# Table of Contents

Message from the MIPR 2018 Program Co-Chairs ................................................................. xvi
MIPR 2018 Organizing Committee .......................................................................................... xviii
MIPR 2018 Program Committee .............................................................................................. xx
MIPR 2018 Workshops Welcome .............................................................................................. xxiii

## Feature Extraction and Object Detection

Vehicle Detection in UAV Traffic Video Based on Convolution Neural Network ....................... 1
  Shulin Li (Beijing University of Posts and Telecommunication), Weigang
  Zhang (Harbin Institute of Technology), Guorong Li (University of
  Chinese Academy of Sciences), Li Su (University of Chinese Academy of
  Sciences), and Qingming Huang (University of Chinese Academy of
  Sciences)

Comparing Visual, Textual, and Multimodal Features for Detecting Sign Language in Video Sharing Sites ........................................................................................................................................ 7
  Caio Duarte Diniz Monteiro (Texas A&M University), Frank Shipman
  (Texas A&M University), and Ricardo Gutierrez-Osuna (Texas A&M
  University)

Integrating Visual and Textual Affective Descriptors for Sentiment Analysis of Social Media Posts ........................................................................................................................................ 13
  Shuanglu Dai (Stevens Institute of Technology) and Hong Man (Stevens
  Institute of Technology)

## Parallel Sessions 1

### Machine Learning and Data Mining I

Ontology-Driven Hierarchical Deep Learning for Fashion Recognition ........................................ 19
  Zhenzhong Kuang (Hangzhou Dianzi University), Jun Yu (Hangzhou Dianzi
  University), Zhou Yu (Hangzhou Dianzi University), and Jianping Fan
  (University of North Carolina at Charlotte)

Deep Learning of Path-Based Tree Classifiers for Large-Scale Plant Species Identification ........... 25
  Haixi Zhang (Northwestern Polytechnical University), Guiqing He
  (Northwestern Polytechnical University), Jinye Peng (Northwestern
  University), Zhenzhong Kuang (Hangzhou Dianzi University), and
  Jianping Fan (University of North Carolina at Charlotte)
Game-Aware and SDN-Assisted Bandwidth Allocation for Data Center Networks .......................... 86
Maryam Amiri (University of Ottawa), Hussein Al Osman (University of Ottawa), and Shervin Shirmohammadi (University of Ottawa)

Parallel Sessions 2

Machine Learning and Data Mining II

Personalizing a Generic ECG Heartbeat Classification for Arrhythmia Detection: A Deep Learning Approach ................................................................. 92
Meng-Hsi Wu (HTC Research & Healthcare), Emily J. Chang (Dynamical Biomarkers Group), and Tzu-Hsuan Chu (HTC Research & Healthcare)

Generative Sensing: Transforming Unreliable Sensor Data for Reliable Recognition ................... 100
Lina J. Karam (Arizona State University), Tejas Borkar (Arizona State University), Yu Cao (Arizona State University), and Junseok Chae (Arizona State University)

Sequential Deep Learning for Disaster-Related Video Classification ........................................ 106
Haiman Tian (Florida International University), Hector Cen Zheng (Florida International University), and Shu-Ching Chen (Florida International University)

Dynamic Sampling in Convolutional Neural Networks for Imbalanced Data Classification ................. 112
Samira Pouyanfar (Florida International University), Yudong Tao (University of Miami, Coral Gables), Anup Mohan (Intel Corporation), Haiman Tian (Florida International University), Ahmed S. Kaseb (Cairo University), Kent Gauen (Purdue University), Ryan Dailey (Purdue University), Sarah Aghajanzadeh (Purdue University), Yung-Hsiang Lu (Purdue University), Shu-Ching Chen (Florida International University), and Mei-Ling Shyu (University of Miami, Coral Gables)

Multimedia Interfaces and Human-Computer Interfaces

Who Is Earning? Understanding and Modeling the Virtual Gifts Behavior of Users in Live Streaming Economy ................................................................. 118
Wei Tu (Tsinghua University), Chen Yan (Tsinghua University), Yiping Yan (Tsinghua University), Xu Ding (Tsinghua University), and Lifeng Sun (Tsinghua University)

A New TV World for Kids - When ZUI Meets Deep Learning .............................................. 124
Haohong Wang (TCL Research America), Yaoyuan Fu (TCL Research America), Yang Li (University of Missouri), Guanghan Ning (University of Missouri), Zhihai He (University of Missouri), and Mengwen Liu (Amazon.com)

Audio Based Handwriting Input for Tiny Mobile Devices ......................................................... 130
Tuo Yu (University of Illinois at Urbana-Champaign), Haiming Jin (University of Illinois at Urbana-Champaign), and Klara Nahrstedt (University of Illinois at Urbana-Champaign)

Immersive, Social Applications for 8K Displays ........................................................................ 136
V. Michael Bove, Jr. (Massachusetts Institute of Technology)
Workshop: Multimodal Representation, Retrieval, and Analysis of Multimedia Content I (MR2AMC I)

The Impact of Multi-Optimizers and Data Augmentation on TensorFlow Convolutional Neural Network Performance ........................................................................................................... 140
Arwa Mohammed Taqi (University of Arkansas at Little Rock), Ahmed Awad
(University of Arkansas at Little Rock), Fadwa Al-Azzo (University of Arkansas at Little Rock), and Mariofanna Milanova (University of Arkansas at Little Rock)

Entity Resolution Using Logistic Regression as an extension to the Rule-Based Oyster System .................................................................................................................................. 146
Fumiko Kobayashi (University of Arkansas at Little Rock), Aziz Eram
(University of Arkansas at Little Rock), and John Talburt (University of Arkansas at Little Rock)

Parallel Sessions 3

Machine Learning and Data Mining III

Scalable Logo Detection and Recognition with Minimal Labeling ........................................... 152
Daniel Mas Montserrat (Purdue University), Qian Lin (HP Labs), Jan Allebach (Purdue University), and Edward Delp (Purdue University)

Multimodal Image Captioning for Marketing Analysis ................................................................. 158
Philipp Harzig (University of Augsburg), Stephan Brehm (University of Augsburg), Rainer Lienhart (University of Augsburg), Carolin Kaiser (GfK Verein), and René Schallner (GfK Verein)

Joint Estimation of Age and Gender from Unconstrained Face Images Using Lightweight Multi-Task CNN for Mobile Applications ................................................................. 162
Jia-Hong Lee (Institute of Information Science), Yi-Ming Chan
(Institute of Information Science), Ting-Yen Chen (Institute of Information Science), and Chu-Song Chen (Institute of Information Science)

GeoSClean: Secure Cleaning of GPS Trajectory Data Using Anomaly Detection ..................... 166
Vikram Patil (Albany Lab for Privacy and Security), Priyanka Singh
(Albany Lab for Privacy and Security), Shivam Parikh (Albany Lab for Privacy and Security), and Pradeep K. Atrey (Albany Lab for Privacy and Security)

Affective Visual Question Answering Network ............................................................................. 170
Nelson Ruwa (Jiangsu University), Qirong Mao (Jiangsu University),
Liangjun Wang (Jiangsu University), and Ming Dong (Wayne State University)
Workshop: Multimodal Representation, Retrieval, and Analysis of Multimedia Content II (MR2AMC II)

Bayesian Regularization Based ANN for the Design of Flexible Antenna for UWB Wireless Applications ........................................................................................................... 174
   Ali I. Hammoodi (University of Arkansas at Little Rock), Fadwa Al-Azzo (University of Arkansas at Little Rock), Mariofanna Milanova (University of Arkansas at Little Rock), and Haider Khaleel (Xavier University)

Quantitative Analysis of Renal Fibrosis using a Colorimetric System .......................................................... 178
   Cassandra L. Reed (University of Arkansas), Shree G. Sharma (Arkana Laboratories), Sandra P. Prieto (University of Arkansas), and Timothy J. Muldoon (University of Arkansas)

Theme-Weighted Ranking of Keywords from Text Documents Using Phrase Embeddings .................................. 184
   Debanjan Mahata (University of Arkansas at Little Rock), Rajiv Ratn Shah (Indraprastha Institute of Information Technology), John Kuriakose (Infosys Limited), Roger Zimmermann (National University of Singapore), and John R. Talburt (University of Arkansas at Little Rock)

A Multimodal Approach to Predict Social Media Popularity ........................................................................... 190
   Mayank Meghawat (Nirma Institute of Technology), Satyendra Yadav (Delhi Technological University), Debanjan Mahata (UALR), Yifang Yin (NUS), Rajiv Ratn Shah (IIIT Delhi), and Roger Zimmermann (NUS)

Self-Attentive Feature-Level Fusion for Multimodal Emotion Detection .......................................................... 196
   Devamanyu Hazarika (National University of Singapore), Sruthi Gorantla (Indian Institute of Science), Soujanya Poria (Nanyang Technological University), and Roger Zimmermann (National University of Singapore)

Demo and Poster Session

Real-Time Lightweight CNN for Detecting Road Object of Various Size .......................................................... 202
   Byeonghak Lim (Inha University), Bin Yang (Inha University), and Hakil Kim (Inha University)

What Is Going on in the World? A Display Platform for Media Understanding .................................................. 204
   Delia Fernandez (Vilynx), Joan Espadaler (Vilynx), David Varas (Vilynx), Issey Masuda (Vilynx), Aleix Colom (Vilynx), David Rodriguez (Vilynx), David Vegas (Vilynx), Miquel Montalvo (Vilynx), Xavi Giro-i-Nieto (Universitat Politècnica de Catalunya), Juan Carlos Rivero (Vilynx), and Elisenda Bou (Vilynx)

A Standalone Demo for Quiz Game “Describe and Guess” .............................................................................. 206
   Yikun Sheng (Hefei University of Technology), Xiaoshan Yang (Chinese Academy of Sciences), and Changsheng Xu (Chinese Academy of Sciences)

Extracting Typical Domain Keywords from Annual Reports of Listed Company .............................................. 208
   Zhaohui Chao (Wuhan University of Technology) and Lin Li (Wuhan University of Technology)

Multi-types Court E-File Classification System ............................................................................................... 210
   Wei Duan (Wuhan University of Technology) and Lin Li (Wuhan University of Technology)
Ownership Identification and Signaling of Multimedia Content Components .......................... 212
   Luntian Mou (Beijing University of Technology)

Fast Vision-Based Pedestrian Traffic Light Detection ............................................................... 214
   Xue-Hua Wu (Southeast University), Renjie Hu (Southeast University),
   and Yu-Qing Bao (Nanjing Normal University)

Automatic Feature Subset Selection for Clustering Images using Differential Evolution .............. 216
   V. Sessa Srinivas (JNTUA), A. Srikrishna (RVR&JC), and B. Eswara Reddy
   (JNTUA)

The Bring Your Own Device Trend in an Oil and Gas Sector ...................................................... 218
   Iniabasi Ephraim Ekpo (University of Liverpool) and Sheila D.
   Fournier-Bonilla (LLUMNO LNC)

An Investigation into the Effect of Implementing an Integrated It System in a
Multi-location Healthcare ............................................................................................................. 220
   Diaa Eldin ElSaied (Magrabi Hospitals and Centers) and Sheila D.
   Fournier-Bonilla (LLUMNO LNC)

Parallel Sessions 4

Workshop: Multimedia Pragmatics: A Cross-Fertilization of Content-Based
Retrieval and Natural Language Processing I (MMPrag I)

Information Retrieval and Recommendation Using Emotion from Speech Signals ...................... 222
   Alexander Iliev (University of Wisconsin) and Peter Stanchev
   (Kettering University)

Multimedia Content Understanding and Analytics I

Understanding Human Aging Patterns from a Machine Perspective ........................................... 226
   Shixing Chen (Wayne State University), Ming Dong (Wayne State
   University), Jialiang Le (Ford Motor Company), and Saeed Barbat (Ford
   Motor Company)

COME for No-Reference Video Quality Assessment .................................................................... 232
   Chunfeng Wang (University of Chinese Academy of Sciences), Li Su
   (University of Chinese Academy of Sciences), and Weigang Zhang (Harbin
   Institute of Technology)

Multi-Pose Learning based Head-Shoulder Re-identification ..................................................... 238
   Jia Li (Peking University), Yunpeng Zhai (Beijing University of Posts
   and Telecommunications), Yaowei Wang (Beijing Institute of
   Technology), Yemin Shi (Peking University), and Yonghong Tian (Peking
   University)

Soccer Fans Sentiment Through The Eye of Big Data: The UEFA Champions League as a Case
Study ........................................................................................................................................... 244
   Samah Aloufi (Multimedia Computing Research Laboratory), Fatimah
   Alzamzami (Multimedia Computing Research Laboratory), Mohamad Hoda
   (Multimedia Computing Research Laboratory), and Abdulmotaleb El Saddik
   (Multimedia Computing Research Laboratory)
Machine Learning and Data Mining IV

Statistical Machine Learning vs Deep Learning in Information Fusion: Competition or Collaboration? ................................................................. 251
   Ling Guan (Ryerson University), Lei Gao (Ryerson University), Nour El Din Elmadany (Ryerson University), and Chengwu Liang (Zhengzhou University)

Can You Tell a Face from a HEVC Bitstream? ...................................................... 257
   Saeed Ranjbar Alvar (Simon Fraser University), Hyomin Choi (Simon Fraser University), and Ivan V Bajic (Simon Fraser University)

Embedding User Behavioral Aspect in TF-IDF Like Representation ................................ 262
   Ligaj Pradhan (University of Alabama at Birmingham), Chengcui Zhang (University of Alabama at Birmingham), Steven Bethard (University of Arizona), and Xin Chen (Governors State University)

Exploring Facial Differences in European Countries Boundary by Fine-Tuned Neural Networks ...... 268
   Viet-Duy Nguyen (University of Rochester), Minh Tran (University of Rochester), and Jiebo Luo (University of Rochester)

Parallel Sessions 5

Workshop: Multimedia Pragmatics: A Cross-Fertilization of Content-Based Retrieval and Natural Language Processing II (MMPrag II)

Exploring Coherence in Visual Explanations ........................................................... 272
   Malihe Alikhani (Rutgers University) and Matthew Stone (Rutgers University)

Using Thermal Images and Physiological Features to Model Human Behavior: A Survey .................. 278
   Christian Hessler (University of Michigan - Dearborn) and Mohamed Abouelenien (University of Michigan)

Beyond Big Data of Human Behaviors: Modeling Human Behaviors and Deep Emotions ........... 282
   James Deng (Hong Kong Applied Science and Technology Institute), Clement Leung (United International College), and Yuanxi Li (Hong Kong Baptist University)

Multimedia Content Understanding and Analytics II

Attribute-assisted Domain Transfer from Image to Sketch ............................................ 287
   Yikun Sheng (Hefei University of Technology), Xiaoshan Yang (Institute of Automation), Xueliang Liu (Hefei University of Technology), and Changsheng Xu (Institute of Automation)

CycleGANs Based Social Image Stylization by Emotion ............................................. 293
   Jie Nie (Ocean University of China), Lei Huang (Ocean University of China), Zhen Li (Ocean University of China), Meng Yuan (Ocean University of China), and Zhiqiang Wei (Ocean University of China)
Predictive Real-time Beat Tracking from Music for Embedded Application  ............................................. 297
Irfan Al-Hussaini (Bangladesh University of Engineering and Technology), Ahmed Imtiaz Humayun (Bangladesh University of Engineering and Technology), Samiul Alam (Bangladesh University of Engineering and Technology), Shariful Islam Foysal (Bangladesh University of Engineering and Technology), Abdullah Al Masud (Bangladesh University of Engineering and Technology), Arafat Mahmud (Bangladesh University of Engineering and Technology), Rakibul Islam Chowdhury (Bangladesh University of Engineering and Technology), Nabil Ibtehaz (Bangladesh University of Engineering and Technology), Sums Uz Zaman (Bangladesh University of Engineering and Technology), Rakib Hyder (Bangladesh University of Engineering and Technology), Sayeed Shafayet Chowdhury (Bangladesh University of Engineering and Technology), and Mohammad Ariful Haque (Bangladesh University of Engineering and Technology)

MPEG CDVS Feature Trajectories for Action Recognition in Videos ............................................................... 301
Radhakrishna Dasari (State University of New York at Buffalo) and Chang Wen Chen (Chinese University of Hong Kong)

Object-Centric Scene Understanding for Image Memorability Prediction .................................................... 305
Sejong Yoon (The College of New Jersey) and Jongpil Kim (Bloomberg)

Multimedia and Vision

Power Constrained Contrast Enhancement by Joint L2,1-norm Regularized Sparse Coding for OLED Display .................................................................................................................. 309
En-Hung Lai (Yuan Ze University), Bo-Hao Chen (Yuan Ze University), and Ling-Feng Shi (Fuzhou University)

A Multi-View Pedestrian Tracking Framework Based on Graph Matching .................................................. 315
Fanyi Duanmu (New York University), Xin Feng (Chongqing University of Technology), Xiaoqing Zhu (Cisco Systems Inc.), Wai-tian Tan (Cisco Systems Inc.), and Yao Wang (New York University)

Robust Surface Light Field Modeling ............................................................................................................ 321
Wei Li (Nanjing University of Aeronautics and Astronautics), Hui Qiao (Baidu Research), Chen Zhao (Baidu Research), Zhongqin Wu (Baidu Research), and Ruigang Yang (Baidu Research)

A Novel Approach of Multiple Objects Segmentation Based on Graph Cut .................................................. 328
Jiayang Dong (University of Chinese Academy of Sciences), Jian Xue (University of Chinese Academy of Sciences), Shuqiang Jiang (Institute of Computing Technology, Chinese Academy of Sciences), and Ke Lu (University of Chinese Academy of Sciences)

Parallel Sessions 6

Multimedia Retrieval II

Subjective Evaluation of Vector Representation of Emotion Flow for Music Retrieval ............................... 334
Chia-Hao Chung (National Taiwan University), Ming-I Yang (National Taiwan University), and Homer H. Chen (National Taiwan University)
A Saliency Guided Shallow Convolutional Neural Network for Traffic Signs Retrieval ........................................ 340
Xi Liang (Beijing University of Technology), Jing Zhang (Beijing University of Technology), Qi Tian (University of Texas at San Antonio), Jiafeng Li (Beijing University of Technology), and Li Zhuo (Beijing University of Technology)

A Context-Aware Nonnegative Matrix Factorization Framework for Traffic Accident Risk Estimation via Heterogeneous Data ............................................................................................................. 346
Quanjun Chen (University of Tokyo), Xuan Song (University of Tokyo), Zipei Fan (University of Tokyo), Tianqi Xia (University of Tokyo), Harutoshi Yamada (University of Tokyo), and Ryosuke Shibasaki (University of Tokyo)

Multi-Vehicle Motion Planning for Search and Tracking ................................................................. 352
Ju Wang (Virginia State University), Wei-bang Chen (Virginia State University), and Vitalis Temu (Virginia State University)

Multimedia Systems II

DUPLEX: An Architecture for a Data-Universal Plane for Information Exchange ............................................ 356
Cedric Westphal (Huawei & University of California)

Automated Objective and Subjective Evaluation of HTTP Adaptive Streaming Systems .................. 362
Christian Timmerer (Alpen-Adria-Universität Klagenfurt), Anatoliy Zabrovs'kiy (Petrozavodsk State University), and Ali Begen (Ozyegin University)

Determining the Necessary Frame Rate of Video Data for Object Tracking under Accuracy Constraints ............................................................................................................................................. 368
Anup Mohan (Intel Corporation), Ahmed S. Kaseb (Cairo University), Kent W. Gauen (Purdue University), Yung-Hsiang Lu (Purdue University), Amy R. Reibman (Purdue University), and Thomas J. Hacker (Purdue University)

Workshop: Fake Multimedia I

A Taxonomy of Audiovisual Fake Multimedia Content Creation Technology ............................................. 372
Ali Khodabakhsh (NTNU), Christoph Busch (NTNU), and Raghavendra Ramachandra (NTNU)

Automatic JPEG Grid Detection with Controlled False Alarms, and Its Image Forensic Applications ..................................................................................................................................................... 378
Tina Nikoukhah (ENS Cachan - CMLA), Rafael Grompone von Gioi (ENS Cachan - CMLA), Miguel Colom (ENS Cachan - CMLA), and Jean-Michel Morel (ENS Cachan - CMLA)

Detection of GAN-Generated Fake Images over Social Networks .......................................................... 384
Francesco Marra (University Federico II of Naples), Diego Gragnaniello (University Federico II of Naples), Davide Cozzolino (University Federico II of Naples), and Luisa Verdoliva (University Federico II of Naples)
Parallel Sessions 7

Novel Applications: Forensics and Security

SecMed: A Secure Approach for Proving Rightful Ownership of Medical Images in Encrypted Domain over Cloud

Aishwary K. Pandey (Indian Institute of Technology), Priyanka Singh (Dartmouth College), Nishant Agarwal (University of Southern California), and Balasubramanian Raman (Indian Institute of Technology)

Fast Compressed Domain Copy Detection with Motion Vector Imaging

Yuanyuan Yang (Beijing University of Posts and Telecommunications), Yixiong Zou (Peking University), Qingsheng Yuan (School of Cyber Security), Yaowei Wang (Beijing Institute of Technology), and Yonghong Tian (Peking University)

SecureCMerge: Secure PDF Merging over Untrusted Servers

Neha Sharma (Albany Lab for Privacy and Security), Priyanka Singh (Albany Lab for Privacy and Security), and Pradeep K. Atrey (Albany Lab for Privacy and Security)

Improving Malware Detection Accuracy by Extracting Icon Information

Pedro Silva (University of California), Sepehr Akhavan-Masouleh (Cylance), and Li Li (Cylance)

Multimedia Data Management

Client Side Secure Image Deduplication Using DICE Protocol

Ashish Agarwala (State University of New York at Albany), Priyanka Singh (State University of New York at Albany), and Pradeep K. Atrey (State University of New York at Albany)

Comprehensive Dataset of Broadcast Soccer Videos

Junqing Yu (Huazhong University of Science and Technology), Aiping Lei (Huazhong University of Science and Technology), Zikai Song (Huazhong University of Science and Technology), Tingting Wang (Huazhong University of Science and Technology), Hengyou Cai (Huazhong University of Science and Technology), and Na Feng (Huazhong University of Science and Technology)

Workshop: Fake Multimedia II

Automatic Detection of Demosaicing Image Artifacts and Its Use in Tampering Detection

Quentin Bammey (CMLA), Rafael Grompone von Gioi (CMLA), and Jean-Michel Morel (CMLA)

Understanding User Profiles on Social Media for Fake News Detection

Kai Shu (Arizona State University), Suhang Wang (Arizona State University), and Huan Liu (Arizona State University)

Media-Rich Fake News Detection: A Survey

Shivam B. Parikh (State University of New York at Albany) and Pradeep K. Atrey (State University of New York at Albany)