

# **2020 IEEE 19th International Conference on Cognitive Informatics & Cognitive Computing (ICCI\*CC 2020)**

**Beijing, China  
26 – 28 September 2020**



**IEEE Catalog Number: CFP20312-POD  
ISBN: 978-1-7281-9595-7**

**Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP20312-POD
ISBN (Print-On-Demand):	978-1-7281-9595-7
ISBN (Online):	978-1-7281-9594-0

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# Table of Contents

<b>Preface</b>	<b>iii</b>
<b>Conference Organization</b>	<b>iv</b>
<b>Table of Contents</b>	<b>vi</b>
<b>Keynotes</b>	<b>1</b>
<b>Complex Networks</b>	<b>1</b>
<i>Prof. Ljiljana Trajkovic</i>	
<b>A Hybrid Brain-Inspired Computing Architecture towards Artificial General Intelligence</b>	<b>2</b>
<i>Prof. Luping Shi</i>	
<b>Human Capability Augmentation through Cognitive and Autonomous Systems</b>	<b>3</b>
<i>Dr. Ming Hou</i>	
<b>Intelligent Mathematics (IM): Indispensable Mathematical Means for General AI, Autonomous Systems, Deep Knowledge Learning, Cognitive Robots, and Intelligence Science</b>	<b>4</b>
<i>Prof. Yingxu Wang</i>	
<b>Towards Energy-Efficient Systems for Artificial Intelligence in the Future</b>	<b>5</b>
<i>Prof. Yu Wang</i>	
<b>Session A1 - Cognitive Systems</b>	<b>6</b>
<b>The Cognitive and Mathematical Foundations of Analytic Epidemiology</b>	<b>6</b>
<i>Yingxu Wang, Kostas N. Plataniotis, Jane Z. Wang, Ming Hou, Mengchu Zhou, Newton Howard, Jun Peng, Runhe Huang, Shushma Patel, and Du Zhang</i>	
<b>Predicting the Retweet Level of COVID-19 Tweets with Neural Network Classifier</b>	<b>15</b>
<i>Zhen Qu and Zhen Ding</i>	
<b>Improvement of Data Fusion with Threading Technology in Home UbiHealth</b>	<b>21</b>
<i>John Sarivougioukas and Aristides Vagelatos</i>	
<b>Research on Resource Hierarchical Scheduling Based on multiple QoS for IoT</b>	<b>27</b>
<i>Chunguang Zhang, Guangping Zeng, Zhiying Ren and Xuyan Tu</i>	
<b>Heart Rate Analysis for Pre-performance Routine in Darts Game</b>	<b>34</b>
<i>Hironori Hiraishi</i>	
<b>A Cognitive Model of the Tactile Vibration Sense and Experiments on a Touch Simulation System</b>	<b>39</b>
<i>Junjie Bai, Jiajie Li, Jun Peng, Kan Luo, Shuai Gao, Jianfeng Cai and Yingxu Wang</i>	
<b>Analysis of a New 3-D Chaotic System with a Self-Excited Attractor</b>	<b>45</b>
<i>Shaochun Zhang, Jun Peng, Shangzhu Jin and Shuangquan Gu</i>	
<b>SAPCGAN: Self-Attention based Generative Adversarial Network for Point Clouds</b>	<b>52</b>
<i>Yushi Li and George Baci</i>	
<b>Session A2 - Cognitive Machine Learning</b>	<b>60</b>
<b>A Deep Learning-Based Approach for Quality Control and Defect Detection for Industrial Bagging Systems</b>	<b>60</b>
<i>Mathieu Juncker, Ismail Khriess, Jean Brousseau, Steven Pigeon, Alexis Darisse and Billy Lapointe</i>	
<b>EEG Signals Feature Extraction and Artificial Neural Networks Classification for The Diagnosis of Schizophrenia</b>	<b>68</b>
<i>Lei Zhang</i>	
<b>Early Detection Method for Subclinical Mastitis in Auto Milking Systems Using Machine Learning</b>	<b>76</b>
<i>Haruka Motohashi, Hayato Ohwada and Chikara Kubota</i>	
<b>Local Learning in Point Clouds based on Spectral Pooling</b>	<b>84</b>
<i>Yushi Li and George Baci</i>	

Practicable Strategy of High-Dimensional Multi-objective Coevolution <i>Hongbo Wang, Wei Huang, Kena Tian and Xuyan Tu</i>	92
QAM: Question Answering System Based on Knowledge Graph in the Military <i>Xueling Dai, Jike Ge, Hongyue Zhong, Dong Chen and Jun Peng</i>	100
Specific Time Embedding for Temporal Knowledge Graph Completion <i>Runyu Ni, Zhonggui Ma, Kaihang Yu and Xiaohan Xu</i>	105
Improving Motor Imagery EEG Classification by CNN with Data Augmentation <i>Bin Du, Yue Liu and Geliang Tian</i>	111
<b>Session B1 – Cognitive Informatics</b>	<b>119</b>
A Neural Network Based Algorithm Selector for Radar Task Scheduling <i>Zhen Qu, Zhen Ding and Peter Moo</i>	119
Exploring Lexical Irregularities in Hypothesis-Only Models of Natural Language Inference <i>Qingyuan Hu, Yi Zhang, Kanishka Misra and Julia Rayz</i>	125
Designing a Cost Function to Assess a Neural Network to Detect Distributed Denial of Service Attacks <i>Maryam Ghanbari and Witold Kinsner</i>	131
Power Allocation for Maritime Cognitive Satellite-UAV-Terrestrial Networks <i>Xinran Fang, Yanmin Wang, Wei Feng, Yunfei Chen and Bo Ai</i>	139
Misspelling Correction with Pre-trained Contextual Language Model <i>Yifei Hu, Xiaonan Jing, Youlim Ko and Julia Rayz</i>	144
Modeling Brain-like Association Among Focal Visual Objects by a Bipartite Mesh <i>Jinxin Yang, Xin Hu, Yufei Zhao, Qi Xu and Wen-Chi Yang</i>	150
Simulation Analysis of Epidemic Trend for COVID-19 Based on SEIRS Model <i>Jike Ge, Lanzhu Zhang, Zuqin Chen and Jun Peng</i>	158
Research on Iterative Receiving Algorithm for Aviation Communication System <i>Di Wang, Sheng Wu, Yuehong Gao and Lin Sang</i>	162
<b>Session B2 – Cognitive Computing</b>	<b>169</b>
Data Augmentation Methods and their Effects on Long-Range Dependence <i>Maryam Ghanbari and Witold Kinsner</i>	169
Heatmap-Based Method for Estimating Drivers' Cognitive Distraction <i>Antonyo Musabini and Mounsiif Chetitah</i>	179
Formal Software Requirement Elicitation based on Semantic Algebra and Cognitive Computing <i>Yifan Xu and Yingxu Wang</i>	187
A Cognitive Model Based Framework and Multi-layer Storage Architecture for Associative Memory <i>Jiandong Li, Runhe Huang and Kevin I-Kai Wang</i>	195
QPA*: Design of a Searching and Path Planning Algorithm for Intelligent Agents in Two Dimensions <i>Brian García Sarmina and Georgii Khachaturov</i>	202
An Emprical Study of Underlying Cognitive Factors in Complex Problem Solving Collaboration <i>Yingting Chen, Taro Kanno and Kazuo Furuta</i>	210
Safety Helmet Detection Algorithm based on Color and HOG Features <i>Miao Jin, Jun Zhang, Xiwen Chen, Quan Wang, Bing Lu, Wei Zhou, Gaoning Nie and Xu Wang</i>	215
Optimized design pattern matrix of PDMA based on binary particle swarm optimization for 5G <i>Kun Lu, Sheng Wu and Hongwen Yang</i>	220
Prediction of Fatality Crashes with Multilayer Perceptron of Crash Record Information System Datasets <i>Thanh Hung Duong, Fengxiang Qiao, Jyh-Haw Yeh and Yunpeng Zhang</i>	225
<b>Additional Paper</b>	<b>230</b>
Applying ML Algorithms to Improve Traffic Classification in Intrusion Detection Systems <i>L. N. Reddy, S. Butakov and P. Zavorsky</i>	230
<b>Author Index</b>	<b>236</b>