INTERNATIONAL NEURAL NETWORK SOCIETY

INNS Members News

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INSIDE

Annual traditional exchange of ties between IEEE CIS and INNS presidents

Memorable event! for the first time, the annual traditional exchange of ties between IEEE CIS and INNS presidents was an exchange of scarves between two women presidents at the IJCNN 2021 conference!

Prof Chrisina Jayne – President of INNS (top) and IEEE CIS President, Bernadette Bouchon-Meunier (bottom).

IJCNN 2021 Highlights

- By Prof Zeng-Guang

The 2021 International Joint Conference on Neural Networks (IJCNN2021), the flagship annual conference of the International Neural Network Society (INNS), was held on July 18th to July 23rd 2021. The event was planned to be held in Shenzhen, China, however, due to COVID-19 restrictions, it was held virtually. The main organizer of the conference were INNS and IEEE Computational Intelligence Society, assisted by the Institute of Automation, Chinese Academy of Sciences and Southern University of Science and Technology, China. The goal of IJCNN2021 was to bring together experts from the fields of all aspects of neural networks theory, analysis, and applications, disseminate the recent advances in the area, discuss future research directions, and exchange application experience.

This year IJCNN has received 2032 papers submitted by 7743 authors from over 74 different countries, 38 of which were later withdrawn. Of these, 1183 papers (59.3%) were accepted. All of them are included in the program as virtual oral presentations. The top ten countries where the submitting authors come from are (in descending order): China, United Sates, India, Brazil, Australia, United Kingdom, Germany, Japan, Italy, Brazil, Japan, Italy, and France. The program features 29 special sessions, two competitions, eight tutorials, and three workshops.

Our technical program was highlighted with seven distinguished plenary speakers. They addressed the following topics:

- "Smart Interactive Buildings" by Professor Marios M. Polycarpou of the KIOS Research and Innovation Center,
- "Active Inference" by Professor Karl J. Friston of the University College London,
- "What neuroimaging can tell about human brain function" by Professor Riitta Salmelin of the Aalto University,
- "Fascinating World of Recurrent Networks: A Personal View" by Professor Peter Tino of the University of Birmingham,
- "Self-Organized Criticality in the Brain" by Dr. Dietmar Plenz of theNational Institute of Mental Health,
- "On Presuppositions of Machine Learning: A Best-fitting Theory" by Professor Zongben Xu of the Xi'an Jiaotong University, and
- "Transfer Learning and Knowledge Transfer Between Humans and Machines with Brain-Inspired Spiking Neural Networks for Adaptable and Explainable AI" by Professor Nikola Kasabov of the Auckland University of Technology.

The IJCNN series is renowned for its dedication to recognizing research outcomes achieved by researchers and fellow students. With that goal in mind, this year several awards have been presented, and they are as follows:

Best Paper Award

- "Relevance-Aware Anomalous Users Detection in Social Network via Graph Neural Network" by Li Yangyang, Ji Yipeng, Li Shaoning, He Shulong, Cao Yinhao, Liu Yifeng, Li Xiong, Shi Jun, and Yang Yangchao.

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Best Paper Finalist

- "Deep Recurrent Neural Networks with Attention Mechanisms for Respiratory Anomaly Classification" by Conor Wall, Li Zhang, Yonghong Yu, and Kamlesh Mistry,
- "Robust quantum classifier with minimal overhead" by Daniel K. Park, Carsten Blank, and Francesco Petruccione,
- "Neural inverse optimal control applied to design therapeutic options for patients with COVID-19" by Victor M. Chan, Esteban A. Hernandez-Vargas, and Edgar N. Sanchez, and
- "Under sampling with Support Vectors for Multi-Class Imbalanced Data Classification" by Bartosz Krawczyk, Colin Bellinger, Roberto Corizzo, and Nathalie Japkowicz.

Best Student Paper Award

- "Disentangled-based Adversarial Network for Multiplex Network Embedding" by Shimeng Zhan, Nianwen Ning, Kai Zhao, Lianwei Li, Bin Wu, and Bai Wang, and
- "Robust Deep Multi-task Learning Framework for Cancer Survival Analysis" by Shuang Yun, Bo Du, and Yuren Mao.

Best Student Paper Finalist

- "A New Approach to Design Symmetry Invariant Neural Networks" by Piotr Kicki, Piotr Skrzypczynski, and Mete Ozay,
- "Generative Adversarial Networks: A Likelihood Ratio Approach" by Kalliopi Basioti and George V. Moustakides,
- "Benchmarking Inference Performance of Deep Learning Models on Analog Devices" by Omobayode Fagbohungbe and Lijun Qian,
- "CAP-GAN: Towards Adversarial Robustness with Cycle-consistent Attentional Purification" by Mingu Kang, Trung Quang Tran, Seungju Cho, and Daeyoung Kim, and
- "The Case Against Sentiment Analysis for Natural Text" by Shamoon Siddiqui, Ghulam Rasool, and Ravi P. Ramachandran.

New research publications – By Supriyo Mandal

First work "Rating Prediction with Review Network Feedback: A New Direction in Recommendation" is accepted in IEEE Transactions on Computational Social Systems and another one "Graph Neural Networks for Heterogeneous Trust based Social Recommendation" is accepted in IEEE International Joint Conference on Neural Network (IJCNN 2021).

Research publication Using AI for detecting skin cancer – By
Karl Thurnhofer-Hemsi, Universidad de Málaga

Skin lesions are caused due to multiple factors, like allergies, infections, exposition to the sun, etc. Melanoma is one of the best-known types of skin lesions due to the vast majority of skin cancer deaths. These skin diseases have become a challenge in medical diagnosis due to visual similarities, and sometimes these misclassifications can aggravate the lesion.

The Computational Intelligence and Image Analysis (ICAI) research group of the University of Málaga has developed an automatic classifier of skin lesions using the power of artificial intelligence. Deep neural networks were trained in order to recognize several types of moles, although their precision is not good enough yet. Therefore, we proposed a shifting technique in the testing phase that improves the classification accuracy by around 6%. Moreover, the proposed methodology is applicable to any other image classification model based on deep networks. Read more at https://doi.org/10.1109/ACCESS.2021.3103410

Donald C. Wunsch II becomes NSF Program Director, Missouri S&T / NSF

In 2021, Donald C. Wunsch II became a Program Director at the National Science Foundation, on contract from Missouri University of Science and Technology, where he is the Mary K. Finley Missouri Distinguished Professor and Director of the Applied Computational Intelligence Laboratory. He and his students and collaborators continue their research on unsupervised and reinforcement learning. At NSF he has supported programs in Energy, Power, Controls and Networks, Harnessing the Data Revolution, Foundational Research in Robotics, National Robotics Initiative, Mathematics of Deep Learning, CAREER, and more.
See more at https://www.nsf.gov/staff/staff_bio.jsp?lan=dwunsch&org=NSF&from_org=NSF

SHIFT15M: multiobjective large-scale fashion dataset with distributional shifts – By Masanari Kimura, ZOZO Research

We present a novel dataset aimed at properly evaluating machine learning models under distributional shifts. Our SHIFT15M dataset has several good properties:
1. Multiobjective. Each instance in the dataset has several numerical values that can be used as target variables.
2. Large-scale. The SHIFT15M dataset consists of 15million fashion images.

3. Coverage of types of dataset shifts. SHIFT15M contains multiple dataset shift problem settings (e.g., covariate shift or target shift). SHIFT15M also enables the performance evaluation of the model under various magnitudes of dataset shifts by switching the magnitude.
In addition, we provide software to handle SHIFT15M in a very simple way.

Arxiv: https://arxiv.org/abs/2108.12992
GitHub: https://github.com/st-tech/zozo-shift15m

Neuro Control T&L Framework for Improving Learning and Retention in Higher Education – By Dr. Nabeel Murshed, University of Dubai

Studies have shown that an increase in retention is related, among other things, to improvement in teaching and learning. To improve learning and retention, we developed a Neuro Control Teaching and Learning (T&L) Framework based on control system structure and Neural Networks (NNs). It has a controller, a process, dual Neuro feedback modules, and knowledge base. The controller component is the teaching methodologies, based on established learning theories and best practice. The process consists of lecture design and delivery, real-time formative and summative assessments. The feedback modules are based on fuzzy ARTMAP NNs. Initial results, produced 85.6% satisfactory improvement of student learning, compared to traditional approach. See more at https://www.researchgate.net/profile/Nabeel-Murshed

Towards symbiotic autonomous systems

Theme issue compiled and edited by Okyay Kaynak, Wei He, Francesco Flammini and Zhijie Liu

Published 16 August 2021. Available online and in print.

About this issue

Starting in the second half of the last century, the widespread use of computers significantly changed the lifestyle of humankind. Since then, with the explosive and perhaps disruptive developments in digital technology, the internet, and IoT, and artificial intelligence have promoted a growing interaction among humans and machines, with technology capable of extending human capabilities (augmentation) and making devices seamlessly interact with humans. In the longer term, there is a growing consensus that this will create symbiotic autonomous systems (SASs). Although this is a trend that will see maturity possibly in the next decade, research and industry interest are already strong, resulting in several concrete results ready to hit the market. What matters most in the context of SAS is the varying degrees of autonomy they have, their capability to evolve (e.g., to learn and adapt), and their ability to interact with their environment, between themselves, and with humans.

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