

2019 International Conference on Cyberworlds (CW 2019)

**Kyoto, Japan
2 – 4 October 2019**



**IEEE Catalog Number: CFP19314-POD
ISBN: 978-1-7281-2298-4**

**Copyright © 2019 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:	CFP19314-POD
ISBN (Print-On-Demand):	978-1-7281-2298-4
ISBN (Online):	978-1-7281-2297-7
ISSN:	2642-357X

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
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2019 International Conference on Cyberworlds (CW) CW 2019

Table of Contents

Message from the Chairs	xiv
Organizing Committee	xv
International Program Committee	xvi
External Reviewers	xx

General Track

AR/VR

Development of Easy Attachable Biological Information Measurement Device for Various Head Mounted Displays	1
<i>Masahiro Inazawa (The University of Tokyo) and Yuki Ban (The University of Tokyo)</i>	
An Efficient Diminished Reality Approach Using Real-Time Surface Reconstruction	9
<i>Christian Kunert (Ilmenau University of Technology), Tobias Schwandt (Ilmenau University of Technology), and Wolfgang Broll (Ilmenau University of Technology)</i>	
Mixed Reality User Interface for Astronauts Procedure Viewer	17
<i>Kaj Helin (VTT Technical Research Centre of Finland Ltd, Finland), Jaakko Karjalainen (VTT Technical Research Centre of Finland Ltd, Finland), Paul Kiernan (SKYTEK Ltd Dublin, Ireland), Mikael Wolff (ESTEC), and David Martinez Oliveira (ESTEC)</i>	
ParaVR: Paramedic Virtual Reality Training Simulator	21
<i>Neil Vaughan (University of Chester), Nigel John (University of Chester), and Nigel Rees (Welsh Ambulance Services NHS Trust)</i>	
CPR Virtual Reality Training Simulator for Schools	25
<i>Neil Vaughan (University of Chester), Nigel John (University of Chester), and Nigel Rees (Welsh Ambulance Services NHS Trust)</i>	

Media Creation

Flexible Indoor Scene Synthesis via a Multi-object Particle Swarm Intelligence Optimization Algorithm and User Intentions	29
<i>Yuerong Li (Beijing Normal University), Xingce Wang (Beijing Normal University), Zhongke Wu (Beijing Normal University), Shaolong Liu (Beijing Normal University), and Mingquan Zhou (Beijing Normal University)</i>	

Stylized Line Drawing of 3D Models using CNN	37
<i>Mitsuhiro Uchida (Tokyo Institute of Technology) and Suguru Saito (Tokyo Institute of Technology)</i>	
Making of The Dark Anim: Technical and Scientific Notes	45
<i>Monica Zoppè (Scientific Visualization Unit IFC - CNR), Tiziana Loni (Scientific Visualization Unit, IFC – CNR, Pisa, Italy), Ilaria Carlone (Scientific Visualization Unit, IFC – CNR, Pisa, Italy), and Stefano Cianchetta (Scientific Visualization Unit, IFC – CNR, Pisa, Italy)</i>	
Semi-Automatic Creation of an Anime-Like 3D Face Model from a Single Illustration	53
<i>Takayuki Niki (Saitama University) and Takashi Komuro (Saitama University)</i>	
Music in the Air with Leap Motion Controller	57
<i>Alexei Sourin (Nanyang Technological University)</i>	

Media Retrieval & Estimation

Visual Saliency Prediction in Dynamic Virtual Reality Environments Experienced with Head-Mounted Displays: An Exploratory Study	61
<i>Dilara Albayrak (TED University), Mehmet Bahadir Askin (Hacettepe University), Tolga K. Capin (TED University), and Ufuk Celikkan (Hacettepe University)</i>	
Query by Partially-Drawn Sketches for 3D Shape Retrieval	69
<i>Shutaro Kuwabara (University of Yamanashi), Ryutarou Ohbuchi (University of Yamanashi), and Takahiko Furuya (University of Yamanashi)</i>	
A Harmonic Wave Kernel Signature for Three-Dimensional Skull Similarity Measurements	77
<i>Dan Zhang (Beijing Normal University), Zhongke Wu (Beijing Normal University), Xingce Wang (Beijing Normal University), Chenlei Lv (Beijing Normal University), and Mingquan Zhou (Beijing Normal University)</i>	
Bird Species Classification with Audio-Visual Data using CNN and Multiple Kernel Learning	85
<i>Naranchimeg Bold (Iwate University, Japan), Chao Zhang (University of Fukui, Japan), and Takuya Akashi (Iwate University, Japan)</i>	
A Tangible Interface using 3D Printed Figures for Searching for Combat Motions of Two Characters	89
<i>Kouhei Hino (Kyushu Institute of Technology) and Masaki Oshita (Kyushu Institute of Technology)</i>	

Industry 4.0 & Smart Manufacturing

Modeling Distributed Stream Processing Systems Under Heavy Workload	93
<i>Qureshi Muhammad Mudassar (Huazhong University of Science and Technology), Hanhua Chen (Huazhong University of Science and Technology), and Hai Jin (Huazhong University of Science and Technology)</i>	

Detection Defect in Printed Circuit Boards using Unsupervised Feature Extraction Upon Transfer Learning	101
<i>Ihar Volkau (Nanyang Technological University), Mujeeb Abdul (Nanyang Technological University), Wenting Dai (Nanyang Technological University), Marius Erdt (Nanyang Technological University), and Alexei Sourin (Nanyang Technological University)</i>	
Automatic Furniture Layout Based on Functional Area Division	109
<i>Bailin Yang (Zhejiang Gongshang University), Liuliu Li (Zhejiang Gongshang University), Chao Song (Zhejiang Gongshang University), Zhaoyi Jiang (Zhejiang Gongshang University), and Yun Ling (Zhejiang Gongshang University)</i>	
Vehicle Rear-Lamp Detection at Nighttime via Probabilistic Bitwise Genetic Algorithm	117
<i>Takumi Nakane (University of Fukui, Japan), Tatsuya Takeshita (University of Fukui, Japan), Shogo Tokai (University of Fukui, Japan), and Chao Zhang (University of Fukui, Japan)</i>	

Multimodal Interaction

Composite Sketch Recognition Using Multi-scale Hog Features and Semantic Attributes	121
<i>Xinying Xue (Hangzhou Dianzi University, China), Jiayi Xu (Hangzhou Dianzi University, China), and Xiaoyang Mao (University of Yamanashi, Japan)</i>	
Combining Tendon Vibration and Visual Stimulation Enhances Kinesthetic Illusions	128
<i>Daiki Hagimori (Nara Institute of Science and Technology, Japan), Naoya Isoyama (Nara Institute of Science and Technology, Japan), Shunsuke Yoshimoto (The University of Tokyo, Japan), Nobuchika Sakata (Nara Institute of Science and Technology, Japan), and Kiyoshi Kiyokawa (Nara Institute of Science and Technology, Japan)</i>	
Chronic Stress Level Estimation Focused on Motion Pattern Changes Acquired from Seat Pressure Distribution	135
<i>Masanori Kuroha (The University of Tokyo), Yuki Ban (The University of Tokyo), Rui Fukui (The University of Tokyo), and Shin'ichi Warisawa (The University of Tokyo)</i>	
Inducing Simple Actions While Working by Generating Tactile Apparent Motion	143
<i>Yuki Ashida (The University of Tokyo), Yuki Ban (The University of Tokyo), Rui Fukui (The University of Tokyo), and Shin'ichi Warisawa (The University of Tokyo)</i>	

Modeling & Rendering

Automated Generation of Roofs by Straight Skeleton with Line Segment Event	N/A
<i>Kenichi Sugihara (Gifu Kyoritsu University), Takahiro Murase (ChukyoGakuin University), and Zhenjiang Shen (Kanazawa University)</i>	
Realistic Folded Surface Modeling from Sketching	155
<i>Yufei Zheng (Tokyo Institute of Technology), Hatsu Shi (Tokyo Institute of Technology), and Suguru Saito (Tokyo Institute of Technology)</i>	

Simulation Controlling Method for Generating Desired Water Caustics	163
<i>Kenta Suzuki (Institute of Advanced Media Arts and Sciences, Japan), Makoto Fujisawa (University of Tsukuba, Japan), and Masahiko Mikawa (University of Tsukuba, Japan)</i>	
Social Computing and Older Adults: Challenges with Data Loss and Digital Legacies	171
<i>Derani Dissanayake (Edith Cowan University, Australia) and David Cook (Edith Cowan University, Australia)</i>	

Special Session: AR/VR for the Vision Impaired

Computational Alleviation of Homonymous Visual Field Defect with OST-HMD: The Effect of Size and Position of Overlaid Overview Window	175
<i>Xi Zhao (Keio University), Kentaro Go (University of Yamanashi), Kenji Kashiwagi (University of Yamanashi), Masahiro Toyoura (University of Yamanashi), Xiaoyang Mao (University of Yamanashi), and Issei Fujishiro (Keio University)</i>	
Eyes-Free Text Entry with EdgeWrite Alphabets for Round-Face Smartwatches	183
<i>Kentaro Go (University of Yamanashi), Mei Kikawa (University of Yamanashi), Yuichiro Kinoshita (University of Yamanashi), and Xiaoyang Mao (University of Yamanashi)</i>	
Visual Assessment of Distorted View for Metamorphopsia Patient by Interactive Line Manipulation	187
<i>Hirohichi Ichige (University of Yamanashi), Masahiro Toyoura (University of Yamanashi), Kentaro Go (University of Yamanashi), Kenji Kashiwagi (University of Yamanashi), Issei Fujishiro (Keio University), and Xiaoyang Mao (University of Yamanashi)</i>	

Cognitive Human-Machine Interaction Track

Machine-Assisted Cognitive Enhancement

On the Ethnic Classification of Pakistani Face using Deep Learning	191
<i>Shelina Khalid Jilani (University of Bradford), Hassan Ugail (University of Bradford), Ali Maina Bukar (University of Bradford), and Andrew Logan (Glasgow Caledonian University)</i>	
Modified Bat Algorithm with Local Search for Fractal Image Compression of Bitmap Images	199
<i>Akemi Gálvez (Toho University, Japan & University of Cantabria, Spain) and Andrés Iglesias (Toho University, Japan & University of Cantabria, Spain)</i>	
La Petite Fee Cosmo: Learning Data Structures Through Game-Based Learning	207
<i>Vinayak Teoh Kannappan (Nanyang Technological University), Owen Noel Newton Fernando (Nanyang Technological University), Anupam Chattopadhyay (Nanyang Technological University), Xavier Tan (Nanyang Technological University), Jeffrey Yan Jack Hong (Nanyang Technological University), Hock Soon Seah (Nanyang Technological University), and Hui En Lye (Nanyang Technological University)</i>	

Applying Firefly Algorithm to Data Fitting for the Van der Waals Equation of State with Bézier Curves	211
<i>Almudena Campuzano (Oregon State University, USA & University of Cantabria, Spain), Andrés Iglesias (Toho University, Japan & University of Cantabria, Spain), and Akemi Gálvez (Toho University, Japan & University of Cantabria, Spain)</i>	
Multi-modal Recognition of Mental Workload Using Empirical Mode Decomposition and Semi-Supervised Learning	215
<i>Jianhua Zhang (Oslo Metropolitan University) and Jianrong Li (East China University of Science and Technology)</i>	

Brain Computer Interface

Detection of Humanoid Robot Design Preferences Using EEG and Eye Tracker	219
<i>Yisi Liu (Fraunhofer Singapore), Fan Li (Nanyang Technological University), Lin Hei Tang (Nanyang Technological University), Zirui Lan (Fraunhofer Singapore, Nanyang Technological University), Jian Cui (Fraunhofer Singapore, Nanyang Technological University), Olga Sourina (Fraunhofer Singapore, Nanyang Technological University), and Chun-Hsien Chen (Nanyang Technological University)</i>	
Idle-State Detection in Multi-user Motor Imagery Brain Computer Interface with Cross-Brain CSP and Hyper-Brain-Network	225
<i>Li Zhu (Xiamen University), Chongwei Su (Hangzhou Dianzi University), Gaochao Cui (National Institute of Advanced Industrial Science and Technology, Japan), Changle Zhou (Xiamen University), Jianhai Zhang (Hangzhou Dianzi University), and Wanzeng Kong (Hangzhou Dianzi University)</i>	
Epileptic Seizure Detection from EEG Signals Using Multiband Features with Feedforward Neural Network	231
<i>Kazi Mahmudul Hassan (Jatiya Kabi Kazi Nazrul Islam University), Md. Rabiul Islam (Tokyo University Agriculture and Technology), Toshihisa Tanaka (Tokyo University of Agriculture and Technology), and Md. Khademul Islam Molla (University of Rajshahi)</i>	
Electroencephalography Based Motor Imagery Classification Using Unsupervised Feature Selection	239
<i>Abdullah Al Shiam (University of Rajshahi), Md. Rabiul Islam (Tokyo University of Agriculture and Technology), Toshihisa Tanaka (Tokyo University of Agriculture and Technology), and Md. Khademul Islam Molla (University of Rajshahi)</i>	

Human Factors

EEG-Based Cross-Subject Mental Fatigue Recognition	247
<i>Yisi Liu (Fraunhofer Singapore), Zirui Lan (Fraunhofer Singapore, Nanyang Technological University), Jian Cui (Fraunhofer Singapore, Nanyang Technological University), Olga Sourina (Fraunhofer Singapore, Nanyang Technological University), and Wolfgang Müller-Wittig (Fraunhofer Singapore, Nanyang Technological University)</i>	

EEG-Based Human Factors Evaluation of Air Traffic Control Operators (ATCOs) for Optimal Training	253
<i>Yisi Liu (Fraunhofer Singapore), Zirui Lan (Fraunhofer Singapore, Nanyang Technological University), Fitri Traspsilawati (Universitas Gadjah Mada), Olga Sourina (Fraunhofer Singapore, Nanyang Technological University), Chun-Hsien Chen (Nanyang Technological University), and Wolfgang Müller-Wittig (Fraunhofer Singapore, Nanyang Technological University)</i>	
Determining Necessary Length of the Alternating Series Test for Parkinson's Disease Modelling	261
<i>Sven Nomm (Tallinn University of Technology), Tanel Kossas (Tallinn University of Technology), Aaro Toomela (Tallinn Univeristy), Kadri Medijainen (University of Tartu), and Pille Taba (University of Tartu)</i>	
Human Movements Classification Using Multi-channel Surface EMG Signals and Deep Learning Technique ..	267
<i>Jianhua Zhang (Oslo Metropolitan University), Chen Ling (East China University of Science and Technology), and Sunan Li (East China University of Science and Technology)</i>	

Cybersecurity and Biometrics Track

Authentication & Identification

Vulnerability of Adaptive Strategies of Keystroke Dynamics Based Authentication Against Different Attack Types	274
<i>Abir Mhenni (Normandie Univ, UNICAEN, ENSICAEN, CNRS, GREYC, France), Denis Migdal (Normandie Univ, UNICAEN, ENSICAEN, CNRS, GREYC, France), Estelle Cherrier (Normandie Univ, UNICAEN, ENSICAEN, CNRS, GREYC, France), Christophe Rosenberger (Normandie Univ, UNICAEN, ENSICAEN, CNRS, GREYC, France), and Najoua Essoukri Ben Amara (Universite de Sousse, Ecole Nationale d'Ing enieurs de Sousse, Laboratory of Advanced Technology and Intelligent Systems, Tunisie)</i>	
Person Identification from Visual Aesthetics Using Gene Expression Programming	279
<i>Brandon Sieu (University of Calgary) and Marina Gavrilova (University of Calgary)</i>	
Multi-instance Cancelable Biometric System using Convolutional Neural Network	287
<i>Tanuja Sudhakar (University of Calgary) and Marina Gavrilova (University of Calgary)</i>	
Comparative Study of Fingerprint Database Indexing Methods	295
<i>Joannes Falade (ENSICAEN/ Imprimerie Nationale), Sandra Cremer (ENSICAEN/ Imprimerie Nationale), and Christophe Rosenberger (ENSICAEN/ Imprimerie Nationale)</i>	

IoT & SNS

My Behavior is my Privacy & Secure Password !	299
<i>Denis Migdal (Normandie Univ, UNICAEN, ENSICAEN, CNRS, GREYC, France) and Christophe Rosenberger (Normandie Univ, UNICAEN, ENSICAEN, CNRS, GREYC, France)</i>	

Impact of Low-Bitwidth Quantization on the Adversarial Robustness for Embedded Neural Networks	308
<i>Rémi Bernhard (CEA Tech, Equipe Commune CEA Tech - Mines Saint-Etienne, France), Pierre-Alain Moellic (CEA Tech, Equipe Commune CEA Tech - Mines Saint-Etienne, France), and Jean-Max Dutertre (Mines Saint-Etienne, Centre CMP, France)</i>	
Gathering Cyber Threat Intelligence from Twitter Using Novelty Classification	316
<i>Ba-Dung Le (University of Adelaide), Guanhua Wang (University of Adelaide), Mehwish Nasim (University of Adelaide), and Muhammad Ali Babar (University of Adelaide)</i>	
Hybrid Feature Selection Models for Machine Learning Based Botnet Detection in IoT Networks	324
<i>Alejandro Guerra-Manzanares (Tallinn University of Technology, Estonia), Hayretin Bahsi (Tallinn University of Technology, Estonia), and Sven Nõmm (Tallinn University of Technology, Estonia)</i>	

Content Protection

A Practical Use Case of Homomorphic Encryption	328
<i>Amina Bel Korchi (Mines Saint-Etienne, CEA-Tech, Centre CMP, Gardanne France; KONTRON) and Nadia El Mrabet (Mines Saint-Etienne, CEA-Tech, Centre CMP, Gardanne France)</i>	
A Shoulder-Surfing Resistant Image-Based Authentication Scheme with a Brain-Computer Interface	336
<i>Florian Gondesen (Nanyang Technological University; Hamburg University of Technology), Matthias Marx (University of Hamburg), and Ann-Christine Kycler (Hamburg University of Technology)</i>	
A Contribution to Detect and Prevent a Website Defacement	344
<i>Barerem-Melgueba Mao (Université de Lomé) and Kanlanfei Damnam Bagolibe (Autorité de Réglementation des Secteurs de Postes et de Télécommunications)</i>	

Poster Papers

Finding Hidden Shrines using AR and Clustering Techniques	348
<i>Liu Jihao Bryan (Nanyang Technological University), Owen Noel Newton Fernando (Nanyang Technological University), Sujatha Arundathi Meegama (Nanyang Technological University), Hedren Sum Wai Yuan (Nanyang Technological University), and Muhammad Faisal Bin Husni (Nanyang Technological University)</i>	
Augmented Reality Hologram	352
<i>Jia Jun Gan (Nanyang Technological University) and Owen Noel Newton Fernando (Nanyang Technological University)</i>	
Colorblind-Shareable Videos	356
<i>Xinghong Hu (The Chinese University of Hong Kong), Xueting Liu (Caritas Institute of Higher Education), Xiangyu Mao (SenseTime Limited Company), and Tien-Tsin Wong (The Chinese University of Hong Kong)</i>	

A Deformation Method for Simulating Coating Degradation While Taking Mechanical Behavior into Account	360
<i>Akinori Ishitobi (Keio University), Masanori Nakayama (Keio University), and Issei Fujishiro (Keio University)</i>	
Tsunami Evacuation Simulation System for Disaster Prevention Plan	362
<i>Yasuo Kawai (Bunkyo University) and Yurie Kaizu (Bunkyo University)</i>	
Development of Past General Townscape Simulation System Using Time Series Design and Ukiyo-e Style Rendering	366
<i>Yasuo Kawai (Bunkyo University)</i>	
The Art of La Petite Fee Cosmo	370
<i>Hui En Lye (Nanyang Technological University), Vinayak Kannappan (Nanyang Technological University), and Jeffrey Hong (Nanyang Technological University)</i>	
Automatic Image Enhancement Taking into Account User Preference	374
<i>Yu Murata (Hokkaido University) and Yoshinori Dobashi (Hokkaido University)</i>	
Twitter: An Aggregated News Platform	378
<i>Owen Noel Newton Fernando (Nanyang Technological University) and Chan Wei Chang (Nanyang Technological University)</i>	
Realizing Pseudo Color Bleeding with a Deep Composite Image	382
<i>Masaru Ohkawara (Keio University) and Issei Fujishiro (Keio University)</i>	
A Study of Usability Improvement in Immersive VR Programming Environment	384
<i>Atsuki Onishi (Osaka Institute of Technology), Satoshi Nishiguchi (Osaka Institute of Technology), Yasuharu Mizutani (Osaka Institute of Technology), and Wataru Hashimoto (Osaka Institute of Technology)</i>	
A Study of Analyzing Shape Similarities Between the Arm Model of Mongolian Buddha Statues for Archaeological Applications	387
<i>Amartuvshin Renchin-ochir (National University of Mongolia), Enkhbayar Altantsetseg (National University of Mongolia), and Kouichi Konno (Iwate University)</i>	
Fonts Style Transfer using Conditional GAN	391
<i>Naho Sakao (Hokkaido University) and Yoshinori Dobashi (Hokkaido University)</i>	
An Interactive System for Modeling Fish Shapes	395
<i>Masayuki Tamiya (Hokkaido University) and Yoshinori Dobashi (Hokkaido University)</i>	
A Kinect-Based Augmented Reality Game for Lower Limb Exercise	399
<i>Yoshimasa Tokuyama (Tokyo Polytechnic University), R.P.C. Janaka Rajapakse (Tainan National University of the Arts), Sachiyo Yamabe (Hitachi Industry & Control Solutions, Ltd.), Kouichi Konno (Iwate University), and Yi-Ping Hung (Tainan National University of the Arts)</i>	
A Virtual and Interactive Light-Art-Like Representation of Human Silhouette	403
<i>Momoko Tsuchiya (Ochanomizu University), Takayuki Itoh (Ochanomizu University), Michael Neff (University of California, Davis), and Yuhan Liu (University of California, Davis)</i>	

How does Augmented Reality Improve the Play Experience in Current Augmented Reality Enhanced Smartphone Games? 407
Matthias Wölfel (Karlsruhe University of Applied Sciences), Melinda Braun (Furtwangen University), and Sandra Beuck (Furtwangen University)

Author Index **411**