Sujin Jang

Staff Researcher, Samsung Advanced Institute of Technology (SAIT)

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Resaerch Interests

My current and past research work broadly involve machine learning, human-computer interaction, visual analytics, and robotics. More recently, I am primarily interested in self-supervised learning, domain generalization, and cross-modal representation learning for computer vision tasks in the field of autonomous driving.

Professional Experience

Samsung Advanced Institute of Technology (SAIT) — *Suwon, South Korea*

Staff Researcher — *Jun 2020 - Present*

- Technical lead of multi-view 3D vision systems for autonomous driving;
- Cross-modal representation learning algorithms;
- Unsupervised domain adaptation methods for visual perception

S.LSI, Samsung Electronics Co. — *Hwaseong, South Korea*

Staff Engineer — *Jan 2019 - Jun 2020*

- Frontal-facing camera systems for ADAS;
- Object detection and semantic segmentation algorithms for autonomous driving;
- Hardware-aware quantization;
- GPU/NPU compiler for optimal neural network inference

Motorola Mobility LLC. — *Chicago, IL, USA*

Machine Learning Staff Researcher — *Jun 2017 - Dec 2018*

- Object detection, semantic segmentation, and hand pose estimation for AR/VR applications;
- Optimization and acceleration of neural network models for smart mobile devices;
- Human activity analyses based on various types of wearable sensors;
- Machine learning algorithms for smart mobile/healthcare devices

Education

Purdue University — *West Lafayette, IN, USA*

Ph.D., in Mechanical Engineering — *May 2017*

- Specialization: Human-Computer Interaction, Visual Analytics, Machine Learning
- Thesis: Methods for Analyzing Natural Patterns and Physical Ergonomics of Human Gestures in Mid-Air Interaction
- Committee members: Karthik Ramani, Niklas Elmqvist, David Ebert, Alexander Quinn, and Jitesh Panchal

University of Florida — *Gainesville, FL, USA*

M.S., in Mechanical Engineering — *Aug 2012*

- Specialization: Vision-based nonlinear estimation/control, Robotics, Machine Learning
- Thesis: Experimental Demonstration of Structure Estimation of Moving Objects Using Unknown Input Observers
- Committee members: Carl D. Crane III, Warren E. Dixon, and Prabir Barooah

Kookmin University — *Seoul, South Korea*

B.S., in Mechanical and Automotive Engineering — *Aug 2010*

- Research intern at Unmanned Vehicle Lab.
- Advisor: Jungha Kim

Publications

Journal Articles

J.2 **S. Jang***, A. Villanueva*, W. Stüerzlinger, S. Ambike, K. Ramani, *"Advanced Modeling Method for Quantifying Cumulative Subjective Fatigue in Mid-Air Interaction"*, International Journal of Human-Computer Studies (IJHCS), Vol 169, Jan 2023 (*: equal contributions)

J.1 **S. Jang**, N. Elmqvist, K. Ramani, *"MotionFlow: Visual Abstraction and Aggregation of Sequential Patterns in Human Motion Tracking Data"*, IEEE Transaction on Visualization and Computer Graphics (TVCG), vol 22. Jan 31, 2016 / IEEE VAST 2015 (22% acceptance rate).

Conference Proceedings (peer-reviewed)

C.8 G. Chang*, W. Roh*, **S. Jang**, D. Lee, D. Ji, G. Oh, J. Park, J. Kim, S. Kim, *"CMDA: Cross-Modal and Domain Adversarial Adaptation for LiDAR-based 3D Object Detection"*, Proceedings of the AAAI Conference on Artificial Intelligence (AAAI, 23.7% acceptance rate), 2024 (*: equal contributions)

C.7 **S. Jang***, D. Jo*, S. Hwang, D. Lee, D. Ji, *"STXD: Structural and Temporal Cross-Modal Distillation for Multi-View 3D Object Detection"*, Proceedings of the Conference on Neural Information Processing Systems (NeurIPS, 26.1% acceptance rate), 2023 (*: equal contributions)

C.6 **S. Jang**, J. Na, D. Oh, *"DaDA: Distortion-aware Domain Adaptation for Unsupervised Semantic Segmentation"*, Proceedings of the Conference on Neural Information Processing Systems (NeurIPS–Oral, 184/2665 ∼ 6.9%), 2022

C.5 **S. Jang**, W. Stuerzlinger, S. Ambike, K. Ramani, *"Modeling Cumulative Arm Fatigue in Mid-Air Interaction based on Perceived Exertion and Kinetics of Arm Motion"*, In Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI, 25% acceptance rate), 2017

C.4 C. Choi, A. Sinha, J. H. Choi, **S. Jang**, K. Ramani, *"A Collaborative Filtering Approach to Real-Time Hand Pose Estimation"*, Proceedings of the IEEE Interactional Conference on Computer Vision (ICCV, 30% acceptance rate), 2015

C.3 **S. Jang**, N. Elmqvist, K. Ramani, *"GestureAnalyzer: Visual Analytics for Pattern Analysis of Mid-Air Hand Gesture"*, Proceedings of the ACM Symposium on Spatial User Interaction (SUI, 29% acceptance rate), 2014

C.2 S. Gupta, **S. Jang**, K. Ramani, *"PuppetX: A Framework for Gestural Interactions With User Constructed Playthings"*, Proceedings of the ACM Conference on Advanced Visual Interfaces (AVI, 28% acceptance rate), 2014

C.1 **S. Jang**, A. P. Dani, C. D. Crane, W. E. Dixon, *"Experimental Results for Moving Object Structure Estimation using an Unknown Input Observer Approach"*, Proceedings of the ASME Conference on Dynamic Systems and Control (DSCC, Best Paper in Session Award), 2012

Patens

P.4 J Lee, Y Park, KJ Sung, **S. Jang** *"Method and apparatus with data labeling"*, US Patent App. 18/109,928, 2023

P.3 **S. Jang**, J Na, D Oh *"Method and device with data processing using neural network"*, US Patent App. 17/575,002, 2022

P.2 N. A. Madhusudhana, V. K. Tyagi, N. Dabhi, H. Zhao, **S. Jang**, *"Pressure sensing device interface representation"*, US Patent 11,320,984, 2022

P.1 M. Qian, **S. Jang**, J. W. Nicholson, S. Wang, *"Modifying an image based on identifying a feature"*, US Patent 11,023,769, 2021

Honors and Awards

A.3 **Samsung Best Paper Award (Bronze, Multimedia Division)**, Samsung Group, 2023

A.2 **Magoon Excellence in Teaching Award**, College of Engineering, Purdue University, West Lafayette, IN, 2015

A.1 **Best Paper in Session Award**, ASME Dynamic Systems and Control Conference, Fort Lauderdale, FL, 2013

Teaching Experience

School of Mechanical Engineering, Purdue University *West Lafayette, IN, USA*

Graduate Teaching Assistant *Aug. 2013–May. 2016*

ME 444: Computer-aided design and rapid prototyping

- Course goals: generating and communicating design ideas, effective use of CAD tools for product design, action toy design
- Instructed undergraduate students during the lab sessions and guided them to complete toy design projects

Media Coverage

M.5 **Health Hazards: Beware of 'gorilla arm syndrome**, DECCAN CHRONICLE, June 23rd, 2017 (Article link)

M.4 **Arm and muscle fatigue accumulates during prolonged use of mid-air computer interfaces say Purdue University researchers**, DATAQUEST, June 13th, 2017 (Article link)

M.3 **Researchers Study Gorilla Arm Fatigue in VR Gaming**, VR Times, May 9th, 2017 (Article link)

M.2 **Study researches 'gorilla arm' fatigue in mid-air computer usage**, Physics.org, May 9th, 2017 (Article link)

M.1 **Do YOU suffer from 'gorilla arm'? Experts warn virtual reality controllers are leading to new medical problems**, DailyMail, May 9th, 2017 (Article link)

Scientific Community Service

- [CVPR] Reviewer, IEEE Conference on Computer Vision and Pattern Recognition, 2023,2024
- [ISMAR] Reviewer, IEEE International Symposium on Mixed and Augmented Reality, 2021
- [VR] Reviewer, IEEE Conference on Virtual Reality, 2018–2019
- [3DUI] Reviewer, IEEE Symposium on 3D User Interfaces, 2016
- [TVCG] Reviewer, IEEE Transaction on Visualization and Computer Graphics, 2017
- [InfoVis] Reviewer, IEEE Conference on Information Visualization, 2015
- [VAST] Reviewer, IEEE Conference on Visual Analytics Science and Technology, 2016–2020
- [EuroVis] Reviewer, EG/VGTC Conference on Data Visualization, 2016
- Student Volunteer, IEEE VIS, 2015
- [CSCW] Reviewer, ACM Conference on Computer Supported Collaborative Work, 2016–2024
- [CHI] Reviewer, ACM Conference on Human Factors in Computing Systems, 2016–2024

- [UIST] Reviewer, ACM Symposium on User Interface Software and Technology, 2018
- [MobileCHI] Reviewer, ACM International Conference on Mobile Human-Computer Interaction, 2019
- [SUI] Reviewer, ACM Symposium on Spatial User Interaction, 2019
- [DIS] Reviewer, ACM Conference on Designing Interactive Systems, 2016–2017
- [TEI] Reviewer, ACM Conference on Tangible, Embedded, and Embodied Interaction, 2017
- [IDC] Reviewer, ACM Conference on Interaction Design and Children, 2017
- [JCISE] Reviewer, ASME Journal of Computing and Information Science in Engineering, 2023

References

Available upon request