

## **Machine Learning in Medical Diagnosis and Prognosis**

Machine learning and computational intelligence techniques have huge potential to transform healthcare by providing objective decision support tools to assist medical professionals in diagnosis and prognosis of patient conditions. In recent years there has been increasing interest in the use of machine learning in both medical imaging and pattern recognition for computer aided diagnosis. State-of-the-art pattern recognition and machine learning techniques such as deep neural networks, and combinations of supervised, semi-supervised and unsupervised learning techniques, are increasingly being used to solve problems in medical image analysis, medical diagnosis, and analysis of biomarkers. However, machine learning in healthcare informatics presents many challenges to machine learning researchers, including high dimensional feature vectors, limited sample sizes, complex and interdependent patient features, and the sometimes poorly understood relationships between patient features and the final diagnosis / prognosis.

This special session invites original research on the use of computational intelligence and machine learning techniques in the field of healthcare informatics for medical diagnosis and prognosis. The aim is to bring together researchers working in all areas of the application of machine learning and computational intelligence to medical diagnosis and prognosis to share ideas and research into this emerging field.

Topics of interest include (but are not limited to) the application of state-of-the-art machine learning and computational intelligence techniques in:

- Medical image classification
- Medical image analysis
- Expert systems for computer aided diagnosis and prognosis
- Pattern recognition in the analysis of biomarkers for medical diagnosis
- Deep learning in medical image processing and analysis

## **Biography**

Dr. Alex Shenfield is a Senior Lecturer at Sheffield Hallam University with research interests in the field of machine learning and its application to real-world problems in image processing, pattern recognition, and medical decision making. He has published over a dozen internationally peer-reviewed journal and conference papers in the fields of intelligent systems, control, and pattern recognition. He sits on the international technical programme committee for the IEEE International Symposium on Communication Systems, Networks and Digital Signal Processing and acts as a reviewer for several high impact international journals.

Dr. Adil Khan is currently an Associate Professor in the Dept. of Computer Science and Associate Dean of Education at Innopolis University, Tatarstan, Russia. He is also the head of "Machine Learning and Knowledge Representation (MLKr) Lab at Innopolis University. Before his move to Russia, he was a faculty member in the Dept. of Information Systems & Computer Engineering, College of Information Technology, at Ajou University during 2011-2014. Dr. Khan has also been a visiting faculty at IT University Copenhagen, Denmark from February - June 2015. He has received his B.Sc. in Information Technology from National University of Sciences and Technology in Pakistan, and Ph.D. in Computer Science from Kyung Hee University, South Korea. His areas of specialization include machine learning, pattern recognition, computer vision and context-aware computing. He has published more than 40 refereed articles. He is a professional member of IEEE and serves as a reviewer for several high impact international journals.

Dr. Shahin Rostami is a Lecturer in Computational Intelligence within the Department of Computing and Informatics at the Bournemouth University, where he has been a faculty member since 2014. Dr Rostami's research interests lie within the areas of Computational Intelligence and Machine Learning, ranging from theory to their application to complex real-world problems. Specifically, Dr. Rostami is currently interested in the following research directions: Many-objective Optimisation, Evolutionary Computation, Artificial Neural Networks, Direct-neural Interfaces, and Real-World Applications of Computational Intelligence. Dr. Rostami acts as a reviewer for Information Sciences, International Journal of Neural Systems, Expert Systems with Applications, and Computers & Security.