

**Special Session on
Evolutionary Machine Learning for Image Analysis and Pattern Recognition**

Organisers:

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Aim and Scope:

Image analysis and pattern recognition have been increasingly important in recent years, with a wide range of real-world applications. However, they are challenging tasks since complex data require powerful techniques to achieve optimal (near-optimal) performance. *Evolutionary machine learning* explores technologies that integrate *machine learning* with *evolutionary computation* (*GAs, GP, PSO, ACO, DE, LCSs, and so on*) for solving complex tasks in image analysis and pattern recognition including classification, regression, and clustering, image classification, object recognition, edge detection, and transfer learning. Furthermore, image analysis and pattern recognition often have a *large complex feature space*, which limits the performance of most machine learning algorithms. *Evolutionary machine learning* has been used for feature extraction, feature selection, and feature construction to improve the quality of feature space to facilitate the learning process.

This special session aims to offer world-wide academic researchers in evolutionary machine learning, image analysis and pattern recognition as well as people from industry an opportunity to present their latest research and to discuss current developments and applications, besides fostering closer future interaction between members of the academic and industry communities. We welcomes contributions that investigate the new theories, methods or applications of different evolutionary machine learning paradigms to feature analysis and to image analysis and pattern recognition tasks.

Authors are invited to submit their original and unpublished work to this special session. Topics of interest include but are not limited to:

- Image Analysis
- Edge detection
- Classification
- Clustering
- Regression
- Transfer learning
- Evolutionary computation for other data mining tasks
- Feature ranking/weighting
- Feature selection
- Feature construction/extraction

- Multi-objective feature selection, construction or extraction
- Evolutionary learning systems
- Evolutionary fuzzy systems
- Evolutionary reinforcement learning
- Evolutionary neural networks
- Evolutionary adaptive systems
- Analysis on evolutionary machine learning algorithms
- Hybridisation of evolutionary computation, neural networks, and fuzzy logic for feature selection and construction
- Real-world applications of evolutionary computation for image and video sequences/analysis, face recognition, gene analysis, biomarker detection, medical data classification, diagnosis, and analysis, handwritten digit recognition, text mining, instrument recognition, power system, financial and business data analysis, etc.

Muhammad Iqbal completed his PhD in Learning Classifier Systems at the School of Engineering and Computer Science, Victoria University of Wellington (VUW), New Zealand. He is currently working as a postdoctoral research fellow at VUW, New Zealand. Iqbal's main research interests are in the area of evolutionary machine learning. His research focuses on evolutionary image analysis and classification using transfer learning in genetic programming and learning classifier systems techniques. He is also interested in medical image analysis, data mining, and scalability of evolutionary techniques. Iqbal have authored more than 20 international publications, including top journal publications in IEEE Transactions on Evolutionary Computation, Pattern Recognition, and Evolutionary Computation; and two best paper awards at the Genetic and Evolutionary Computation Conference in 2013 and 2014 in the evolutionary machine learning track.

Bing Xue received her PhD degree in 2014 at Victoria University of Wellington, New Zealand. Since May 2015, she has been working as a Lecturer at Victoria University of Wellington. She is with the Evolutionary Computation Research Group at VUW, and her research focuses mainly on evolutionary computation, machine learning and data mining, particularly, evolutionary computation for feature selection, feature construction, dimension reduction, symbolic regression, multi-objective optimisation, bioinformatics and big data. Bing is currently leading the strategic research direction on evolutionary feature selection and construction in Evolutionary Computation Research Group at VUW, and has been organising special sessions and issues on evolutionary computation for feature selection and construction. She is also the Chair of IEEE CIS Task Force on Evolutionary Computation for Feature Selection and Construction. Bing is a committee member of Evolutionary Computation Technical Committee, and Emergent Technologies Technical Committee, IEEE CIS. She has been serving as a guest editor, associated editor or editorial board member for international journals, and program chair, special session chair, symposium/special session organiser for a number of international conferences, and as reviewer for top international journals and conferences in the field.

Mengjie Zhang is a Professor of Computer Science at the School of Engineering and Computer Science, Victoria University of Wellington (VUW), New Zealand. His research is mainly focused on evolutionary computation, particularly genetic programming, particle swarm optimization and learning classifier systems with application areas of image analysis, multi-objective optimization, classification with unbalanced data, feature selection and reduction, and job shop scheduling. He has published over 400 academic papers in refereed international journals and conferences. He has been serving as an associated editor or editorial board member for five international journals (including IEEE Transactions on Evolutionary Computation and the Evolutionary Computation Journal) and as a reviewer of over fifteen international journals. He has been serving as a steering committee member and a program committee member for over eighty international conferences.