommender using Deep Learning.* Adrian-Catalin Florea, John Anvik, Razvan Andonie

C9.05 *A deep learning approach to detect distracted drivers associated with the mobile phone use.* Renato Torres, Orlando Ohashi, Gustavo Pessin

C9.06 *A Multi-Level Weighted Representation for Person Re-identification.* Xianglai Meng, Guanglu Song, Biao Leng

C9.07 *Stage Dependent Ensemble Deep Learning for Dots-and-Boxes Game.* Yipeng Zhang, Shuqin Li, Meng Ding, Kun Meng

C9.08 *Conditional Time Series Forecasting with Convolutional Neural Networks.* Anastasia Borovykh, Sander Bohte, Cornelis W. Oosterlee

C9.09 *A Convolutional Neural Network based approach for stock forecasting.* Haixing Yu, Lingyu Xu, Gaowei Zhang

C9.10 *The All-Convolutional Neural Networks with Recurrent Architecture for Object Recognition.* Yiwei Gu, Xiaodong Gu

C9.11 *Body Measurement and Weight Estimation for Live Yaks Using Binocular Camera and Convolutional Neural Network.* Siqi Liu, Chun Yu, Yuan Xie, Zhiqiang Liu, Pin Tao, Yuanchun Shi