## Contents – Part II

### Deep Learning

- Video Description Using Bidirectional Recurrent Neural Networks .......................... 3
  Álvaro Peris, Marc Bolaños, Petia Radeva, and Francisco Casacuberta

- Tactile Convolutional Networks for Online Slip and Rotation Detection ..................... 12
  Martin Meier, Florian Patzelt, Robert Haschke, and Helge J. Ritter

- DeepPainter: Painter Classification Using Deep Convolutional Autoencoders ............... 20
  Omid E. David and Nathan S. Netanyahu

- Revisiting Deep Convolutional Neural Networks for RGB-D Based Object Recognition .................. 29
  Lorand Madai-Tahy, Sebastian Otte, Richard Hanten, and Andreas Zell

- Deep Learning for Emotion Recognition in Faces .................................................. 38
  Ariel Ruiz-Garcia, Mark Elshaw, Abdulrahman Altahhan, and Vasile Palade

- Extracting Muscle Synergy Patterns from EMG Data Using Autoencoders ................... 47
  Martin Spüler, Nerea Irastorza-Landa, Andrea Sarasola-Sanz, and Ander Ramos-Murguialday

- Integration of Unsupervised and Supervised Criteria for Deep Neural Networks Training ........................................ 55
  Francisco Zamora-Martínez, Javier Muñoz-Almaraz, and Juan Pardo

- Layer-Wise Relevance Propagation for Neural Networks with Local Renormalization Layers ........................................ 63
  Alexander Binder, Grégoire Montavon, Sebastian Lapuschkin, Klaus-Robert Müller, and Wojciech Samek

- Analysis of Dropout Learning Regarded as Ensemble Learning .................................. 72
  Kazuyuki Hara, Daisuke Saitoh, and Hayaru Shouno

- The Effects of Regularization on Learning Facial Expressions with Convolutional Neural Networks ........................................ 80
  Tobias Hinz, Pablo Barros, and Stefan Wermter

- DeepChess: End-to-End Deep Neural Network for Automatic Learning in Chess ............ 88
  Omid E. David, Nathan S. Netanyahu, and Lior Wolf
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Convolutional Network Model of the Primate Middle Temporal Area</td>
<td>97</td>
</tr>
<tr>
<td>Bryan P. Tripp</td>
<td></td>
</tr>
<tr>
<td>Pseudo Boosted Deep Belief Network</td>
<td>105</td>
</tr>
<tr>
<td>Tiehang Duan and Sargur N. Srihari</td>
<td></td>
</tr>
<tr>
<td>Keyword Spotting with Convolutional Deep Belief Networks and Dynamic Time Warping</td>
<td>113</td>
</tr>
<tr>
<td>Baptiste Wicht, Andreas Fischer, and Jean Hennebert</td>
<td></td>
</tr>
<tr>
<td>Computational Advantages of Deep Prototype-Based Learning</td>
<td>121</td>
</tr>
<tr>
<td>Thomas Hecht and Alexander Gepperth</td>
<td></td>
</tr>
<tr>
<td>Deep Convolutional Neural Networks for Classifying Body Constitution</td>
<td>128</td>
</tr>
<tr>
<td>Haiteng Li, Bin Xu, Nanyue Wang, and Jia Liu</td>
<td></td>
</tr>
<tr>
<td>Feature Extractor Based Deep Method to Enhance Online Arabic Handwritten Recognition System</td>
<td>136</td>
</tr>
<tr>
<td>Mohamed Elleuch, Ramzi Zouari, and Monji Kherallah</td>
<td></td>
</tr>
<tr>
<td>On Higher Order Computations and Synaptic Meta-Plasticity in the Human Brain</td>
<td>145</td>
</tr>
<tr>
<td>Stanislaw Ambroszkiewicz</td>
<td></td>
</tr>
<tr>
<td>Compression of Deep Neural Networks on the Fly</td>
<td>153</td>
</tr>
<tr>
<td>Guillaume Soulié, Vincent Gripon, and Maëlys Robert</td>
<td></td>
</tr>
<tr>
<td>Blind Super-Resolution with Deep Convolutional Neural Networks</td>
<td>161</td>
</tr>
<tr>
<td>Clément Peyrard, Moez Baccouche, and Christophe Garcia</td>
<td></td>
</tr>
<tr>
<td>DNN-Buddies: A Deep Neural Network-Based Estimation Metric for the Jigsaw Puzzle Problem</td>
<td>170</td>
</tr>
<tr>
<td>Dror Sholomon, Omid E. David, and Nathan S. Netanyahu</td>
<td></td>
</tr>
<tr>
<td>A Deep Learning Approach for Hand Posture Recognition from Depth Data</td>
<td>179</td>
</tr>
<tr>
<td>Thomas Kopinski, Fabian Sachara, Alexander Gepperth, and Uwe Handmann</td>
<td></td>
</tr>
<tr>
<td>Action Recognition in Surveillance Video Using ConvNets and Motion History Image</td>
<td>187</td>
</tr>
<tr>
<td>Sheng Luo, Haojin Yang, Cheng Wang, Xiaoyin Che, and Christoph Meinel</td>
<td></td>
</tr>
</tbody>
</table>

**Classification and Forecasting**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bi-Modal Deep Boltzmann Machine Based Musical Emotion Classification</td>
<td>199</td>
</tr>
<tr>
<td>Moyuan Huang, Wenge Rong, Tom Arjannikov, Nan Jiang, and Zhang Xiong</td>
<td></td>
</tr>
</tbody>
</table>
StreamLeader: A New Stream Clustering Algorithm not Based in Conventional Clustering

Jaime Andrés-Merino and Lluís A. Belanche

Comparison of Methods for Community Detection in Networks

Hassan Mahmoud, Francesco Masulli, Stefano Rovetta, and Amr Abdullatif

A Robust Evolutionary Optimisation Approach for Parameterising a Neural Mass Model

Elham Zareian, Jun Chen, and Basabdatta Sen Bhattacharya

Kernel Depth Measures for Functional Data with Application to Outlier Detection

Nicolás Hernández and Alberto Muñoz

Nesterov Acceleration for the SMO Algorithm

Alberto Torres-Barrán and José R. Dorronsoro

Local Reject Option for Deterministic Multi-class SVM

Johannes Kummert, Benjamin Paassen, Joris Jensen, Christina Göpfert, and Barbara Hammer

Palmprint Biometric System Modeling by DBC and DLA Methods and Classifying by KNN and SVM Classifiers

Raouia Mokni and Monji Kherallah

Ensemble Models of Learning Vector Quantization Based on Bootstrap Resampling

Fumiaki Saitoh

Cluster Ensembles Optimization Using Coral Reefs Optimization Algorithm

Huliane M. Silva, Anne M.P. Canuto, Inácio G. Medeiros, and João C. Xavier-Júnior

Classification of Photo and Sketch Images Using Convolutional Neural Networks

Kazuma Sasaki, Madoka Yamakawa, Kana Sekiguchi, and Tetsuya Ogata

Day-ahead PV Power Forecast by Hybrid ANN Compared to the Five Parameters Model Estimated by Particle Filter Algorithm

Emanuele Ogliari, Alberto Bolzoni, Sonia Leva, and Marco Mussetta

Extended Weighted Nearest Neighbor for Electricity Load Forecasting

Mashud Rana, Irena Koprinska, Alicia Troncoso, and Vassilios G. Agelidis
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using Reservoir Computing and Trend Information for Short-Term</td>
<td>308</td>
</tr>
<tr>
<td>Streamflow Forecasting</td>
<td></td>
</tr>
<tr>
<td><em>Sabrina G.T.A. Bezerra, Camila B. de Andrade, and Mêuser J.S. Valença</em></td>
<td></td>
</tr>
<tr>
<td>Effect of Simultaneous Time Series Prediction with Various Horizons</td>
<td>317</td>
</tr>
<tr>
<td>on Prediction Quality at the Example of Electron Flux in the Outer</td>
<td></td>
</tr>
<tr>
<td>Radiation Belt of the Earth</td>
<td></td>
</tr>
<tr>
<td><em>Irina Myagkova, Vladimir Shiroky, and Sergey Dolenko</em></td>
<td></td>
</tr>
<tr>
<td>A Time Series Forecasting Model Based on Deep Learning Integrated</td>
<td>326</td>
</tr>
<tr>
<td>Algorithm with Stacked Autoencoders and SVR for FX Prediction</td>
<td></td>
</tr>
<tr>
<td><em>Hua Shen and Xun Liang</em></td>
<td></td>
</tr>
<tr>
<td>Multivariate Dynamic Kernels for Financial Time Series Forecasting</td>
<td>336</td>
</tr>
<tr>
<td><em>Mauricio Peña, Argimiro Arratia, and Lluís A. Belanche</em></td>
<td></td>
</tr>
<tr>
<td>Recognition and Navigation</td>
<td></td>
</tr>
<tr>
<td>Symbolic Association Using Parallel Multilayer Perceptron</td>
<td>347</td>
</tr>
<tr>
<td>*Federico Raue, Sebastian Palacio, Thomas M. Breuel, Wonmin Byeon,</td>
<td></td>
</tr>
<tr>
<td>Andreas Dengel, and Marcus Liwicki*</td>
<td></td>
</tr>
<tr>
<td>Solution of an Inverse Problem in Raman Spectroscopy</td>
<td>355</td>
</tr>
<tr>
<td>of Multi-component Solutions of Inorganic Salts</td>
<td></td>
</tr>
<tr>
<td>by Artificial Neural Networks</td>
<td></td>
</tr>
<tr>
<td><em>Alexander Efitorov, Tatiana Dolenko, Sergey Burikov, Kirill Laptinskiy, and Sergey Dolenko</em></td>
<td>363</td>
</tr>
<tr>
<td>Sound Recognition System Using Spiking and MLP Neural Networks</td>
<td></td>
</tr>
<tr>
<td><em>Elena Cerezuela-Escudero, Angel Jimenez-Fernandez, Rafael Paz-Vicente, Juan P. Dominguez-Morales, Manuel J. Dominguez-Morales, and Alejandro Linares-Barranco</em></td>
<td></td>
</tr>
<tr>
<td>Using Machine Learning Techniques to Recover Prismatic Cirrus Ice</td>
<td>372</td>
</tr>
<tr>
<td>Crystal Size from 2-Dimensional Light Scattering Patterns</td>
<td></td>
</tr>
<tr>
<td><em>Daniel Priori, Giseli de Sousa, Mauro Roisenberg, Christopher Stopford, Evelyn Hesse, Emmanuel Salawu, Neil Davey, and Yi Sun</em></td>
<td>380</td>
</tr>
<tr>
<td>25 Years of CNNs: Can We Compare to Human Abstraction Capabilities?</td>
<td></td>
</tr>
<tr>
<td><em>Sebastian Stabinger, Antonio Rodríguez-Sánchez, and Justus Piater</em></td>
<td></td>
</tr>
<tr>
<td>A Combination Method for Reducing Dimensionality in Large Datasets</td>
<td>388</td>
</tr>
<tr>
<td><em>Daniel Araújo, Jhoseph Jesus, Adrião Dória Neto, and Allan Martins</em></td>
<td></td>
</tr>
</tbody>
</table>
Two-Class with Oversampling Versus One-Class Classification for Microarray Datasets ................................................................. 398

Beatriz Pérez-Sánchez, Oscar Fontenla-Romero, and Noelia Sánchez-Maroño

Polar Sine Based Siamese Neural Network for Gesture Recognition ............. 406

Samuel Berlemont, Grégoire Lefebvre, Stefan Duffner, and Christophe Garcia

Day Types Identification of Algerian Electricity Load Using an Image Based Two-Stage Approach ................................................................. 415

Kheir Eddine Farfar and Mohamed Tarek Khadir

SMS Spam Filtering Using Probabilistic Topic Modelling and Stacked Denoising Autoencoder ................................................................. 423

Noura Al Moubayed, Toby Breckon, Peter Matthews, and A. Stephen McGough

Improving MDLSTM for Offline Arabic Handwriting Recognition Using Dropout at Different Positions ................................................................. 431

Rania Maalej and Monji Kherallah

A Neural Network Model for Solving the Feature Correspondence Problem ... 439

Ala Aboudib, Vincent Gripon, and Gilles Coppin

The Performance of a Biologically Plausible Model of Visual Attention to Localize Objects in a Virtual Reality ................................................................. 447

Amirhossein Jamalian, Frederik Beuth, and Fred H. Hamker

Pose-Invariant Object Recognition for Event-Based Vision with Slow-ELM ...... 455

Rohan Ghosh, Tang Siyi, Mahdi Rasouli, Nitish V. Thakor, and Sunil L. Kukreja

Learning V4 Curvature Cell Populations from Sparse Endstopped Cells ...... 463

Antonio Rodríguez-Sánchez, Sabine Oberleiter, Hanchen Xiong, and Justus Piater

Recognition of Transitive Actions with Hierarchical Neural Network Learning ................................................................. 472

Luiza Mici, German I. Parisi, and Stefan Wermter

Rotation-Invariant Restricted Boltzmann Machine Using Shared Gradient Filters .................................................................................. 480

Mario Valerio Giuffrida and Sotirios A. Tsaftaris

Improving Robustness of Slow Feature Analysis Based Localization Using Loop Closure Events ................................................................. 489

Benjamin Metka, Mathias Franzius, and Ute Bauer-Wersing
Self-Organizing Map for the Curvature-Constrained Traveling Salesman Problem ............................................. 497
Jan Faigl and Petr Váňa

Non-negative Kernel Sparse Coding for the Analysis of Motion Data ........ 506
Babak Hosseini, Felix Hülsmann, Mario Botsch, and Barbara Hammer

Effect of Neural Controller on Adaptive Cruise Control .................. 515
Arden Kuyumcu and Neslihan Serap Şengör

Intelligent Speech-Based Interactive Communication Between Mobile Cranes and Their Human Operators .................. 523
Maciej Majewski and Wojciech Kacalak

Short Papers

Orthogonal Permutation Linear Unit Activation Function (OPLU) .......... 533
Artem Chernodub and Dimitri Nowicki

Smartphone Based Human Activity and Postural Transition Classification with Deep Stacked Autoencoder Networks ................. 535
Luke Hicks, Yih-Ling Hedley, Mark Elshaw, Abdulrahman Altahhan, and Vasile Palade

Accuracies and Number of Rules Extracted Using the Re-RX Algorithm Family from a Pareto-Optimal Perspective ................. 537
Yoichi Hayashi, Guido Bologna, and Riku Hashiguchi

Finding an Hidden Common Partition in Duplex Structure-Function Brain Networks ............................................. 539
Casimiro Pio Carrino and Sebastiano Stramaglia

A Novel Quasi-Newton-Based Training Using Nesterov’s Accelerated Gradient for Neural Networks ......................... 540
Hiroshi Ninomiya

Use of Ensemble Approach and Stacked Generalization for Neural Network Prediction of Geomagnetic Dst Index ................. 541
Vladimir Shiroky, Irina Myagkova, and Sergey Dolenko

Artificial Neural Network for the Urinary Lithiasis Type Identification .... 542
Yasmina Nozha Mekki, Nadir Farah, Abdelatif Boutefnouchet, and KheirEddine Chettibi

Artificial Neural Network-Based Modeling for Multi-scroll Chaotic Systems ............................................. 544
Mohammed Amin Khelifa and Abdelkrim Boukabou
Detailed Remote Sensing of High Resolution Planetary Images by Artificial Neural Network ................................. 545 
  Marzieh Foroutan

Sentiment Analysis Using Extreme Learning Machine with Linear Kernel .......................... 547 
  Shangdi Sun and Xiaodong Gu

Neural Network with Local Receptive Fields for Illumination Effects .......................... 549 
  Alejandro Lerer, Matthias S. Keil, and Hans Supèr

ROS Based Autonomous Control of a Humanoid Robot ........................................ 550 
  Ganesh Kumar Kalyani, Zhijun Yang, Vaibhav Gandhi, and Tao Geng

A Robotic Implementation of Drosophila Larvae Chemotaxis ........................................ 552 
  Daniel Malagarriga, Ivica Slavkov, James Sharpe, and Matthieu Louis

Author Index ................................................................. 553
## Contents – Part I

### From Neurons to Networks

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved Chaotic Multidirectional Associative Memory</td>
<td>3</td>
</tr>
<tr>
<td>Hiroki Sato and Yuko Osana</td>
<td></td>
</tr>
<tr>
<td>Effect of Pre- and Postsynaptic Firing Patterns on Synaptic Competition</td>
<td>11</td>
</tr>
<tr>
<td>Nobuhiro Hinakawa and Katsunori Kitano</td>
<td></td>
</tr>
<tr>
<td>Asymmetries in Synaptic Connections and the Nonlinear Fokker-Planck</td>
<td>19</td>
</tr>
<tr>
<td>Roseli S. Wedemann and Angel R. Plastino</td>
<td></td>
</tr>
<tr>
<td>Synaptogenesis: Constraining Synaptic Plasticity Based on a Distance Rule</td>
<td>28</td>
</tr>
<tr>
<td>Jordi-Ysard Puigbò, Joeri van Wijngaarden, Sock Ching Low, and Paul F.M.J. Verschure</td>
<td></td>
</tr>
<tr>
<td>A Sensor Fusion Horse Gait Classification by a Spiking Neural Network on SpiNNaker</td>
<td>36</td>
</tr>
<tr>
<td>Antonio Rios-Navarro, Juan Pedro Dominguez-Morales, Ricardo Tapiador-Morales,</td>
<td></td>
</tr>
<tr>
<td>Manuel Dominguez-Morales, Angel Jimenez-Fernandez, and Alejandro Linares-Barranco</td>
<td></td>
</tr>
<tr>
<td>Multilayer Spiking Neural Network for Audio Samples Classification</td>
<td>45</td>
</tr>
<tr>
<td>Juan Pedro Dominguez-Morales, Angel Jimenez-Fernandez, Daniel Gutierrez-Galan,</td>
<td></td>
</tr>
<tr>
<td>Manuel J. Dominguez-Morales, and Gabriel Jimenez-Moreno</td>
<td></td>
</tr>
<tr>
<td>Input-Modulation as an Alternative to Conventional Learning Strategies</td>
<td>54</td>
</tr>
<tr>
<td>Esin Yavuz and Thomas Nowotny</td>
<td></td>
</tr>
<tr>
<td>A Potential Mechanism for Spontaneous Oscillatory Activity in the Degenerative Mouse Retina</td>
<td>63</td>
</tr>
<tr>
<td>Kanako Taniguchi, Chieko Koike, and Katsunori Kitano</td>
<td></td>
</tr>
<tr>
<td>Striatal Processing of Cortical Neuronal Avalanches – A Computational Investigation</td>
<td>72</td>
</tr>
<tr>
<td>Jovana J. Belić and Jeanette Hellgren Kotalski</td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Networks and Dynamics</td>
<td></td>
</tr>
<tr>
<td>Mapping the Language Connectome in Healthy Subjects and Brain Tumor</td>
<td>83</td>
</tr>
<tr>
<td>Gregory Zegarek, Xerxes D. Arsiwalla, David Dalmazzo, and Paul F.M.J. Verschure</td>
<td></td>
</tr>
<tr>
<td>Method for Estimating Neural Network Topology Based on SPIKE-Distance</td>
<td>91</td>
</tr>
<tr>
<td>Kaori Kuroda and Mikio Hasegawa</td>
<td></td>
</tr>
<tr>
<td>Dynamics of Evolving Feed-Forward Neural Networks and Their Topological Invariants</td>
<td>99</td>
</tr>
<tr>
<td>Paolo Masulli and Alessandro E.P. Villa</td>
<td></td>
</tr>
<tr>
<td>Scaling Properties of Human Brain Functional Networks</td>
<td>107</td>
</tr>
<tr>
<td>Riccardo Zucca, Xerxes D. Arsiwalla, Hoang Le, Mikail Rubinov, and Paul F.M.J. Verschure</td>
<td></td>
</tr>
<tr>
<td>Attractor Dynamics Driven by Interactivity in Boolean Recurrent Neural Networks</td>
<td>115</td>
</tr>
<tr>
<td>Jérémie Cabessa and Alessandro E.P. Villa</td>
<td></td>
</tr>
<tr>
<td>Training Bidirectional Recurrent Neural Network Architectures with the Scaled Conjugate Gradient Algorithm</td>
<td>123</td>
</tr>
<tr>
<td>Michalis Agathocleous, Chris Christodoulou, Vasilis Promponas, Petros Kountouris, and Vassilis Vassiliades</td>
<td></td>
</tr>
<tr>
<td>Learning Multiple Timescales in Recurrent Neural Networks</td>
<td>132</td>
</tr>
<tr>
<td>Tayfun Alpay, Stefan Heinrich, and Stefan Wermter</td>
<td></td>
</tr>
<tr>
<td>Investigating Recurrent Neural Networks for Feature-Less Computational Drug Design</td>
<td>140</td>
</tr>
<tr>
<td>Alexander Dörr, Sebastian Otte, and Andreas Zell</td>
<td></td>
</tr>
<tr>
<td>Inverse Recurrent Models – An Application Scenario for Many-Joint Robot Arm Control</td>
<td>149</td>
</tr>
<tr>
<td>Sebastian Otte, Adrian Zwiener, Richard Hanten, and Andreas Zell</td>
<td></td>
</tr>
<tr>
<td>Population Coding of Goal Directed Movements</td>
<td>158</td>
</tr>
<tr>
<td>Andreas G. Fleischer</td>
<td></td>
</tr>
<tr>
<td>Body Model Transition by Tool Grasping During Motor Babbling</td>
<td>166</td>
</tr>
<tr>
<td>Using Deep Learning and RNN</td>
<td></td>
</tr>
<tr>
<td>Kuniyuki Takahashi, Hadi Tjandra, Tetsuya Ogata, and Shigeki Sugano</td>
<td></td>
</tr>
<tr>
<td>Centering Versus Scaling for Hubness Reduction</td>
<td>175</td>
</tr>
<tr>
<td>Roman Feldbauer and Arthur Flexer</td>
<td></td>
</tr>
</tbody>
</table>
Higher Nervous Functions

Influence of Saliency and Social Impairments on the Development of Intention Recognition .......................... 205
Laura Cohen and Aude Billard

A System-Level Model of Noradrenergic Function .................... 214
Maxime Carrere and Frédéric Alexandre

Phenomenological Model for the Adaptation of Shape-Selective Neurons in Area IT ..................................................... 222
Martin A. Giese, Pradeep Kuravi, and Rufin Vogels

Deliberation-Aware Responder in Multi-proposer Ultimatum Game ...... 230
Marko Ruman, František Hůla, Miroslav Kárny, and Tatiana V. Guy

From Cognitive to Habit Behavior During Navigation, Through Cortical-Basal Ganglia Loops ............................... 238
Jean-Paul Banquet, Souheïl Hanoune, Philippe Gaussier, and Mathias Quoy

Fast and Slow Learning in a Neuro-Computational Model of Category Acquisition .............................................. 248
Francesc Villagrasa, Javier Baladron, and Fred H. Hamker

Realizing Medium Spiny Neurons with a Simple Neuron Model ........ 256
Sami Utku Çelikok and Neslihan Serap Şengör

Marta Balagué and Laura Dempere-Marco

Plasticity in the Granular Layer Enhances Motor Learning in a Computational Model of the Cerebellum ..................... 272
Giovanni Maffei, Ivan Herreros, Marti Sanchez-Fibla, and Paul F.M.J. Verschure

How Is Scene Recognition in a Convolutional Network Related to that in the Human Visual System? .......................... 280
Sugandha Sharma and Bryan Tripp
Hybrid Trajectory Decoding from ECoG Signals for Asynchronous BCIs

Marie-Caroline Schaeffer and Tetiana Aksenova

Dimensionality Reduction Effect Analysis of EEG Signals in Cross-Correlation Classifiers Performance

Jefferson Tales Oliva and João Luis Garcia Rosa

EEG-driven RNN Classification for Prognosis of Neurodegeneration in At-Risk Patients

Giulio Ruffini, David Ibañez, Marta Castellano, Stephen Dunne, and Aureli Soria-Frisch

Competition Between Cortical Ensembles Explains Pitch-Related Dynamics of Auditory Evoked Fields

Alejandro Tabas, André Rupp, and Emili Balaguè-Ballester

Dynamics of Reward Based Decision Making: A Computational Study

Bhargav Teja Nallapu and Nicolas P. Rougier

Adaptive Proposer for Ultimatum Game

František Hůla, Marko Ruman, and Miroslav Kárný

Dynamical Linking of Positive and Negative Sentences to Goal-Oriented Robot Behavior by Hierarchical RNN

Tatsuro Yamada, Shingo Murata, Hiroaki Arie, and Tetsuya Ogata

Neuronal Hardware

Real-Time FPGA Simulation of Surrogate Models of Large Spiking Networks

Murphy Berzish, Chris Eliasmith, and Bryan Tripp

Randomly Spiking Dynamic Neural Fields Driven by a Shared Random Flow

Benoît Chappet de Vangel and Bernard Girau

Synfire Chain Emulation by Means of Flexible SNN Modeling on a SIMD Multicore Architecture

Mireya Zapata and Jordi Madrenas

Towards Adjustable Signal Generation with Photonic Reservoir Computers

Piotr Antonik, Michiel Hermans, Marc Haelterman, and Serge Massar

Hierarchical Networks-on-Chip Interconnect for Astrocyte-Neuron Network Hardware

Junxiu Liu, Jim Harkin, Liam McDaid, and George Martin
Restricted Boltzmann Machines Without Random Number Generators for Efficient Digital Hardware Implementation .......................................................... 391
Sansei Hori, Takashi Morie, and Hakaru Tamukoh

Compact Associative Memory for AER Spike Decoding in FPGA-Based Evolvable SNN Emulation ................................................................. 399
Mireya Zapata and Jordi Madrenas

Learning Foundations

Combining Spatial and Parametric Working Memory in a Dynamic Neural Field Model ............................................................................................. 411
Weronika Wojtak, Stephen Coombes, Estela Bicho, and Wolfram Erlhagen

C4.5 or Naive Bayes: A Discriminative Model Selection Approach .............. 419
Lungan Zhang, Liangxiao Jiang, and Chaoqun Li

Adaptive Natural Gradient Learning Algorithms for Unnormalized Statistical Models ........................................................................................... 427
Ryo Karakida, Masato Okada, and Shun-ichi Amari

Octonion-Valued Neural Networks ................................................................. 435
Călin-Adrian Popa

Reducing Redundancy with Unit Merging for Self-constructive Normalized Gaussian Networks ................................................................................ 444
Jana Backhus, Ichigaku Takigawa, Hideyuki Imai, Mineichi Kudo, and Masanori Sugimoto

Learning to Enumerate. .................................................................................. 453
Patrick Jörger, Yukino Baba, and Hisashi Kashima

Pattern Based on Temporal Inference. ............................................................. 461
Zeineb Neji, Marieme Ellouze, and Lamia Hadrich Belguith

Neural Networks Simulation of Distributed Control Problems with State and Control Constraints ................................................................. 468
Tibor Kmet and Maria Kmetova

The Existence and the Stability of Weighted Pseudo Almost Periodic Solution of High-Order Hopfield Neural Network ........................................ 478
Chaouki Aouiti, Mohammed Salah M’hamdi, and Farouk Chérif

Sparse Extreme Learning Machine Classifier Using Empirical Feature Mapping ............................................................................................. 486
Takuya Kitamura
Three Approaches to Train Echo State Network Actors of Adaptive Critic Design .......................................................... 494
Petia Koprinkova-Hristova

Increase of the Resistance to Noise in Data for Neural Network Solution of the Inverse Problem of Magnetotellurics with Group Determination of Parameters ................................................................. 502
Igor Isaev, Eugeny Obornev, Ivan Obornev, Mikhail Shimelevich, and Sergey Dolenko

Convergence of Multi-pass Large Margin Nearest Neighbor Metric Learning .............................................................. 510
Christina Göpfert, Benjamin Paassen, and Barbara Hammer

Short Papers

Spiking Neuron Model of a Key Circuit Linking Visual and Motor Representations of Actions ........................................ 521
Mohammad Hovaidi Ardestani and Martin Giese

Analysis of the Effects of Periodic Forcing in the Spike Rate and Spike Correlation’s in Semiconductor Lasers with Optical Feedback. ................................. 523
Carlos Quintero-Quiroz, Taciano Sorrentino, M.C. Torrent, and Cristina Masoller

Neuronal Functional Interactions Inferred from Analyzing Multivariate Spike Trains Generated by Simple Models Simulations Using Frequency Domain Analyses Available at Open Platforms ................................. 524
Takeshi Abe, Yoshiyuki Asai, and Alessandro E.P. Villa

Controlling a Redundant Articulated Robot in Task Space with Spiking Neurons ...................................................... 526
Samir Menon, Vinay Sriram, Luis Kumanduri, Oussama Khatib, and Kwabena Boahen

Onset of Global Synchrony by Application of a Size-Dependent Feedback .............................................................. 528
August Romeo and Hans Supér

Identification of Epileptogenic Rhythms in a Mesoscopic Neuronal Model .............................................................. 529
Maciej Jedynak, Antonio J. Pons, Jordi Garcia-Ojalvo, and Marc Goodfellow

Modulation of Wave Propagation in the Cortical Network by Electric Fields .............................................................. 530
Pol Boada-Collado, Julia F. Weinert, Maurizio Mattia, and Maria V. Sanchez-Vives
Investigation of SSEP by Means of a Realistic Computational Model of the Sensory Cortex .................................................. 532
Elżbieta Gajewska-Dendek and Piotr Suffczyński

Exploration of a Mechanism to Form Bionic, Self-growing and Self-organizing Neural Network .................................................. 533
Hailin Ma, Ning Deng, Zhiheng Xu, Yuzhe Wang, Yingjie Shang, Xu Yang, and Hu He

Living Neuronal Networks in a Dish: Network Science and Neurological Disorders .................................................. 534
Sara Teller, Elisenda Tibau, and Jordi Soriano

Does the Default Network Represent the ‘Model’ in Model-Based Decision-Making? .................................................. 535
Raphael Kaplan and Gustavo Deco

Experimental Approaches to Assess Connectivity in Living Neuronal Networks .................................................. 536
Lluis Hernández-Navarro, Javier G. Orlandi, Jaume Casademunt, and Jordi Soriano

Spectral Analysis of Echo State Networks .................................................. 537
Pau Vilimelis Aceituno, Gang Yan, and Yang-Yu Liu

Adaptive Hierarchical Sensing .................................................. 538
Henry Schütze, Erhardt Barth, and Thomas Martinetz

Across-Trial Dynamics of Stimulus Priors in an Auditory Discrimination Task .................................................. 539
Ainhoa Hermoso-Mendizabal, Alexandre Hyafil, Pavel Ernesto Rueda-Orozco, Santiago Jaramillo, David Robbe, and Jaime de la Rocha

Artificial Neural Network-Based Control Architecture: A Simultaneous Top-Down and Bottom-Up Approach to Autonomous Robot Navigation .................................................. 540
Dalia-Marcela Rojas-Castro, Arnaud Revel, and Michel Ménard

Realization of Profit Sharing by Self-Organizing Map-Based Probabilistic Associative Memory .................................................. 541
Takahiro Katayama and Yuko Osana

State-Dependent Information Processing in Gene Regulatory Networks .................................................. 542
Marçal Gabaldà-Sagara and Jordi García-Ojalvo

Patent Citation Network Analysis: Topology and Evolution of Patent Citation Networks .................................................. 543
Péter Erdi
Patent Citation Network Analysis: Ranking: From Web Pages to Patents . . . . . 544
   Péter Érdi and Péter Bruck

Multistable Attractor Dynamics in Columnar Cortical Networks
Transitioning from Deep Anesthesia to Wakefulness . . . . . . . . . . . . . . . . . . 545
   Cristiano Capone, Nuria Tort-Colet, Maurizio Mattia,
   and Maria V. Sanchez-Vives

Modulation of Cortical Intrinsic Bistability and Complexity
in the Cortical Network . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 547
   Maria V. Sanchez-Vives, Julia F. Weinert, Beatriz Rebollo,
   Adenauer G. Casali, Andrea Pigorini, Marcello Massimini,
   and Mattia D’Andola

A Neural Network for Visual Working Memory that Accounts
for Memory Binding Errors . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 548
   João Barbosa and Albert Compte

Single-Neuron Sensory Coding Might Influence Performance
in a Monkey’s Perceptual Discrimination Task . . . . . . . . . . . . . . . 549
   Pau de Jorge, Verónica Nácher, Rogelio Luna, Jordi Soriano,
   Ranulfo Romo, Gustavo Deco, and Adrià Tauste Campo

Modelling History-Dependent Perceptual Biases in Rodents . . . . . . . . . . . . 550
   Alexandre Hyafil, Ainhoa Hermoso Mendizabal, and Jaime de la Rocha

Applicability of Echo State Networks to Classify EEG Data
from a Movement Task . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 551
   Lukas Hestermeyer and Gordon Pipa

Data Assimilation of EEG Observations by Neural Mass Models . . . . . . . . . 553
   Lara Escuain-Poole, Jordi Garcia-Ojalvo, and Antonio J. Pons

Functional Reorganization of Neural Networks Prior to Epileptic Seizures . . . 554
   Adrià Tauste Campo, Alessandro Principe, Rodrigo Rocamora,
   and Gustavo Deco

Attractor Models of Perceptual Decisions Making Exhibit Stochastic
Resonance . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 555
   Genis Prat-Ortega, Klaus Wimmer, Alex Roxin, and Jaime de la Rocha

VLSI Design of a Neural Network Model for Detecting Planar Surface
from Local Image Motion . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 556
   Hisanao Akima, Satoshi Moriya, Susumu Kawakami, Masafumi Yano,
   Koji Nakajima, Masao Sakurabah, and Shigeo Sato
Contents – Part I

Learning Method for a Quantum Bit Network. .......................... 558
Yoshihiro Osakabe, Shigeo Sato, Mitsunaga Kinjo, Koji Nakajima, Hisanao Akima, and Masao Sakuraba

Information-Theoretical Foundations of Hebbian Learning ................. 560
Claudius Gros and Rodrigo Echeveste

Artificial Neural Network Models for Forecasting Tourist Arrivals to Barcelona. .................................................. 561
Bulent Alptekin and Cagdas Hakan Aladag

Experimental Study of Multistability and Attractor Dynamics in Winnerless Neural Networks. .................................................. 562
Ashok Chauhan and Alain Nogaret

Author Index ................................................................. 563
Artificial Neural Networks and Machine Learning – ICANN 2016
25th International Conference on Artificial Neural Networks, Barcelona, Spain, September 6-9, 2016,
Proceedings, Part II
Villa, A.E.P.; Masulli, P.; Pons Rivero, A.J. (Eds.)
2016, XXIX, 557 p. 173 illus., Softcover
ISBN: 978-3-319-44780-3