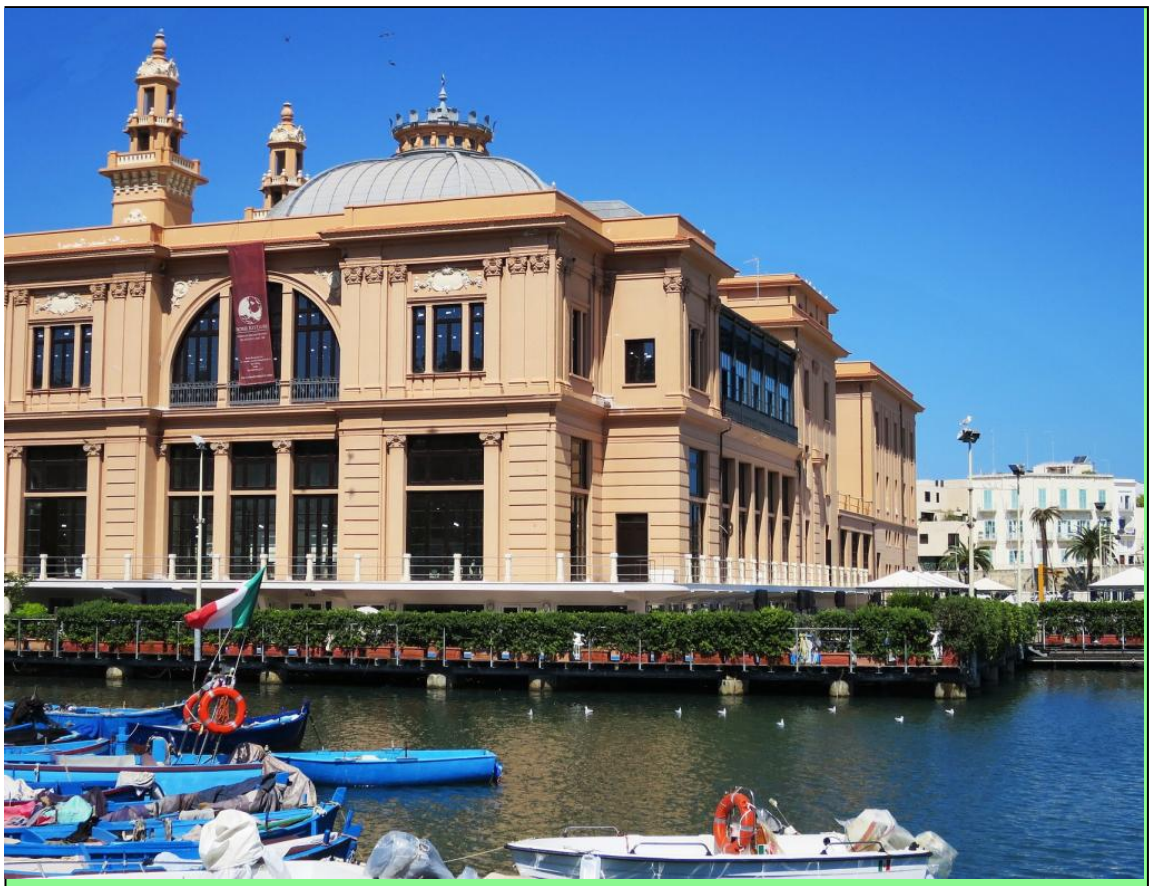

Final Program

The 2020 Sixteenth International Conference on Intelligent Computing

October 10-11, 2020
Bari, Italy

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FINAL PROGRAM

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Outlines

WELCOME MESSAGE FROM GENERAL CHAIRS

The International Conference on Intelligent Computing (ICIC) was started to provide an annual forum dedicated to the emerging and challenging topics in artificial intelligence, machine learning, pattern recognition, bioinformatics, and computational biology. It aims to bring together researchers and practitioners from both academia and industry to share ideas, problems, and solutions related to the multifaceted aspects of intelligent computing.

ICIC 2020, held in Bari, Italy, October 2-5, 2020, constituted the 16th International Conference on Intelligent Computing. It built upon the success of ICIC2019-ICIC 2005 that were held in Nanchang, Wuhan, China, Liverpool, UK, Lanzhou, Fuzhou, Taiyuan, Nanning, Huangshan, Zhengzhou, Changsha, China, Ulsan, Korea, Shanghai, Qingdao, Kunming, and Hefei, China, respectively.

This year, the conference concentrated mainly on the theories and methodologies as well as the emerging applications of intelligent computing. Its aim was to unify the picture of contemporary intelligent computing techniques as an integral concept that highlights the trends in advanced computational intelligence and bridges theoretical research with applications. Therefore, the theme for this conference was “Advanced Intelligent Computing Technology and Applications”. Papers focused on this theme were solicited, addressing theories, methodologies, and applications in science and technology.

ICIC 2020 received 457 submissions from 21 countries and regions. All papers went through a rigorous peer-review procedure and each paper received at least three review reports. Based on the review reports, the Program Committee finally selected 162 high-quality papers for presentation at ICIC 2020, included in three volumes of proceedings published by Springer: two volumes of Lecture Notes in Computer Science (LNCS), and one volume of Lecture Notes in Artificial Intelligence (LNAI).

The organizers of ICIC 2020, including Tongji University, Polytechnic of Bari, Italy, made an enormous effort to ensure the success of the conference. We hereby would like to thank the members of the Program Committee and the referees for their collective effort in reviewing and soliciting the papers. We would like to thank Alfred Hofmann, executive editor from Springer, for his frank and helpful advice and guidance throughout and for his continuous support in publishing the proceedings. In particular, we would like to thank all the authors for contributing their papers. Without the high-quality submissions

from the authors, the success of the conference would not have been possible. Finally, we are especially grateful to the International Neural Network Society, and the National Science Foundation of China for their sponsorship.

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Politecnico di Bari	**Polytechnic of Bari, Italy**
Technically Co-sponsored by	
NSFC National Natural Science Foundation of China	**The National Natural Science Foundation of China**
THE INTERNATIONAL NEURAL NETWORK SOCIETY (INNS)	**The International Neural Network Society**
International Partners	
LIVERPOOL JOHN MOORES UNIVERSITY	**Liverpool John Moores University, Liverpool, UK**
Kazan Federal UNIVERSITY	**Kazan Federal University, RUS**

General Information

I. Conference Working Language

English is the official language of the conference.

II. Conference Registration

The ICIC2020 is going to a fully virtual conference due to COVID-19. All registered participants are welcome to this webinar "ICIC2020 Virtual".

III. Conference Rooms

The used Virtual Meeting is VooV one based on Tencent Cloud, and the website is https://voovmeeting.com/. The three Rooms information are as follows:

- Virtual Room I (2020/10/10: **294 758 368**; 2020/10/11: **302 990 432**)
- Virtual Room II (2020/10/10: **307 855 437**; 2020/10/11: **285 495 414**)
- Virtual Room III (2020/10/10: **754 122 391**; 2020/10/11: **912 361 051**)

IV. Information for Oral Presenters

- Please prepare a 12-minute PowerPoint (PPT) slide. Your actual presentation time may depend on the number of presentations in your session.
- Please check this Final Program for your presentation time and room. Please go to the room five minutes before the session starts and report to the Session Chair.
- Please follow the instructions of the Session Chair(s) not to exceed your time allotted to you by them.
- If the Session Chair(s) is/are absent from the session, the last speaker is requested to serve as the Session Chair.

V. Information for Session Chairs

The Organizing Committee would like to ask for your kind help as Session Chair(s). If you cannot fulfill your duties as session chair, please try to make sure that someone else will take your place as Session Chair(s).

As a Session Chair, you are kindly requested to help at the following:

- Arrive at the room of the session at least 5 minutes before the session starts and identify each of the speakers for the session.
- Calculate and announce the time allocated for each paper in your session for only the authors present before the session starts.
- The time allocated to a paper may be different in different sessions, due to uneven distribution of papers in different areas and a small number of absentees due to visa and other reasons. The suggested time for each presentation is 15 minutes, then request each presenter to talk for no more than 12 minutes, with 3 minutes for question and answers.
- Each oral presentation room is held online via VooV Meeting/Tencent Meeting, please keep the internet open.

Schedule Overview

Date	Afternoon	Evening
October 10 Saturday	**Opening Session** **Keynote speech** **Speaker:** Oscar Cordón **Chair:** Prashan Premaratne 15:30-16:15 pm Room I **Oral Presentation** 16:20-17:20 pm Room I, Room II, Room III **Break, 17:20-17:30 pm** **Oral Presentation** 17:30-18:30 pm Room I, Room II, Room III	**Oral Presentation** 19:30-20:30 pm Room I, Room II, Room III **Break, 20:30-20:40 pm** **Oral Presentation** 20:40-21:40 pm Room I, Room II, Room III
October 11 Sunday	**Keynote speech** **Speaker:** Leandro Pecchia **Chair:** De-Shuang Huang 15:30-16:15 pm Room I **Oral Presentation** 16:20-17:20 pm Room I, Room II, Room III **Break, 17:20-17:30 pm** **Oral Presentation** 17:30-18:30 pm Room I, Room II, Room III	**Oral Presentation** 19:30-20:30 pm Room I, Room II, Room III **Break, 20:30-20:40 pm** **Oral Presentation** 20:40-21:55 pm Room I, Room II, Room III

Introduction of Keynote Speakers

■ Keynote Speaker 1: Oscar Cordón

Computational Intelligence for Skeleton-based Forensic Identification

Oscar Cordón, IEEE Fellow, PhD & Professor
Department of Computer Science and Artificial Intelligence, University of Granada, Spain
Email: ocordon@decsai.ugr.es
Personal website: http://decsai.ugr.es/~ocordon/

Abstract: Skeleton-based forensic identification (SFI) techniques are a sound alternative to other kinds of primary human identification methods when there is not enough ante-mortem (AM) or post-mortem (PM) information as the skeleton usually survives both natural and non-natural decomposition processes. Two of the most important SFI techniques are craniofacial superimposition (CFS) and comparative radiography (CR). CFS aims to overlay a skull with some AM images of a candidate in order to determine if they correspond to the same person. CR considers the AM and PM comparison of other bones and cavities (skull frontal sinuses, clavicles, patellae, …) which have been reported as useful for positive identification based on their individuality and uniqueness.
Designing systematic and automatic methods to support the forensic anthropologist when applying CFS and CR, avoiding the use of subjective, error-prone, and time-consuming manual procedures, is mandatory to enhance forensic identification. The use of computational intelligence (evolutionary algorithms, fuzzy sets and deep learning) and computer vision (3D-2D image registration and image processing) is a natural way to achieve this aim. This talk is devoted to present two intelligent systems for CFS and CR developed in collaboration with the University of Granada's Physical Anthropology Lab within a fifteen years long research project. One of those systems is protected by an international patent, exploited by Panacea Cooperative Research, and is under commercialization in Mexico.
Bio-Sketch: Prof. Oscar Cordón is Full Professor with the University of Granada (UGR) in Spain. He was the founder and leader of the Virtual Learning Centre (2001-05) and Vice-President for Digital University (2015-19) at the UGR. He also was one of the founding researchers of the European Centre for Soft Computing (2006-2011). Prof. Cordón received the IEEE Computational Intelligence Society Outstanding Early Career Award in its 2011 edition, the first such award conferred; the IFSA Award for Outstanding Applications of Fuzzy Technology also in 2011; the Spanish National Award on Computer Science ARITMEL by the Spanish Computer Science Scientific Society (SCIE) in 2014; the IEEE Fellow grade for his contributions to genetic and evolutionary fuzzy systems in 2018, and the International Fuzzy Systems Association Fellow in 2019. He has published more than 370 peer-reviewed scientific publications, including 107 JCR-SCI-indexed journals (36 in D1, 63 in Q1) and a co-authored book published by World Scientific in 2001 with more than 1350 citations in Google Scholar.
He is an IEEE fellow. He has also been involved in the organization of many different conferences: IPC chair of IEEE EFS2006, GEFS2008 and ESTYLF2008; international co-chair of HIS2008; publicity co-chair of IEEE SCCI2009; finance co-chair of IFSA-EUSFLAT 2009; advisory board member of ISDA'09; evolutionary algorithms IPC area chair of IPMU2010; special session co-chair of 2010 IEEE CEC 2010 (WCCI 2010); Fuzzy image, speech, vision and signal processing IPC area chair of Fuzz-IEEE 2011; special session chair of Fuzz-IEEE 2013; program committe co-chair of IFSA2015, program committe co-chair of IEEE CEC 2015, Conference Chair of Fuzz-IEEE 2016 (WCCI 2016), and technical co-chair of IEEE CEC 2017, 2019, and Fuzz-IEEE 2020 (WCCI 2020).

■ Keynote Speaker 2: Leandro Pecchia

Machine Learning for Precision Medicine and Remote Monitoring of Chronic Conditions

Leandro Pecchia, PhD & Reader
University of Warwick, UK
Email: L.Pecchia@warwick.ac.uk
Personal website: https://warwick.ac.uk/fac/sci/eng/people/leandro_pecchia/

Abstract: After briefly introducing the research activity of his lab, Dr Pecchia will provide an overview of his research activities in the area of machine learning and remote health monitoring for the management of chronic conditions. In this talk, Dr Pecchia will present the results of more than 10 years of experience, demonstrating how the evolution of methods and tools have enhanced the application of machine learning in real-life for the control of several conditions, including congestive heart failure, hypertension, mental stress and hypoglycemia.
Finally, Dr Pecchia will provide a quick overview of his current projects on the application of machine learning for enhancing healthcare services in lower-income countries.

Bio-sketch: Leandro Pecchia graduated in Biomedical Engineering in 2005 the University "Federico II" of Naples, where he also received the PhD in Biomedical Engineering in 2009. After a fellowship at the University of Nottingham, in 2013 he joined The University of Warwick, UK, where he is Reader of Biomedical Engineering. In 2014, he founded the Applied Biomedical Signal Processing and Intelligent eHealth Lab (ABSPIE), which he is directing. The lab has fast grown, counting now 5 Senior Research Fellows and 9 PhD students. The lab has successfully been financed with National, European and international competitive research grants, in the area of IoT, AI, big data for health. Dr Pecchia authored more than 150 publications, including peer-reviewed journal articles, book chapters, patent applications and conference papers in the fields of Health Technology Assessment (HTA), clinical engineering, machine learning and biomedical signal processing. Dr Pecchia researches focused on healthy ageing, chronic disease management and adverse events' prediction, medical device design, regulation, maintenance and assessment, with a particular focus to low-resource settings.
Dr Pecchia is Secretary General of the IUPESM, Treasurer of the IFMBE Clinical Engineering Division, and Elected President of the EAMBES. He also served the IFMBE Healthcare Technology Assessment Division as Chair (2015-18) and Treasurer (2012-15).

Parallel Sessions for Oral Presentations

Room / Time	Room I (294 758 368)	Room II (307 855 437)	Room III (754 122 391)
Afternoon Oct. 10 16:20-17:20	**A1:** Evolutionary Computing and Learning **Chair:** Francesco Fontanella	**A10:** Neural Networks **Chair**: Gaoyuan Liang	**B10:** Intelligent Computing in Robotics **Chair**: Basanta Joshi
Afternoon Oct. 10 17:30-18:30	**A15:** Image Processing **Chair**: Daniel Ayala Nio	**A10:** Neural Networks **Chair**: Yong Wu	**B14:** Intelligent Control and Automation **Chair**: Hai-Long Su
Evening Oct. 10 19:30-20:30	**A15:** Image Processing **Chair:** Zhi-Peng Li	**B17:** Intelligent Data Analysis and Prediction **Chair**: Cristian Rodriguez Rivero	**B7:** Machine Learning **Chair**: Chao Wang
Evening Oct. 10 20:40-21:40	**B11:** Intelligent Computing in Computer Vision **Chair**: Xiao-Bo Zhu	**B8:** Knowledge Discovery and Data Mining **Chair**: Haoran Mo	**B8:** Knowledge Discovery and Data Mining **Chair**: Prashan Premaratne
Time	**Room I (302 990 432)**	**Room II (285 495 414)**	**Room III (912 361 051)**
Afternoon Oct. 11 16:20-17:20	**C1:** Gene Expression Array Analysis **Chair:** Zhan-Heng Chen	**C16:** Intelligent Computing in Computational Biology **Chair**: Qin-Hu Zhang	**C2:** Gene Regulation Modeling and Analysis **Chair**: Yin He
Afternoon Oct. 11 17:30-18:30	**C12:** Modeling, Simulation, and Optimization of Biological Systems **Chair**: Lin Yuan	**C16:** Intelligent Computing in Computational Biology **Chair**: Hai-Cheng Yi	**C17:** Intelligent Computing in Drug Design **Chair**: Zhen-Hao Guo
Evening Oct. 11 19:30-20:30	**C3:** Protein-Protein Interaction Prediction **Chair:** Zhen Shen	**SS1:** Special Session on Artificial Intelligence in Biological and Medical Information Procession **Chair**: Si-Guo Wang	**SS8:** Special Session on Intelligent Computing and Swarm Optimization **Chair**: Dan-Ning Lu
Evening Oct. 11 20:40-21:55	**SS6:** Special Session on Machine Learning Techniques in Bioinformatics **Chair**: Qin-Hu Zhang	**SS3:** Special Session on Recent Advances in Swarm Intelligence: Computing and Applications **Chair**: Zhan-Heng Chen	**SS8:** Special Session on Intelligent Computing and Swarm Optimization **Chair**: Zhen Cui

Detailed Parallel Sessions for Oral Presentations

October 10, Saturday, Room I

A1: Evolutionary Computing and Learning

Chair: Francesco Fontanella

Paper 172 **16:20-16:35**	**Identification of cell types from single-cell transcriptomes using a novel clustering framework** Xinguo Lu, Gao Yan, Jinxin L, Keren He, Guanyuan Chen, Qiang Qu
Paper 107 **16:35-16:50**	**Phasor symbiotic organisms search algorithm for global optimization** Fahui Miao, Li Yao, Xiaojie Zhao and Yawen Zheng
Paper 127 **16:50-17:05**	**A novel approach of steganalysis to deal with steganographic algorithm mismatch** Pengfei Shi, Donghui Hu, Gang Zheng, Shuli Zheng, Zhong-qiu Zhao
Paper 613 **17:05-17:20**	**Novel mutation operators of a variable-length representation for EC-based feature selection in high-dimensional data** Vitoantonio Bevilacqua, Nicole Dalia Cilia, Claudio De Stefano, Francesco Fontanella

A15: Image Processing

Chair: Daniel Ayala Nio

Paper 126 **17:30-17:45**	**Component Tree Computation of 2D Images** Rui Tao, Yuqing Song
Paper 235 **17:45-18:00**	**Low Contrast Chinese Rubbing Image Segmentation Based on Gradient Filtering** Zhi-Kai Huang, Huan Wang, Xian-Chang Xi, Yi-Ning Ning, Ling-Ying Hou
Paper 130 **18:00-18:15**	**An Efficient Method for Computation of Entropy and Joint Entropy of Images** Debapriya Sengupta, Phalguni Gupta, Arindam Biswas
Paper 164 **18:15-18:30**	**A Hybrid Convolutional Neural Network for Complex Leaves Identification** Daniel Ayala Niño, Jair Cervantes Canales, Farid García Lamont, Guillermo Calderón Zavala and Joel Ayala de la Vega

A15: Image Processing

Chair: Zhi-Peng Li

Paper 509 **19:30-19:45**	**A Tversky Loss-based Convolutional Neural Network for Liver Vessels Segmentation** Nicola Altini, Berardino Prencipe, Giacomo Donato Cascarano, Antonio Brunetti, Gioacchino Brunetti, Leonarda Carnimeo, Francescomaria Marino, Andrea Guerriero, Laura Villani, Arnaldo Scardapane, Vitoantonio Bevilacqua
Paper 569 **19:45-20:00**	**Accurate and Efficient Traffic Sign Detection with a Guided Region Enlarging Algorithm** Qing Tang, Ge Cao, Kanghyun Jo
Paper 671 **20:00-20:15**	**A Novel Approach based on Region Growing Algorithm for Liver and Spleen Segmentation from CT Scans** Berardino Prencipe, Nicola Altini, Giacomo Donato Cascarano, Antonio Brunetti, Andrea Guerriero, Vitoantonio Bevilacqua
Paper 154 **20:15-20:30**	**Depth Guided Attention for Person Re-identification** Md Kamal Uddin, Antony Lam, Hisato Fukuda, Yoshinori Kobayashi, Yoshinori Kuno

B11: Intelligent Computing in Computer Vision

Chair: Xiao-Bo Zhu

Paper 297 **20:40-20:55**	**Identification of diseases and pests in tomatoplants through artificial vision** Ernesto Garc´ıa Amaro, Jair Cervantes, Josue Espejel Cabrera, Jose Sergio Ruiz Castilla, Farid Garcia Lamont
Paper 299 **20:55-21:10**	**LiDAR-Camera-Based Deep Dense Fusion Robust 3D Object Detection** Lihua Wen, Kang-Hyun Jo

Paper 311 **21:10-21:25**	**Improved Vision Based Pose Estimation for Industrial Robots via Sparse Regression** Diyar Khalis Bilal, Mustafa Unel, Lutfi Taner Tunc
Paper 575 **21:25-21:40**	**Aggregated Deep Saliency Prediction by Self-attention Network** Ge Cao, Qing Tang, Kang-Hyun Jo
October 10, Saturday, Room II	
A10: Neural Networks	
Chair: Gaoyuan Liang	
Paper 216 **16:20-16:35**	**An Improved Conditional Generative Adversarial Network for Microarray Data** Sheng Fang, Fei Han, Wan-Yun Ling, Jing Jiang
Paper 254 **16:35-16:50**	**SharedNet: A Novel Efficient Convolutional Architecture Based on Group Sharing Convolution** Jian-Xun Mi, Feng Jie
Paper 513 **16:50-17:05**	**Image Classification Based on Deep Belief Network and YELM** ChengYong Zhang, Zhengwei Li, Ru Nie, Lei Wang, Huan Zhao
Paper 430 **17:05-17:20**	**Paying Deep Attention to both Neighbors and Multiple Tasks** Gaoyuan Liang, Haoran Mo, Chuxin Wang, Jing-Yan Wang
A10: Neural Networks	
Chair: Yong Wu	
Paper 646 **17:30-17:45**	**Detection of abnormal behavior based on the scene of Anti-Photographing** Zhang Wei, Lin Fan
Paper 576 **17:45-18:00**	**Double Channel Neural Non Invasive Blood Pressure Prediction** Annunziata Paviglianiti, Vincenzo Randazzo, Giansalvo Cirrincione, Eros Pasero
Paper 656 **18:00-18:15**	**Emergency Siren Recognition in Urban Scenarios: Synthetic Dataset and Deep Learning Models** Michela Cantarini, Luca Serafini, Leonardo Gabrielli, Emanuele Principi, Stefano Squartini
Paper 660 **18:15-18:30**	**Shallow neural network for biometrics from the ECG-WATCH** Vincenzo Randazzo, Giansalvo Cirrincione, Eros Pasero
B17: Intelligent Data Analysis and Prediction	
Chair: Cristian Rodriguez Rivero	
Paper 101 **19:30-19:45**	**DAAT: A new method to train convolutional neural network on atrial fibrillation detection** Jian Zhang, Juan Liu, Pei-Fang Li, Jing Feng
Paper 260 **19:45-20:00**	**An Integration Framework for Liver Cancer Subtype Classification and Survival Prediction Based on Multi-Omics Data** Zhonglie Wang, Rui Yan, Jie Liu, Yudong Liu, Fei Ren, Chunhou Zheng, Fa Zhang
Paper 643 **20:00-20:15**	**Phishing Attacks and Websites Classification Using Machine Learning and Multiple Datasets (A Comparative Analysis)** Sohail Ahmed Khan, Wasiq Khan, Abir Hussain
Paper 685 **20:15-20:30**	**Short-term Rainfall Forecasting with E-LSTM recurrent neural networks using small datasets** Cristian Rodriguez Rivero, Julián Pucheta, Daniel Patiño, Paula Otaño, Leonardo Franco, Gustavo Juarez
B8: Knowledge Discovery and Data Mining	
Chair: Haoran Mo	
Paper 693 **20:40-20:55**	**A Second-Order Adaptive Agent Network Model for Social Dynamics in a Classroom Setting** Kasper Nicholas, Eric Zonneveld, Jan Treur
Paper 313 **20:55-21:10**	**Discovery of Cancer Subtypes Based on Stacked Autoencoder** Bo Zhang, Rui-Fen Cao, Jing Wang, Chun-Hou Zheng

Paper 320 **21:10-21:25**	**An Adaptive Seed Node Mining Algorithm Based on Graph Clustering to Maximize the Influence of Social Networks** Tie-Hua Zhou, Bo Jiang, Yu Lu, Ling Wang
Paper 432 **21:25-21:40**	**Joint Deep Recurrent Network Embedding and Edge Flow Estimation** Gaoyuan Liang, Haoran Mo, Zhibo Wang, Chao-Qun Dong, Jing-Yan Wang
October 10, Saturday, Room III	
B10: Intelligent Computing in Robotics	
Chair: Basanta Joshi	
Paper 145 **16:20-16:35**	**Person-Following Shopping Support Robot using Kinect Depth Camera based on 3D Skeleton Tracking** Md Matiqul Islam, Antony Lam, Hisato Fukuda, Yoshinori Kobayashi, Yo-shinori Kuno
Paper 614 **16:35-16:50**	**A new robotic manipulator calibration method of identification kinematic and compliance errors** Phu-Nguyen Le, Hee-Jung Kang
Paper 611 **16:50-17:05**	**An Active Disturbance Rejection Control Method for Robot Manipulators** Thanh Nguyen Truong, Hee-Jun Kang, Anh Tuan Vo
Paper 687 **17:05-17:20**	**Automatic Pose Estimation of Micro Unmanned Aerial Vehicle for Autonomous Landing** Manish Shrestha, Sanjeeb Prasad Panday, Basanta Joshi
B14: Intelligent Control and Automation	
Chair: Hai-Long Su	
Paper 369 **17:30-17:45**	**Fuzzy PID Controller for Adaptive Current Sharing of Energy Storage System in DC Microgrid** Duy-Long Nguyen, Hong-Hee Lee
Paper 574 **17:45-18:00**	**A Fault Tolerant Control for Robotic Manipulators using Adaptive Non-singular Fast Terminal Sliding Mode Control Based on Neural Third Order Sliding Mode Observer** Van-Cuong Nguyen, Hee-Jun Kang
Paper 603 **18:00-18:15**	**A Fast Terminal Sliding Mode Control Strategy for Trajectory Tracking Control of Robotic Manipulators** Anh Tuan Vo, Hee-Jun Kang, Thanh Nguyen Truong
Paper 341 **18:15-18:30**	**Deep Learning based Fingerprints Reduction Approach for Visible Light-based Indoor Positioning System** Huy Q. Tran, Cheolkeun Ha
B7: Machine Learning	
Chair: Chao Wang	
Paper 167 **19:30-19:45**	**Multi-stage Hierarchical Clustering method based on Hypergraph** Yue Xi, Yonggang Lu
Paper 582 **19:45-20:00**	**BP Neural Network based Deep Non-Negative Matrix Factorization for Image Clustering** Qianwen Zeng, Wen-Sheng Chen, Binbin Pan
Paper 234 **20:00-20:15**	**Feature Extraction and Random Forest to Identify Sheep Behavior from Accelerometer Data** Natasa Kleanthous, Abir Hussain, Wasiq Khan, Jenny Sneddon, Alex Mason
Paper 409 **20:15-20:30**	**Notes on supervisory control of fuzzy discrete event systems** Chongqing Lin, Daowen Qiu
B8: Knowledge Discovery and Data Mining	
Chair: Prashan Premaratne	
Paper 321 **20:40-20:55**	**Wavelet-based Emotion Recognition Using Single Channel EEG Device**

	Tie Hua Zhou, Wen Long Liang, Hang Yu Liu, Wei Jian Pu, Ling Wang
Paper 322 **20:55-21:10**	**Dense Subgraphs Summarization: An Efficient Way to Summarize Large Scale Graphs by Super Nodes** Ling Wang, Yu Lu, Bo Jiang, Kai Tai Gao, Tie Hua Zhou
Paper 657 **21:10-21:25**	**A Meta graph-based Top-k similarity measure for heterogeneous information networks** Xiangtao Chen, Yonghong Jiang, Yubo Wu, Xiaohui Wei, Xinguo Lu
Paper 156 **21:25-21:40**	**Towards a Universal Steganalyser Using Convolutional Neural Networks** Inas Jawad Kadhim, Prashan Premaratne, Peter James Vial, Osamah M. Al-Qershi
October 11, Sunday, Room I	
C1: Gene Expression Array Analysis	
Chair: Zhan-Heng Chen	
Paper 289 **16:20-16:35**	**Tumor gene selection and prediction via supervised correlation analysis based F-score method** Jia-Jun Cheng, Bo Li
Paper 395 **16:35-16:50**	**A machine learning based method to identify differentially expressed genes** Bolin Chen, Li Gao, Xuequn Shang
Paper 675 **16:50-17:05**	**Multi-omics classification on kidney samples exploiting uncertainty-aware models** Marta Lovino, Gianpaolo Bontempo, Giansalvo Cirrincione, Elisa Ficarra
Paper 378 **17:05-17:20**	**Identification and Analysis of Genes Involved in Stages of Colon Cancer** Bolin Chen, Teng Wang, Xuequn Shang
C12: Modeling, Simulation, and Optimization of Biological Systems	
Chair: Lin Yuan	
Paper 463 **17:30-17:45**	**A Network-driven Approach for LncRNA-Disease Association Mapping** Lin Yuan, Tao Sun, Jing Zhao, Xin-Gang Wang
Paper 286 **17:45-18:00**	**Take it or Leave it: A Computational Model for Flexibility in Decision-Making in Downregulating Negative Emotions** Nimat Ullah, Jan Treur
Paper 511 **18:00-18:15**	**WGMFDDA: A Novel Weighted-based Graph Regularized Matrix Factorization for Predicting Drug-Disease Associations** Mei-Neng Wang, Zhu-Hong You, Li-Ping Li, Zhan-Heng Chen, Xue-Jun Xie
Paper 308 **18:15-18:30**	**A Highly Efficient Biomolecular Network Representation Model for Predicting Drug-Disease Associations** Han-Jing Jiang, Zhu-Hong You, Zhen-Hao Guo, Kai-Zheng, Bo-Ya Ji, Leon Wong
C3: Protein-Protein Interaction Prediction	
Chair: Zhen Shen	
Paper 333 **19:30-19:45**	**Prediction of membrane protein interaction based on deep residual learning** Tengsheng Jiang, Hongjie Wu, Yuhui Chen, Haiou Li, Jin Qiu, Weizhong Lu, Qiming Fu
Paper 453 **19:45-20:00**	**GCNSP: A Novel Prediction Method of Self-interacting Proteins Based on Graph Convolutional Networks** Lei Wang, Zhu-Hong You, Xin Yan, Kai Zheng, Zheng-Wei Li
Paper 288 **20:00-20:15**	**A MapReduce-based parallel Random Forest approach for predicting large-scale protein-protein interactions** Bo-Ya Ji, Zhu-Hong You, Han-Jing Jiang, Hao-Yuan Li, Zhan-Heng Chen
Paper 219 **20:15-20:30**	**A Novel Improved Algorithm for Protein Classification Through a Graph Similarity Approach** Hsin-Hung Chou, Ching-Tien Hsu, Hao-Ching Wang, Sun-Yuan Hsieh
SS6: Special Session on Machine Learning Techniques in Bioinformatics	
Chair: Qin-Hu Zhang	

Paper 568 **20:40-20:55**	**A Novel Computational Method for Predicting LncRNA-disease Associations from Heterogeneous Information Network with SDNE Embedding Model** Ping Zhang, Bo-Wei Zhao, Li-Guang Huang, Zhu-Hong You, Zhen-Hao Guo, Hai-Cheng Yi
Paper 639 **20:55-21:10**	**Expression and gene regulation network of ELF3 in Breast invasive carcinoma based on data mining** Chenxia Ren, Pengyong Han, Chandrasekhar Gopalakrishnan, Caixia Xu, Rajasekaran Ramalingam, Zhengwei Li
Paper 678 **21:10-21:25**	**Embracing Disease Progression with a Learning System for Real World Evidence Discovery** Zefang Tang, Xu Min, Yuan Zhang, Jing Mei, Kenney Ng, Shaochun Li, Lun Hu, Pengwei Hu, Zhuhong You
Paper 523 **21:25-21:40**	**Robust Graph Regularized Extreme Learning Machine Auto Encoder and Its Application to Single-cell Samples Classification** Liang-Rui Ren, Jin-Xing Liu, Ying-Lian Gao, Xiang-Zhen Kong, Chun-Hou Zheng
Paper 580 **21:40-21:55**	**A Novel Stochastic Block Model for Network-based Prediction of Protein-protein Interactions** Xiaojuan Wang, Pengwei Hu, Lun Hu

October 11, Sunday, Room II

C16: Intelligent Computing in Computational Biology

Chair: Qin-Hu Zhang

Paper 190 **16:20-16:35**	**Predicting human disease-associated piRNAs based on multi-source information and Random Forest** Kai Zheng, Zhu-Hong You, Lei Wang, Hao-Yuan Li, Bo-Ya Ji
Paper 191 **16:35-16:50**	**Inferring Disease-Associated Piwi-Interacting RNAs via Graph Attention Networks** Kai Zheng, Zhu-Hong You, Lei Wang, Leon Wong, Zhan-Heng Chen
Paper 315 **16:50-17:05**	**LncRNA-disease Association Prediction based on Graph Neural Networks and Inductive Matrix Completion** Lin Yuan, Tao Sun, Jing Zhao, Xin-Gang Wang
Paper 317 **17:05-17:20**	**Prediction of lncRNA-miRNA Interactions via an Embedding learning Graph Factorize in Heterogeneous Information network** Ji-Ren Zhou, Zhu-Hong You, Li Cheng, Hao-Yuan Li

C16: Intelligent Computing in Computational Biology

Chair: Hai-Cheng Yi

Paper 428 **17:30-17:45**	**Identification of Human LncRNA-Disease Association by Fast Kernel Learning-based Kronecker Regularized Least Squares** Wen Li, ShuLin Wang, Junlin Xu, Jialiang Yang
Paper 518 **17:45-18:00**	**Identification of Autistic Risk Genes using Developmental Brain Gene Expression Data** Zhi-An Huang, Yu-An Huang, Zhu-Hong You
Paper 307 **18:00-18:15**	**Prediction of lncRNA-disease associations from heterogeneous information network based on DeepWalk embedding model** Xiao-Yu Song, Tong Liu, Ze-Yang Qiu, Zhu-Hong You, Yue Sun, Li-Ting Jin, Xiao-Bei Feng, Lin Zhu
Paper 650 **18:15-18:30**	**A Unified Deep Biological Sequence Representation Learning with Pretrained Encoder-Decoder Model** Hai-Cheng Yi, Zhu-Hong You, Xiao-Rui Su, De-Shuang Huang, Zhen-Hao Guo

SS1: Special Session on Artificial Intelligence in Biological and Medical Information Procession

Chair: Si-Guo Wang

Paper 259 **19:30-19:45**	**CT scan synthesis for promoting computer-aided diagnosis capacity of COVID-19** Heng Li, Yan Hu, Sanqian Li, Wenjun Lin, Peng Liu, Risa Higashita, Jiang Liu
Paper 617 **19:45-20:00**	**A novel plastic neural model with dendritic computation for classification problems** Junkai Ji, Cheng Tang, Jiajun Zhao, Shuangbao Song
Paper 625 **20:00-20:15**	**Improving approximate logic neuron model by means of a novel learning algorithm** Junkai Ji, Jiajun Zhao, Cheng Tang, Ying He
Paper 452 **20:15-20:30**	**Detection of COVID-19 by GoogLeNet-COD** Xiang Yu, Shui-Hua Wang, Xin Zhang, Yu-Dong Zhang
SS3: Special Session on Recent Advances in Swarm Intelligence: computing and applications	
Chair: Zhan-Heng Chen	
Paper 314 **20:40-20:55**	**A Novel Hybrid Algorithm Based on Bacterial Foraging Optimization and Grey Wolf Optimizer** Xiaobing Gan, Baoyu Xiao
Paper 377 **20:55-21:10**	**A Novel Hybrid Bacterial Foraging Optimization Algorithm Based on Reinforcement Learning** Ben Niu, Churong Zhang, Kaishan Huang
Paper 597 **21:10-21:25**	**Improved Water Cycle Algorithm and K-means Based Method for Data Clustering** Huan Liu, Ben Niu
Paper 467 **21:25-21:40**	**Predicting LncRNA-miRNA Interactions via Network Embedding with Integrated Structure and Attribute Information** Bo-Wei Zhao, Ping Zhang, Zhu-Hong You, Zhan-Heng Chen, Zhen-Hao Guo, Hai-Cheng Yi, Li-Guang Huang, Yan-Bin Wang
Paper 345 **21:40-21:55**	**A Novel Computational Approach for Predicting Drug-Target Interactions via Network Representation Learning** Xiao-Rui Su, Zhu-Hong You, Ji-Ren Zhou, Hai-Cheng Yi, Zhen-Hao Guo.
October 11, Sunday, Room III	
C2: Gene Regulation Modeling and Analysis	
Chair: Yin He	
Paper 293 **16:20-16:35**	**A network embedding-based method for predicting miRNA-disease associations by integrating multiple information** Hao-Yuan Li, Zhu-Hong You, Kai Zheng, Zhan-Heng Chen, Bo-Ya Ji
Paper 303 **16:35-16:50**	**Biomarkers selection of abnormal functional connections in Schizophrenia with $l_{2,1\text{-}2}$-norm based sparse regularization feature selection method** Na Gao, Chen Qiao, Jian Chen
Paper 373 **16:50-17:05**	**Inference method for reconstructing regulatory networks using statistical path-consistency algorithm and mutual information** Yan Yan, Xinan Zhang, Tianhai Tian
Paper 379 **17:05-17:20**	**Exploring lncRNA-mRNA regulatory modules based on lncRNA similarity in breast cancer** Lei Tian, Shulin Wang
C17: Intelligent Computing in Drug Design	
Chair: Zhen-Hao Guo	
Paper 462 **17:30-17:45**	**DTIFS: A novel computational approach for predicting drug-target interactions from drug structure and protein sequence** Xin Yan, Lei Wang, Zhu-Hong You, Li-Ping Li, Kai Zheng, Mei-Neng Wang
Paper 555 **17:45-18:00**	**HGAlinker: drug-disease association prediction based on attention mechanism of heterogeneous graph** Xiaozhu Jing, Wei Jiang, Yadong Wang, Junyi Li

000Paper 170 18:00-18:15	**An Efficient Computational Method to Predict Drug-target Interactions utilizing Structural Perturbation Method** Xinguo Lu, Fang Liu, Li Ding, Xinyu Wang, Jinxin Li, Yue Yuan
Paper 362 18:15-18:30	**Inferring Drug-miRNA Associations by Integrating Drug SMILES and MiRNA sequence information** Zhen-Hao Guo, Zhu-Hong You, Li-Ping Li, Zhan-Heng Chen, Hai-Cheng Yi, Yan-Bin Wang
SS8: Special Session on Intelligent Computing and Swarm Optimization	
Chair: Dan-Ning Lu	
Paper 318 19:30-19:45	**An Analysis of K-Means, Particle Swarm Optimization and Genetic Algorithm with Data Clustering Technique** Maja Gulan, Chen Guo
Paper 607 19:45-20:00	**A Short Survey of Multi-objective Immune Algorithm Based on Clonal Selection Principle** Lingjie Li, Qiuzhen Lin, Zhong Ming
Paper 616 20:00-20:15	**Adaptive Artificial Immune System for Biological Network Alignment** Shiqiang Wang, Lijia Ma, Xiao Zhang
Paper 623 20:15-20:30	**A Novel Decomposition-Based Multimodal Multi-Objective Evolutionary Algorithm** Wu Lin, Yuan Li, Naili Luo
SS8: Special Session on Intelligent Computing and Swarm Optimization	
Chair: Zhen Cui	
Paper 627 20:40-20:55	**GTCN: Dynamic Network Embedding Based On Graph Temporal Convolution Neural Network** Zhichao Huang, Jingkuan Zhang, Lijia Ma, Fubing Mao
Paper 631 20:55-21:10	**Resource Scheduling Algorithm based on Evolutionary Computation in Dynamic Cloud Environment** Qiyuan Yu, ShenZhong, NailiLuo, Peizhi Huang
Paper 637 21:10-21:25	**An Ensemble Classification Technique for Intrusion Detection based on Dual Evolution** Qiuzhen Lin, Chao Hu, Shuo Chen, Peizhi Huang
Paper 588 21:25-21:40	**Gingivitis detection by Fractional Fourier Entropy and Standard Genetic Algorithm** Yan Yan, Elijah Nguyen

The 2020 Sixteenth International Conference on Intelligent Computing
Bari, Italy, October 10-11, 2020

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