



The 15th International FLINS Conference on Machine learning,
Multi agent and Cyber physical systems

August 26-28, 2022, Tianjin, China



Special Session on Evolving Deep and Transfer Learning Models for Computer Vision and Medical Imaging

<https://flins2022.scievent.com/>

FLINS2022 is the fifteenth in a series of conferences on computational intelligence systems with focus on Machine learning, Multi agent and Cyber physical systems. The conference will be held in Tianjin, China.

FLINS 2022 proceedings will be again published as a book by the World Scientific and it will be again included in the ISI proceedings as previous ones, as well as be included in EI Compendex for indexing. Moreover, special issues of SCI indexed journals will be devoted to a strictly refereed selection of extended papers presented at FLINS 2022.

Scope and Motivation

Automated diagnostic imaging problems are challenging owing to data scarcity, poor data quality (e.g. low contrast, occlusions, and distractors), complex characteristics of the diagnostic problems and subtle and delicate distinctiveness between benign and tumour scenarios. Deep learning and transfer learning show superior capabilities of tackling computer vision and automated medical diagnostic problems. Examples include the proposal and adoption of a variety of deep architectures for image synthesis (e.g. auto-encoders and Generative Adversarial Networks), segmentation (e.g. SegNet and Mask R-CNN), detection (e.g. YOLOv5), and classification (e.g. VGGNet, ResNet, ResNeXt, and SqueezeNet). Moreover, the transfer learning process based on pre-trained models is able to overcome barriers related to data scarcity by transferring learned features to a new task. It enables the networks to not only embed rich features learned from a wide range of non-medical images during pre-training, but also acquire new feature representations from the learning process of a new domain.

However, the design of new and effective deep learning models and identification of the optimal hyper-parameters of the resulting as well as transfer learning models require profound domain knowledge, which may not always be available to researchers. In parallel, evolutionary algorithms show powerful search capabilities of solving single-, multi-, and many-objective optimization problems. In this regard, the superior search capabilities of evolutionary computing algorithms allow them to tackle such optimization problems, e.g. to devise evolving deep neural networks that fit the tasks at hand, as well as to identify optimal hyper-parameters of the transfer learning process.

This special session aims to stimulate studies pertaining to not only complex deep learning-based computer vision and medical imaging systems but also optimal topology and hyper-parameter identification for such deep networks through evolutionary computing and related paradigms.

Potential topics include, but are not limited to, the following:

- Image segmentation & visual saliency detection
- Object detection and recognition
- Image classification and automated medical diagnosis (using X-rays, CT scan, MRI, ultrasound, microscopic and dermoscopic images)
- Hybrid clustering models
- Evolutionary algorithms and soft computing techniques (e.g. Genetic Algorithm and Evolutionary Programming)
- Signal and image processing
- Facial expression recognition
- Human action recognition
- Image/video captioning
- Visual question generation and answering
- Image reconstruction and synthesis
- Feature extraction and selection
- Visual perception and learning
- Health monitoring and surveillance
- Machine learning, deep learning, and transfer learning for computer vision and medical imaging
- Evolving deep architecture generation for computer vision, medical imaging and signal processing problems
- Optimal hyper-parameter identification for deep learning, transfer learning, and other classification and regression models
- Optimal topology generation for machine learning and ensemble learning models

Important Dates

Special session proposals deadline	December 31, 2021
Full paper submission	February 28, 2022
Notification of acceptance	March 31, 2022
Camera-ready paper submission	April 15, 2022
Author registration	April 25, 2022
Conference Date	August 26-28, 2022

Paper Submission

<https://easychair.org/conferences/?conf=flins20220>

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Brief biographical information of the organizers

Dr Li Zhang is currently an Associate Professor & Reader in Computer Science in Royal Holloway, University of London, UK. Dr Zhang received a PhD degree from the University of Birmingham. She holds expertise in machine learning, computer vision, deep learning and intelligent robotics. Previously Dr Zhang's research has been funded by EPSRC & ESRC, TSB and HEIF in collaboration with Northumbria Police and RPptv Ltd. respectively for deep learning and computer vision applications. Dr Zhang also participated in two EU-funded Erasmus-Mundus projects, CLINK (2.5M Euro, 2012-2018) and GLINK (3.05M Euro, 2014-2019), as NU team leader. Dr Zhang led the AI and medical imaging research themes in these projects in collaboration with 14 (CLINK) and 18 (GLINK) partners respectively. Dr Zhang recently participated in two Innovate UK-KTP projects in collaboration with PII Ltd. (ref10497, 02/2017-02/2019) and Smyths Toys Ltd. (ref1024955, 06/2018-09/2020) respectively, and also leads projects funded by Innovate UK R&D (2021-2022), London Tech Bridge – APEX Undersea Challenge (2021-2022), European Regional Development Fund - Intensive Industrial Innovation Programme, in collaboration with Ocucon Ltd. (2018-2022) and RPptv Ltd. (2019-2023), respectively, to develop deep learning solutions for image/video description generation and image segmentation problems.

Professor Chee Peng Lim received his PhD degree from the University of Sheffield, UK, in 1997. His research interests include machine learning for data analytics, condition monitoring, optimization, and decision support. As a recipient of the Commonwealth Fellowship (at University of Cambridge), Fulbright Fellowship (at University of California, Berkeley), and Visiting Scientists Program of the Office of Naval Research Global (at Harvard University and Stanford University), he has published more than 450 papers with 12 best paper awards in these areas. Currently, he is a professor at Institute for Intelligent Systems Research and Innovation, Deakin University, Australia.

Dr Haoqian Huang received the Bachelor degree in automation from the China University of Mining and Technology, China, in 2007, the Master degree in agricultural mechanization engineering from Nanjing Agricultural University, China, in 2010, and the Ph.D. degree in instrument science and technology from Southeast University, China, 2015. From 2015 to 2017, he was a PostDoctoral Researcher with Southeast University. He then joined Hohai University, China, where he is currently an Associate Professor with College of Energy and Electrical Engineering, Hohai University since 2017. His main research interests include navigation technology applied to underwater vehicle, inertial navigation, information fusion and so on. Dr. Huang received the first prize at China General Chamber of Commerce Science and Technology Award, the second prize at China Machinery Industry Science and Technology Award, the third prize at Jiangsu University Science and Technology Research Achievement Award, and Bronze Medal at the 43th Geneva International Exhibition of Inventions for his Underwater Navigation System Design. Dr. Huang has served as a lead Guest Editor of Special Issue in MATHEMATICAL PROBLEMS IN ENGINEERING, and Guest Editor of Special Issue in APPLIED SCIENCES.

Dr Hang Ruan received his B.Eng. degree from the University of Liverpool, UK, in 2011. He received his M.Sc. degree in Digital Signal Processing with distinction level and Ph.D. on Sensor Array Signal Processing, from the University of York, in 2012 and 2017, respectively. From 2018 to 2019, he worked as a research fellow on deep learning with the 5G Innovation Center (5GIC, now 6GIC), University of Surrey. From 2021, he is working as a research associate on machine learning for data science with the School of Mathematics, University of Edinburgh. His expertise and interests cover a wide range of cross-disciplines in machine learning, computational optimization, mathematics, statistical and adaptive signal processing, beamforming, sensor networks, data analytics and predictive modelling; with applications in artificial intelligence, electrical and electronic engineering and data science.