Title of the special session:

Advanced Computational Intelligence Techniques for Mining and Analysis of Biomedical Data

Names of the organizers:

Dr. Anirban Mukhopadhyay and Dr. Ujjwal Maulik

Aims and Scope

With the progress of new technologies, the volume and complexity of the data generated in the field of biomedical and health informatics have been increasing rapidly. These data have been an important resource for enabling scientific discoveries to support healthcare systems. However, due to the voluminous and complex nature of the data, it is really challenging to transfer these data into valuable knowledge for actual clinical use. Therefore the use of advanced computational intelligence techniques such as machine learning, data mining and optimization algorithms to address the challenges involved in handling these biomedical and healthcare data has become inevitable.

A variety of biomedical and healthcare data is available that includes molecular biology data such as genomic, proteomic and metabolomic data, biomedical images such as MRI, CT-scan, X-Ray and other imaging data, and clinical test and patient phenotypic data. There are many features of biomedical data sets to make them unique in nature. These features include the presence of noise, high dimensionality, heterogeneity, imbalanced nature, large volume and presence of missing values. Therefore there is a compelling need of developing new computational intelligence algorithms for efficient mining and analysis of these data sets. In recent times, advanced computational intelligence techniques like deep neural networks, fuzzy systems, game theory, multiobjective evolutionary algorithms, support vector machines, semi-supervised learning, convolutional neural networks, hidden Markov models, Bayesian learning, random forests, association rule learning, and clustering are being heavily applied for mining and extracting knowledge from large biomedical and healthcare data sets. In this special session, we would focus on development, interpretation and validation of novel computational intelligence methods for effective exploitation of biomedical data in order to extract useful knowledge from them.

Topics

The main aim of this special session is to bring together the scientists and researchers to exchange the latest advances in theories and experiments in this field of research. Researchers are invited to submit original and unpublished works that deal with theoretical and experimental results of advanced computational intelligence techniques for mining and analyzing different types of biomedical and healthcare data that include but not limited to the following:

- Analyzing genomic and proteomic sequencing data
- Mining and Analyzing microarray expression data
- Drug Target prediction
- Biological network analysis
- Prediction and analysis of disease progression

- Analyzing 2D and 3D biomedical images such MRI, CT-scan etc.
- Prediction and detection of biomarkers
- Survival analysis and prediction
- Mining electronic medical data
- Predictive analysis of biomedical sensor data

Names, affiliations and email ids of the organizers

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Important Dates

Paper submission:	15th June 2018
Decision:	15th August 2018
Camera-ready submission:	15th September 2018
Early Bird Registration:	15th September 2018
Conference:	18-21 November 2018

Paper Submission

The papers must be prepared IEEE two-column format and must not exceed 8 pages. Only full papers are accepted. The papers must be written in English. The detailed formatting guidelines and templates can be found in http://ieee-ssci2018.org/submission.html.

The paper must be submitted online through the paper submission portal of IEEE SSCI 2018 to be found in the following link: https://ieee-cis.org/conferences/ssci2018/upload.php.

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Biographies of the Organizers

Dr. Anirban Mukhopadhyay is currently an Associate Professor of the Department of Computer Science and Engineering, University of Kalyani, Kalyani, West Bengal. He did his B.E. from National Institute of Technology, Durgapur, India, in 2002 and M.E. from Jadavpur University, Kolkata, India, in 2004, respectively, both in Computer Science and Engineering. He obtained his Ph.D. in Computer Science from Jadavpur University in 2009. Dr. Mukhopadhyay is the recipient of the University Gold Medal and Amitava Dey Memorial Gold Medal from Jadavpur University in 2004 for ranking first class first in M.E. He also received Erasmus Mundus fellowship in 2009 to carry out post-doctoral research at University of Heidelberg and German Cancer Research Center (DKFZ), Heidelberg, Germany during 2009-10. Dr. Mukhopadhyay also visited I3S laboratory, University of Nice Sophia-Antipolis, Nice, France in 2011 as a Visiting Professor, University of Goettingen, Germany, as a Visiting Scientist with DAAD scholarship in 2013 and Colorado State University, Fort Collins, USA as a Visiting Researcher with Fulbright-Nehru fellowship during 2017-18. He has received Institution of Engineers, India (IEI) Young Engineers Award 2013-14 in Computer Engineering Discipline, and Indian National Academy of Engineering (INAE) Young Engineer Award 2014. He has coauthored one book and over 150 research papers in various International Journals and Conferences. He is a senior member of Institute of Electrical and Electronics Engineers (IEEE), USA, and member of Association for Computing Machinery (ACM), USA. He is also a member of IEEE Computational Intelligence Society (CIS) Kolkata Chapter and served in its executive body. Dr. Mukhopadhyay has co-edited special issues in reputed journals and co-organized special sessions in different conferences including IEEE WCCI 2016. His research interests include soft and evolutionary computing, data mining, multiobjective optimization, pattern recognition, bioinformatics, and optical networks.

Dr. Ujjwal Maulik is a Professor in the Department of Computer Science and Engineering, Jadavpur University, Kolkata, India since 2004. Currently he is the also the Chair of the Department. He did his Bachelors in Physics and Computer Science in 1986 and 1989 respectively. Subsequently, he did his Masters and Ph.D. in Computer Science in 1992 and 1997 respectively. He chaired the Department of Computer Science and Technology Kalyani Govt. Engg. College, Kalyani, India during 1996-1999. Dr. Maulik has worked in Los Alamos National Laboratory, Los Alamos, New Mexico, USA in 1997, University of New South Wales, Sydney, Australia in 1999, University of Texas at Arlington, USA in 2001, University of Maryland Baltimore County, USA in 2004, Fraunhofer Institute AiS, St. Augustin, Germany in 2005, Tsinghua University, China in 2007, University of Rome, Italy in 2008, University of Heidelberg, Germany in 2009, German Cancer Research Center (DKFZ) in 2010, 2011 and 2012, Grenoble INP, France in 2010, 2013 and 2014, ICM, Univ. of Warsaw, Poland in 2013, International Center of Theoretical Physics (ICTP), Trieste, Italy in 2014 and 2017, University of Padova in 2014 and 2016, Corvinus University Budapest, Hungary, 2015 and 2016, University of Ljubljana, Slovenia, 2015 and 2017 and Middle East Technological University (METU), Ankara, Turkey in 2017. He has also visited many Institutes/Universities around the world for invited lectures and collaborative research. Dr. Maulik is a co-author of 7 books and more than 300 research publications including the journals from Nature group, IEEE and ACM Transactions and Elsevier. Currently he is also mentoring a startup. He is the recipient of Govt. of India BOYSCAST fellowship in 2001, Alexander Von Humboldt Fellowship for Experienced Researchers in 2010, 2011 and 2012 and Senior Associate of ICTP, Italy in 2012. He is one of the coordinators of five Erasmus Mundus Mobility with Asia (EMMA) programs (European-Asian mobility program). Dr. Maulik has been the Program Chair, Tutorial Chair and Member of the program committee of many international conferences and workshops. He was the Associate Editors of "IEEE Transaction on Fuzzy Systems" and currently the Associate Editors of "Information Sciences". He is also in the editorial board of many journals including "Protein & Peptide Letters". He has also served as guest co-editors of special issues of journals including "IEEE Transaction on Evolutionary Computation", "Applied Soft Computing" and "Algorithms for Molecular Biology". He is the founder Member of IEEE Computational Intelligence Society (CIS) Kolkata Chapter. Prof. Maulik is a Fellow of Indian National Academy of Engineering (INAE), West Bengal Association of Science and Technology (WAST), Institution of Engineering and Telecommunication Engineers (IETE), and Institution of Engineers, India (IEI). His research interests include Pattern Recognition, Computational Intelligence, Computational Biology, Combinatorial Optimization, Data Mining and Social Network.