CURRICULUM VITAE - DONG HUANG

Title: **Senior Project Scientist**
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Research&Engineering Fields

- **Perception on embedded platforms**: My research team at RI CMU empowers cameras and sensors on moving platforms-autonomous machines, drones, smart camera modules-with (a) the light-weight Deep Neural Networks (DNNs) that consume less computation, memory, and power than standard deep learning approaches, and (b) the advanced training approaches that improve performance on embedded platforms with minimal overheads on deployment efforts, training data and testing computation. We are making intelligent perception solutions accessible to general industries and markets.
- **Perception in multi-modality systems**: We develop deep learning approaches that take multiple sensor data (e.g., videos, depth, wearable sensor signal, and WiFi signal) to produce multiple perception results, such as location, poses, activities, and physical metrics. Our deep approaches also trace the key factors of perception results for the purpose of improving the psychical performance of athletes and quality-of-life for the general public.

Professional Experience

- **Senior Project Scientist**—The Robotics Institute
  Carnegie Mellon University, Pittsburgh, PA, USA
  - Head of the DeLight Laboratory and Principal Investigator
  - Dec. 2018 - Present
- **Research Scientist (Part-time)**—Facebook Inc.
  Facebook Head Quater, Menlo Park, CA, USA
  - Mar., 2017 - Mar., 2019
- **Project Scientist**—The Robotics Institute
  Carnegie Mellon University, Pittsburgh, PA, USA
  - Feb., 2012 - Nov. 2018
- **Post-doctoral Research Associate**—The Robotics Institute
  Carnegie Mellon University, Pittsburgh, PA, USA
  - Jun., 2009 - Jan., 2012

Education

- **Ph.D. degree**—Computer Science
  University of Electronic Science and Technology of China, Chengdu, China

  - Thesis: Dimensionality Reduction in High Dimensional Data
  - Supervisor: Professor Zhang Yi
  - Sep.,2005 - Jun., 2009

- **M.S. degree**—Automation
  University of Electronic Science and Technology of China, Chengdu, China
  - Thesis: Error Calibration Algorithm in Spectrum Analyzers
  - Supervisor: Professor Ling Tong
  - Sep., 2002- Jun., 2005

Featured Research&Engineering Projects:

- **Mono Wi-Fi Scene**, URL: https://delightcmu.github.io/monowifiscene/
  This project is the latest effort after our Person-in-WiFi (ICCV 2019) and Denspose-from-WiFi (Arxiv 2022) which were covered by the major media such as the Economist, BBC Digital Planet, New Scientist, etc. In this new project, we presented the first dense 3D sensing solution using only one Wi-Fi device. With no invasion of visual privacy of human faces, clothes, or personal belongings, no additional electromagnetic radiation other than the commodity Wi-Fi, and no interference from lighting or temperature (infrared), Mono Wi-Fi Scene produces dense scene depth, and 3D human segmentation, which can be used to infer human-scene interaction and improve indoor safety.

- **Hello 3D: Universal Monocular 3D Human Recovery Engine**, URL:
  https://delightcmu.github.io/Hello3D/
  We developed a real-time software engine for 3D Human Mesh Recovery from monocular cameras. This engine enables 3D human perception in many use cases including Moving Robots, Stationary Monitoring, and Sports Training. Our engine is ready for use case customization. The tech video has been submitted to ICRA2024. A live demo based on this engine, "Hello 3D", is in the NSH building on Carnegie Mellon University Pittsburgh campus. Please feel free to check it out.

- **Multiple confidential federal projects subcontract from National Robotics Engineering Center(NREC)**
  I lead the DeLight team to develop software modules for exposure correction, 3D object detection, and depth estimation from RGB, Lidar, and Thermal sensors on autonomous vehicles.

Selected Publications

- Yutian Lei, Jun Liu, **Dong Huang**, *MAC: ModAlity Calibration for Object Detection*, ArXiv, 2023.

- Haoyuan Li, Haoye Dong, Hanchao Jia, **Dong Huang**, Michael C Kampffmeyer, Liang Lin, Xiaodan Liang, *Coordinate Transformer: Achieving Single-stage Multi-person Mesh Recovery from Videos*, ICCV, 2023.

- Jinqi Luo, Zhaoning Wang, Chen Henry Wu, **Dong Huang**, Fernando De la Torre, *Zero-shot model diagnosis*, CVPR, 2023.

- Jiaqi Geng, **Dong Huang**, Fernando De la Torre, *DensePose From WiFi*, arXiv:2301.00250, 2022.
- Huajun Liu, Fuqiang Liu, Xinyi Fan and **Dong Huang**, *Polarized Self-Attention: Towards High-quality Pixel-wise Mapping*, Neurocomputing, 2022.
- Zeyi Huang, Haohan Wang,**Dong Huang**, Yong Jae Lee and Eric P. Xing, *The Two Dimensions of Worst-case Training and Their Integrated Effect for Out-of-domain Generalization*, CVPR, 2022.
- Zechun Liu, Kwang-Ting Cheng, **Dong Huang**, Eric Xing and Zhiqiang Shen, *Nonuniform-to-Uniform Quantization: Towards Accurate Quantization via Generalized Straight-Through Estimation*, CVPR, 2022.
- Shizhe Chen and **Dong Huang**, *Elaborative Rehearsal for Zero-shot Action Recognition*, International Conference on Computer Vision (ICCV), 2021.
- Jianwei Feng and **Dong Huang**, *Optimal Gradient Checkpoint Search for Arbitrary Computation Graphs*, CVPR (Oral), 2021.
- Zeyi Huang, Yang Zou, Vijayakumar Bhagavatula and **Dong Huang**, *Comprehensive Attention Self-Distillation for Weakly-Supervised Object Detection*, NeurIPS, 2020.
- Zeyi Huang, Haohan Wang, Eric Xing, **Dong Huang**, *Self-Challenging Improves Cross-Domain Generalization*, ECCV (Oral), 2020.
- Wei Ke, Tianliang Zhang, Zeyi Huang, Qixiang Ye, Jianzhuang Liu and **Dong Huang**, *Multiple Anchor Learning for Visual Object Detection*, CVPR, 2020.
- Zeyi Huang, Wei Ke, **Dong Huang**, *Improving Object Detection with Inverted Attention*, IEEE Winter Conference on Applications of Computer Vision (WACV), 2020.
- Sanping Zhou, Jinjun Wang, Le Wang, Jimuyang Zhang, Fei Wang, **Dong Huang** and Nanning Zheng, *Hierarchical and Interactive Refinement Network for Edge-Preserving Salient Object Detection*, IEEE Transactions on Image Processing(TIP), vol 30, page 1-14, 2020.
- Sanping Zhou, Jinjun Wang, Jimuyang Zhang, Le Wang, **Dong Huang**, Shaoyi Du and Nanning Zheng, *Hierarchical U-Shape Attention Network for Salient Object Detection*, IEEE Transactions on Image Processing(TIP), vol 29, 8417-8428, 2020.
- Fei Wang, Stan, Sanping Zhou, Jinsong Han, **Dong Huang**, *Person-in-WiFi: Fine-grained Person Perception using WiFi*, International Conference on Computer Vision(ICCV), 2019.
- Jimuyang Zhang, Sanping Zhou, Xin Chang, Fangbin Wan, Jinjun Wang, Yang Wu, **Dong Huang**, *Multiple Object Tracking by Flowing and Fusing*, Submitted, arXiv: pending, Dec. 2019.
- Jimuyang Zhang, Sanping Zhou, Jinjun Wang, **Dong Huang**, *Frame-wise Motion and Appearance for Real-time Multiple Object Tracking*, arXiv:1905.02292, 2019.
- Jia Chen, Jiang Liu, Junwei Liang, Ting-Yao Hu, Wei Ke, Wayner Barrios,**Dong Huang** and Alexander G Hauptmann, *Minding the Gaps in a Video Action Analysis Pipeline*, IEEE Winter Applications of Computer Vision Workshops (WACVW), 2019.

- Jianwei Feng, **Dong Huang**, *Cutting Down Training Memory by Re-fowarding*, arXiv:1808.00079, 2019.
- Fei Wang, Jinsong Han, Shiyuan Zhang, Xu He, **Dong Huang**, *CSI-Net: Unified Human Body Characterization and Action Recognition*, arXiv:1810.03064, 2018.
- Dingwen Zhang, Guangyu Guo, **Dong Huang**, Junwei Han, *PoseFlow: A Deep Motion Representation for Understanding Human Behaviors in Videos*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018.
- **Dong Huang**, L. Han and F. De la Torre, *Soft-Margin Mixture of Regression*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2017.
- Y. Yang, D. Zhang, **Dong Huang** and F. De la Torre, *Learning Category-Specific 3D Shape Models from Weakly Labeled 2D Images*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2017.
- **Dong Huang**, R. Silveira and F. De la Torre, *Robust Regression*, IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 38(2): 363-375, 2016.
- **Dong Huang**, S. Yao, Y. Wang, and F. De la Torre, *Sequential Max-Margin Event Detectors*, European Conference on Computer Vision (ECCV), 2014.
- Y. Zhu, **Dong Huang**, S. Lucey and F. De la Torre, *Complex Non-Rigid Motion 3D Reconstruction by Union of Subspaces*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2014.
- **Dong Huang** and F. De la Torre, *Facial Action Transfer with Personalized Bilinear Regression*, European Conference on Computer Vision (ECCV), 2012.
- **Dong Huang**, R. Silveira and F. De la Torre, *Robust Regression*, European Conference on Computer Vision (ECCV), 2012.
- **Dong Huang**, M. Storer, F. De la Torre, and H. Bischof, *Supervised Local Subspace Learning for Continuous Head Pose Estimation*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2011.
- **Dong Huang**, Y. Tian and F. De la Torre, *Local Isomorphism to Solve the Pre-image Problem in Kernel Methods*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2011.
- **Dong Huang**, K. Meyers, S. Henry, F. De la Torre, and C. C. Horn, *Computerized Detection and Analysis of Cancer Chemotherapy-induced Emesis in a Small Animal Model, Musk Shrew*, Journal of Neuroscience Methods, 50(1693-1711), 2010.
- **Dong Huang** and Fernando De la Torre, *Bilinear Kernel Reduced Rank Regression for Facial Expression Synthesis*, European Conference on Computer Vision, (Oral), 2010.
- **Dong Huang**, Zhang Yi and Xiaorong Pu, *Manifold Based Learning and Synthesis*, IEEE Transactions on Systems, Man and Cybernetics - Part B, regular paper, 39(3):529-606, 2009.
- **Dong Huang**, Zhang Yi and Xiaorong Pu, *A New Local PCA SOM Algorithm*, Neurocomputing , 71:3544-3552. 2008.

- **Dong Huang** and Zhang Yi, *Shape Recovery by A Generalized Topology Preserving SOM*, Neurocomputing , 72: 573-580, 2008.
- **Dong Huang** and Zhang Yi, *A New Incremental PCA Algorithm With Application to Visual Learning*, Neural Processing Letters, 30(171-185), 2009.
- **Dong Huang**, Zhang Yi and Xiaorong Pu, *Manifold Learning With Local Geometry Preserving and Global Affine Transformation*. IEEE International Conferences on Cybernetics & Intelligent Systems (CIS) and Robotics, Automation & Mechatronics (RAM) (CIS-RAM 2008), 1178-1192, 2008.
- **Dong Huang** and Xiaorong Pu, *A Kernel View of Manifold Analysis for Face Images*. IEEE International Conference on Intelligent System and Knowledge Engineering (ISKE2008), 650-655, 2008.
- **Dong Huang**, Huizhong Qiu and Zhang Yi, *Local-Bandwidth Mean Shift Segmentation of MR Images Using Nonlinear Diffusion*. Dynamics of Continuous, Discrete and Impulsive Systems, Series A: Mathematical Analysis, Vol. 14(S1) 737-741, 2007.

Selected Projects

- *A View-Invariant Internal World Representation for Predictive Cognitive Human Activity Understanding*
  01/2018-09/2021
  IARPA (Federal Agency) PI: **Alex Hauptmann**, LTI, CMU; co-PI: **Dong Huang**, RI, CMU
  My Role: Co-Principal Investigator. Responsible for managing the research progress on data analysis, designing machine learning techniques, and reporting to IARPA.

  A view-invariant internal representation of human activities and their context is essential for reasoning both normative and abnormal human behavior in a proper situational context. In the same way that changing the viewing angle of a person performing an activity does not change our interpretation of an activity, a truly autonomous surveillance system maintains an interpretation of the scene irrespective of (invariant to) the viewing angle, making it possible to understand, forecast or simulate possible outcomes of anomalous behaviors in real scenarios. In a joint effort with multiple groups at CMU, we developed a portfolio of methods and tools for human activity analysis that makes use of a rich view-invariant internal world representation to detect simple and complex human activities in a video surveillance scenario. My group focuses on efficient activity classification and localization for our autonomous surveillance system.
- *Obstacle Intelligence*
  11/01/2018-10/31/2020
  NREC, CMU PI: **Herman Herman**, RI, CMU
  My Role: Collaborator. Responsible for developing the visual perception module on an embedded GPU computer.

  Developing real-time obstacle perception module on a Nvidia Xavier mounted on moving construction machines. The perception module takes video streams from a stereo camera, identifies obstacles, segments drivable ground, and assesses collision risks under cluttered and dusty construction sites.

- *Light-weighted DNN for Object Detection/Tracking, Body Action Detection and Person Identification*
  05/01/2018-03/30/2019
  Autel Robotics (Private Company) PI: **Dong Huang**, RI, CMU
  My Role: Principal Investigator. Responsible for managing the research progress on data analysis, designing machine learning techniques, and reporting to Autel.

  Modern quadcopters extensively extend the view angles, range, and flexibility of visual perception that were not possible for stationary surveillance cameras. The unique maneuver and hangover capability of quadcopters has presented them with a vital role in improving public safety. However, most state-of-the-art deep neural networks are too heavy for the computation, memory, and power consumption that quadcopters-based platforms could provide. We develop lightweight deep neural networks that empower quadcopters with advanced Machine Learning (ML) technologies and develop multiple building blocks for general perception and analysis solutions.
- *Affective state estimation from wearable sensors: Phase 0*
  01/27/2017-03/31/2017
  Sony Corporation (Private Company) PI: **Dong Huang**, RI, CMU
  My Role: Principal Investigator. Responsible for managing the research progress on data analysis, designing machine learning techniques, and reporting to Sony.

  Understanding and detecting human affective states is a vital step for improving quality of life and personalized product services. This project aims to develop core technologies of advanced affective state estimation (e.g. stress, concentration, joy etc.) by vital sensors (e.g. ECG/HR, GSR, BP, EEG). The CMU team will integrate cutting-edge technologies of device, psychology, and machine learning toward advanced affective state estimation.
- *STTR Phase I: Wearable system for mining Parkinson's disease symptom states in an ambulatory setting*
  01/01/2016-12/30/2017
  National Science Foundation co-PI: **Britta Ulm**, Abililife Inc. co-PI: **Dong Huang**, RI, CMU
  My Role: co-Principal Investigator. Responsible for managing the research progress on data analysis, designing machine learning techniques, and report to the National Science Foundation and Abililife Inc.

  AbiliLife developed, manufactured, and started commercialization of the CALIBRACE, used to improve Parkinson's patients' posture and balance. This grant is to instrument CALIBRACE with six sensors and machine learning techniques to further improve Patients' health. The chosen sensors are a plethysmography band to measure breathing rate; an accelerometer for changes in an individual's position; a gyroscope for an individual's physical orientation; a heart rate monitor; a body temperature monitor; and a microphone. The sensors will be integrated into the CALIBRACE using known cut-and-sew techniques to create the SmartCALIBRACE. Data will be collected from the SmartCALIBRACE and observational logs. These data will be analyzed through machine learning algorithms, developed by the Human Sensing Lab at CMU. The data collected from the six sensors may be used in combination or individually to detect symptoms of ParkinsonâĂŹs disease, such as tremors, bradykinesia, postural instability, or falling. Based on automatic evaluation of patient's posture, SmartCALIBRACE will communicate to the patients and caretakers if the

risk of falling has increased, through a personalized algorithm output for each patient. The fall detection feature presents an enormous commercialization opportunity and expands the market from our initial focus on Parkinson's patients to the global senior care industry, where falls can be costly and deadly. However, the team notes that appropriate sensor data may not be found to adequately predict falling; if this is the case, the team will evaluate all of the data collected in Phase I and determine which symptom of Parkinson's disease is most viable to address as development proceeds. In the final product, the algorithm findings will be communicated to the Parkinson's patient or caretaker through an app, web portal, or haptic feedback. AbiliLife's eventual goal is to provide a more holistic view of Parkinson's disease by expanding the number of detectable symptoms.

- *Face De-Identification for Research and Clinical Use*
  09/01/2014-08/31/2016
  National Institutes of Health PI: **Dong Huang**, RI, CMU
  My Role: Principal Investigator. Responsible for managing the research progress, designing machine learning techniques, and reporting to the National Institutes of Health.

  Recent advances in clinical research require image and video data of people for either immediate inspection or storage and subsequent analysis. For instance, cameras are used to monitor the elderly in an independent living facility, and algorithms are developed to automatically extract behavioral information to aid physicians in assessing care needs. In order to advance the development of algorithms to analyze video sequences recorded by such systems, sharing of the data with other researchers is crucial. This new trend, however, ignites concerns about the privacy of people identifiable in the scene. In particular, privacy concerns of patients visible and identifiable within the data make this task difficult. These privacy concerns have become barriers to the widespread use of on videos in health-related behavioral and social science research. To address these concerns, we develop automated methods to de-identify individuals in these videos. Existing methods for de-identification tend to destroy all information involving the individuals by distorting or blurring the facial images of the subjects. These methods do not preserve the facial actions of the subjects contain valuable information for behavioral and medical studies. In contrast, our advanced face de-identification algorithms are able to obscure the identity of the subject without obscuring the action (i.e. preserving the facial expression that may reveal a particular medical condition). Our system will be developed by an interdisciplinary team of computer and behavioral scientists, and it will be made available to the medical community.

- *A Wearable System for Home-monitoring of Chronic Movement Disorders: Cost-effective Solution to Frequent Clinic Visits*
  09/01/2013-08/31/2015
  Highmark (Private company) PI: Jessica Hodgins, RI, CMU
  My Role: Investigator. Responsible for developing machine learning techniques for tremor and dyskinesia detection from accelerometer data.

  Chronic neurodegenerative movement disorders like ParkinsonâĂŹs disease (PD) pose a serious threat to the elderly population. As many as one million Americans (mostly aged 65 or older) live with PD, which is more than the combined number of people diagnosed with multiple sclerosis, muscular dystrophy, and Lou Gehrig's disease. The combined direct and indirect cost of Parkinson's disease, including treatment, social security payments, and lost income from inability to work, is estimated to be nearly $25 billion per year in the United

States alone. One of the major contributors to these costs is the requirement for periodic assessment of the motor symptoms which is performed during clinic visits. In addition to the cost, there are several shortcomings of this current state-of-the-art, including, a) inconvenience to the patients and most importantly, b) the subjectiveness of the motor symptom assessment tests. In this project, we propose to build a wearable system consisting of a set of low-cost wearable accelerometers and a first-person camera to detect and quantitatively assess the severity of motor symptoms during daily living environments. This patient-centric system will not only reduce the requirement for frequent clinic visits but also allow the neurologists to track patient medication cycles which could be very useful in administering more effective personalized care as well as deciding good candidates for surgical interventions like deep brain stimulation (DBS). Such a system also has the potential to alert the patients to seek hospital care when the severity of the symptoms threatens their safety.

- *Video De-identification in the Automobile Environment*
  02 / 2014- 01 / 2015
  Federal Highway Administration(FHWA) PI: Fernando De La Torre, RI, CMU
  My Role: Technical lead, Designing machine learning methods and core algorithms, Managing technical reports, project inspections, and the team, Primary liaison with sponsors.

  Studying naturalistic driver behaviors is a fundamental step to understanding when and how accidents occur, and improve driving safety. The Second Strategic Highway Research Program (SHRP 2) has launched the Naturalistic Driving Study (NDS) to investigate the underlying causes of highway crashes and congestion. In this study, videos of approximately 3,100 drivers were collected across six states in the United States. The recorded videos capture drivers' head poses and facial movements that provide vital cues to assess drivers' status and awareness. In order to advance the automatic analysis of drivers' videos, sharing the data with researchers is crucial. However, privacy issues prevent such sharing with the research community. To address this problem, we are developing a video face masking system (based on my ECCV2012 paper) to remove the drivers' identifiable facial features, while preserving the information related to driving e.g., the head pose, eye gaze, and facial actions.
- *Human Pose and Motion Behavior Pattern Analysis with Frontal View*
  05/2012-12/2012.
  Samsung Electronics Inc. PI: Fernando De La Torre, RI, CMU
  My Role: Technical lead, Designing machine learning methods and core algorithms, Managing technical reports, project inspections, and the team, Primary liaison with sponsors.

  Real-time action recognition is a core technique for the future interactive home appliances, physical exercise assistant systems, and physiotherapy. In a two-year collaboration with Samsung, we developed novel algorithms that simultaneously find temporal intervals and types of body actions. Based on these algorithms, we developed a Microsoft Kinect-based system that can recognize up to 50 daily actions such as physical exercises (e.g., walking, jumping, crutching), sports (e.g., football kicking and baseball swing), and arm gestures.
- *GM-CMU Vehicular Information Technology Collaborative Research Lab*
  01/2009-12/2015

General Motors Inc. PI: Raj Rajkumar, ECE, CMU
My Role: Managing technical reports, project inspections, and the team, Primary liaison with sponsors.

The amount of time with the Eyes-Off-The-Road (EOTR) of the driver has increased by up to 400%, due to the use of cell phones, eating/drinking, and fatigue. Developing an automatic monitoring system for eye gaze is crucial to driving safety. However, due to the different heights, facial features, seat positions of drivers, and unknown illumination conditions, eye gaze detection is extremely difficult. To address these difficulties, we developed novel facial feature localization, geometric calibration and facial feature detection approaches, and successfully built a reliable real-time driver EOTR classifying system. We are currently working with GM for systematic evaluation and improvements.

- *Computerized Detection and Analysis of Cancer Chemotherapy-induced Emesis in a Small Animal Model, Musk Shrew* 01/10/2009-01/06/2010
Hillman Cancer Center-Research Pavilion PI: Charles C. Horn, University of Pittsburgh
My Role: Technical lead from CMU, Designing and implementing computer vision methods and algorithms, Managing technical reports, and Primary liaison with sponsors.

  Vomiting is a common side effect of cancer chemotherapy and many drug treatments and diseases. Understanding and suppressing such side effects in animal studies are crucial to the clinical treatment and well-being of cancer patients. Traditional approach requires direct observation of the animals, which is time-consuming and often lacks temporal precision. In collaboration with Hillman Cancer Center at the University of Pittsburgh, we developed novel algorithms that automatically detect and characterize emetic episodes of musk shrews induced by the cancer chemotherapy agent cisplatin. The findings of the work were published in the Journal of Neuroscience Methods in 2010.

Patents

- *A WiFi-based fine-grain person perception system*, US Provisional Patent, Carnegie Mellon University
- *System and method for processing video to provide facial de-identification*, US Patent US9799096B1, Carnegie Mellon University and Federal Highway Administration
- *Driver gaze detection system*, US Patent US9405982B2, Carnegie Mellon University and General Motors Inc.

Invention Disclosures

- *WiFi-Graphy: hardware and algorithm for 3D medical imaging of the human body using WiFi* , Carnegie Mellon University
- *The Standalone Wi-Fi Device and Algorithm for Multiple 3D Human Body Reconstruction*, Carnegie Mellon University
- *A WiFi-based fine-grain person perception system*, Carnegie Mellon University
- *Video Face De-Identification*, Carnegie Mellon University
- *Automatic Face Editing*, Carnegie Mellon University
- *Photo-realistic Face Transfer*, Carnegie Mellon University

- *Photo-realistic Facial Expression Synthesis*, Carnegie Mellon University

Professional Services

- Invited Reviewer of International Journals: Institute of Electrical and Electronics Engineers(IEEE) Transaction(Trans.) on Pattern Analysis and Machine Intelligence; IEEE Trans. Circuits and Systems for Video Technology; IEEE Trans. Systems, Man, and Cybernetics, Part B; Pattern Recognition;IEEE Trans. Cybernetics; Computers and Graphics
- Invited Reviewer of International Conferences: Computer Vision and Pattern Recognition, European Conference on Computer Vision, Asian Conference on Computer Vision