SAMSUNG

SAIT
AI RESEARCH
CENTER

WHO WE ARE

Samsung Advanced Institute of Technology(SAIT) is Samsung's R&D hub. Established in 1987, it serves as the incubator for cutting-edge technologies under the philosophy of 'Boundless search for Breakthroughs'.

The Artificial Intelligence & Software (AI&SW) Research Center leads efforts in advancing Artificial Intelligence and Computing Platform technologies.

ARTIFICIAL INTELLIGENCE

- Machine Learning
- Computer Vision
- Speech & Language
- Semiconductor & Material Design Automation
- Automotive Vision

HOW WE WORK

SAIT AI&SW Research Center has a global research network including labs in 7 locations across Asia and North America. We collaborate actively with renowned researchers and research organizations worldwide. Our lab in Montreal is co-located with MILA led by Dr. Yoshua Bengio.

And, we have our own supercomputing systems for simulations & machine learning

JOIN US!

Accepting full-time employment and internship applications

Interested applicants may send their resumes to:
jobinfo@samsung.com

Additional information may be found at:
https://www.sait.samsung.co.kr

ACCOMPLISHMENTS

PUBLICATIONS (Selected)

2021

Unsupervised Representation Transfer for Small Network: I Believe I Can Distill On-the-Fly (NeurIPS)

SEMI-SUPERVISED 360° DEPTH ESTIMATION FROM MULTIPLE FISHEYE CAMERAS WITH PIXEL-LEVEL SELECTIVE LOSS (ICASSP)

Order Regularization on Ordinal Loss for Head Pose, Age and Gaze Estimation (AAAI)

RaScaNet: Learning Tiny Models by Raster-Scanning Images (CVPR)

Controllable Image Restoration for Under Display Camera in Smartphones (CVPR)

Learning Generalized Intersection Over Union for Dense Pixelwise Prediction (ICML)

Large Scale Multi-illuminant (LSMI) Dataset for Developing White Balance Algorithm under Mixed Illumination (Co-authorship, ICCV)

2020

A Graph Similarity for Deep Learning (NeurIPS)

Few-shot Visual Reasoning with Meta-analogicalContrastive Learning (NeurIPS)

Time-Reversal Symmetric ODE Network (NeurIPS)

Distribution Aligning Refinery of Pseudo-label forImbalanced Semi-supervised Learning (NeurIPS)

Slim-panel Holographic Video Display (Nature Communications)

Meta Variance Transfer: Learning to Augment from theOthers (ICML (Oral)

Universal Average-Case Optimality of Polyak Momentum (ICML (Oral))

Average-case Acceleration Through Spectral DensityEstimation (ICML (Oral))

Procrustean Regression Networks: Learning 3DStructure of Non-Rigid Objects from 2D Annotations (ECCV)

Long-term Non-Anesthetic Preclinical Study AvailableExtra-Cranial Brain Activator (ECBA) System for the Future Minimally-InvasiveHuman Neuro-Modulation (EMBC)

Adaptive Knowledge Distillation Based on Entropy (ICASSP)

KL-Divergence-Based Region Proposal Network forObject Detection (ICIP)

Software Development Framework for CooperatingRobots with High-Level Mission Specification (IROS)

Toward Specular Removal from Natural Images Based onStatistical Reflection Models (IEEE T.on Image Processing)

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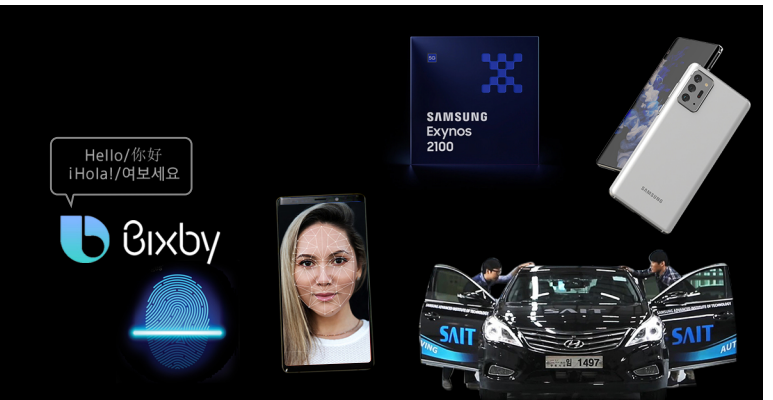
WHAT WE ARE INTERESTED IN

MACHINE LEARNING

Recent technological breakthroughs in the field of artificial intelligence have been enabled by machine learning. There are still many challenges toward human level AI including understanding the physical world, learning the common sense, utilizing the human knowledge, and figuring out causality. Our research efforts aim to move machines and systems further along from perception to cognition.
We conduct fundamental research on machine learning, in particular, deep learning theories and pursue innovations in core machine algorithms.

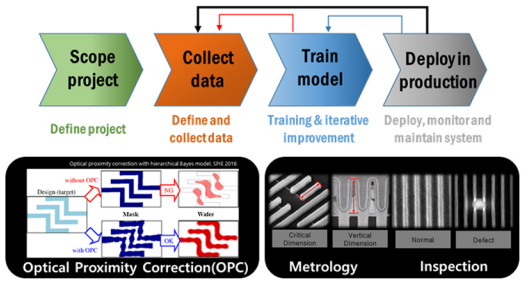
COMPUTER VISION

Computer vision gives devices the power of sight.
SAIT developed on-device face recognition to seamlessly unlock Samsung's Galaxy smartphones.
Our research goals are to further visual understanding and reason about people and the environment and to extend the machine's vision beyond the limitations of hardware and optics.

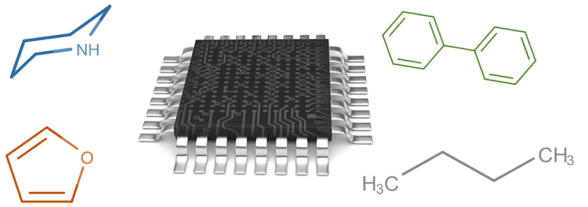


MACHINE VISION

Recent computer vision technology is transforming machine vision systems into deep learning based automation systems. However, the industry are still relies heavily on human involvement in areas like quality assurance and process design. We pursue solving industrial problems by developing computer vision technology to automate the manufacturing systems. Our research topics include depth estimation, image generation, representation learning, anomaly detection, domain adaptation, continual learning and physics based AI simulation.



SEMICONDUCTOR & MATERIAL DESIGN AUTOMATION



New AI-based tools for discovering and designing innovative materials will improve R&D outcomes as well as reduce time to market in areas such as semiconductor chip design, fabrication process design, and materials structure & synthesis.
We develop technologies for physics and chemistry based modeling/simulation and molecule and atom level analysis of material and devices. We are also researching robotics technology for automation of the physical experiment processes.

SENSOR VISION AND IMAGE SIGNAL PROCESSING

We are entering a new era of AI Image Sensors. The goal of sensor vision research is to equip image sensors with AI processing capabilities. It includes research on core computer vision algorithms for the computerization and automation of tasks that the human visual system can perform, as well as the development of systems and frameworks that can efficiently process, interpret, and analyze visual data on the sensor side.

The research of image quality enhancement is a key to image sensor innovation. We are trying to transform the existing mobile camera ISP pipeline to AI ISP for achieving beyond-human perceptual image quality. Major research topics include end-to-end differentiable AI ISP pipeline, AI 3A and AI image restoration. AI design methodology such as Deep optics will be further exploited for developing new types of mobile camera and sensor.

AUTOMOTIVE VISION

We all expect a new era of autonomous driving to come soon. At SAIT, we focus on algorithm development that can move up the new era. As you can expect various fields are covered such as 3D vision technology understanding ego-vehicle surrounding 3D space, sensor fusion based environmental recognition technology, and vehicle path planning & control technology. More in detail, in development vision-based perception algorithms contain vehicle/pedestrian/lane detection and local ization. These algorithms can be used for ADAS (AEB, Level 2+) and Autonomous Driving (Level 3/4) function development.