JangHyeon Lee

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https://janghyeon-lee.github.io/

RESEARCH INTERESTS

Machine learning in general with a focus on **generalization**, **tinyML**, and **spatial AI**.

EDUCATION

University of Minnesota	Twin Cities, MN, USA
Ph.D. in Computer Science	2024 - present
Simon Fraser University	Burnaby, BC, Canada
M.S. in Computing Science	2022 - 2023
Simon Fraser University	Burnaby, BC, Canada
B.S. in Computing Science	2021 - 2022
Korea University	Seoul, S. Korea
B.S. in Materials Science and Engineering	2017 - 2021

AWARDS & HONORS

SFU CS Diversity Award: Winner of 2024 (media)	2024
SFU GSS Professional Development Grant	2023
SFU School of Computing Science Innovation Prize: 1st Place Winner (media)	2023
SFU Master of Science in Professional Computer Science Entrance Scholarship	2022
SFU Alumni Scholarship	2022
SFU Dean's Honour Roll	2022

SELECTED PUBLICATIONS (G. Scholar)

* = equal contribution, † = corresponding author

Journals

[J2] Fan, J.*, **Lee, J.***, & Lee, Y. (2021). A transfer learning architecture based on a support vector machine for histopathology image classification. *Applied Sciences, 11*(14), 6380.

[J1] Im, S., Hyeon, J., Rha, E., **Lee, J.**, Choi, H. J., Jung, Y., & Kim, T. J. (2021). Classification of diffuse glioma subtype from clinical-grade pathological images using deep transfer learning. *Sensors, 21*(10), 3500.

[Under Review] Imran, H.*, & **Lee, J.*** (2023). Enhancing Student Engagement in Online Courses: An Empirical Study on the Efficacy of Self-Determination Theory-Informed Gamification. *Computers & Education.*

[Under Review] **Lee, J.**, & Lee, Y. (2024). Cancer-EffNet: Efficient Cancer Diagnosis for Mobile Devices. *IEEE Journal of Biomedical and Health Informatics.*

Conferences

[C1] Fan, J., **Lee, J.**, Jung, I., & Lee, Y. (2021, June). Improvement of object detection based on faster R-CNN and YOLO. In *2021 36th International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC)* (pp. 1-4). IEEE.

[Under Review] **Lee, J.**, & Kim, L. H. (2024). Out of Sight, Out of Mind: Diminished Reality for Cognitive Enhancement. *UIST*.

[Under Review] **Lee, J.**, Wang, H., Luo, J., & Kim, L. H. (2024). Keep Calm and Carry AR: Mitigating Stage Fright via Diminished Reality. *UIST*.

[Under Review] Liang, H., **Lee, J.**, Kim, L. H., & Yang, XD. (2024). MRfidget: Exploring Fidgeting in Mixed Reality. *UIST*.

[In Progress] **Lee, J.**, Nguyen, H. D., Shokraneh, N., & Libbrecht, M. W. (2024). Forget the Code: Learning to Un-learn for Genomics. *aiming for ACM-BCB*.

[In Progress] **Lee, J.**, Siravuru, A., & Desingh, K. (2024). When2Switch: Adaptive Real-Time Perception Cycles. *aiming for CoRL*.

Peer-reviewed Demos, Posters, Extended Abstracts

[P1] Pulatova, S., Luo, J., **Lee, J.**, Domova, V., Yao, Y., Rajabi, P., & Kim, L. H. (2023). SwarmFidget: Exploring Programmable Actuated Fidgeting with Swarm Robots. In *Adjunct Proceedings of the 36th Annual ACM Symposium on User Interface Software and Technology*.

Book Chapters

[B1] Imran, H., [multiple co-authors, including **Lee, J.**] (2023). Converging Text Mining and Biomedical Domain Knowledge. *Springer*. (to appear)

Preprints

[1] **Lee, J.**[†], Li. J., & Imran, H. (2024). Learning to Teach, Teaching to Learn: Personalized Education via Personalized LLMs.

RESEARCH & WORK EXPERIENCE

University of Minnesota   Twin Cities, MN, USA
RPM Lab, Research Assistant (remote)   2023 - 2024
Advisor: Karthik Desingh
- Investigated bio-inspired fovea vision for adaptive real-time robotics perception
- Explored speed/accuracy/resource trade-offs between object detectors and trackers
- Created a synthetic video dataset *generator* for unlimited dynamic scenes (w/ automatic bbox-labels)

Simon Fraser University   Burnaby, BC, Canada
ixLab, Research Assistant   2023 - 2024
Advisor: Lawrence Kim
- Diminished reality to visually mask real-world objects using Microsoft's AR HoloLens
- Designed and conducted AR for Well-being (AR4WB) user study for 60 participants
- Implemented real-time detection framework for head mounted devices via knowledge distillation
GrUVi Lab, Research Assistant   2022 - 2023
Advisor: Yasutaka Furukawa
- Developed accurate trajectory estimations with multi-modal deep learning for indoor GPS
- Processed sensor streams to correct ground truth trajectory and synchronize time between modalities
- Created a baseline multi-output MLP regressor to predict positions from the magnetometer data
NatLangLab & Computational Sustainability Lab, Undergrad Research Assistant   2022
Advisor: Fred Popowich, Stephen Makonin
- Used generative models (ex., GANs) to generate synthetic time-series data for smart grid analytics
- Performed t-SNE and PCA analysis to assess the fidelity/diversity of the synthetic dataset

- Presented a poster at the SFU CS undergraduate research symposium **(poster)**

Korea Advanced Institute of Science and Technology (KAIST)   Daejeon, S. Korea
Knowledge Engineering and Artificial Intelligence Lab, Intern   2021
Advisor: Ho-Jin Choi, Yuchae Jung
- Spotlighted for biomedical XAI solution at Washington I-Corps sponsored by the Korean MSIT
- Developed digital pathology AI to classify rare glioma subtypes sponsored by the Korean MOHW
- Prepared *Transfer Learning in Digital Pathology* workshop at the Korean Society of Pathologists

Korea University   Seoul, S. Korea
Laboratory for Optoelectronic Materials, Undergrad Research Assistant   2019
Advisor: In-Hwan Lee
- Prepared and tested variants of high-power InGaN-based UV/blue/green LED devices
- Enhanced and streamlined MATLAB scripts to achieve more efficient testing processes

TEACHING EXPERIENCE

Simon Fraser University, Teaching Assistant   2022-2023
CMPT 363: User Interface Design
CMPT 300: Operating Systems, **head TA**
CMPT 120: Introduction to CS and Programming I, **head TA**
CMPT 310: Introduction to Artificial Intelligence, **head TA**

Langara College, Teaching Assistant (remote)   2023
CPSC 2221: Data Base Systems

SELECTED PROJECTS (sole PI)

Fairness: An Epoch is All You Need for Fairness in Distilled Models **(poster)**
- *Problem*: Tiny models are found to be more biased by group identities compared to LLMs
- *Contribution*: Designed a knowledge distillation framework to teach fairness in BERT models
- *Outcome*: Reduced false positive rate gap by 35% in hate speech classification with just one epoch

Synthetic AI: Is Seeing Still Not Necessarily Believing? **(media)**
- *Problem*: Data-hungry DL models face challenges, particularly in fields, where data privacy is strict
- *Contribution*: Created a conditional diffusion model to generate synthetic data for rare data cases
- *Outcome*: Improved 4% in classification when augmented and synthetic alone was on par with original

Domain Adaptation: Update the Data, not the Model **(report)**
- *Problem*: Retraining models for domain shifts is inefficient, requiring significant data and tuning
- *Contribution*: Proposed a diffusion model pipeline to mitigate domain shifts by updating target data
- *Outcome*: Reduced 5% generalization error for classification on the ImageNet-C benchmark

STUDENT ADVISING

Jiadi (Tian) Luo, Simon Fraser University CS BS – now at Northeastern CS MS (starting Fall 2024)

MISCELLANY

Programming: Python (PyTorch, TensorFlow), C++, C# (Unity), R, SAS, MATLAB, SQL
Languages: English (native, Canadian citizen), Korean (native)