JUNHYUN LEE

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Machine Learning Researcher

google scholar *github* *linkedin* wechat: Ant_LJH

https://junhyunlee.com

INTERESTS & TECHNICAL SKILLS

- Deep Learning, Graph Neural Networks, Computer Vision, BioMedical Data Mining, Medical Instrumentation, Signal Processing, Web programming, Cell culture (biology)
- Python(TensorFlow, Pytorch, Django), MATLAB, HTML & CSS

EDUCATION

Ph.D. (M.S Integrated) Course in **Computer Science** at **Korea University** *Seoul*   2018 – Present
- [Data Mining & Information Systems Laboratory](#) (advisor: Prof. Jaewoo Kang)
- [Machine Learning and Vision Laboratory](#) (advisor: Prof. Hyunwoo J. Kim)
- Main research domain: Machine learning on graphs, Biomedical datamining

Visiting Researcher at **Carnegie Mellon University**   JAN 2020 – JUL 2020
- [Data Analysis Techniques Algorithms Laboratory](#) (advisor: Prof. Leman Akoglu)
- Main research domain: Graph neural networks
- Fully supported by Carnegie Mellon University and Korean Institute (IITP)

Bachelor's degree in **Biomedical Engineering** at **Korea University** *Seoul*   2011 – 2017
- Intelligent Bio-MEMS Laboratory (advisor: Prof. Sanghoon Lee)
- Main research domain: Biomedical Instrumentation, MEMS technology

PUBLICATION *google scholar*   *** joint-first-author**

Subgraph-level Universal Prompt Tuning
- Junhyun Lee, Wooseong Yang, Jaewoo Kang

                                                                    Under Review

Understanding and Tackling Over-Dilution in Graph Neural Networks
- Junhyun Lee, Veronika Thost, Bumsoo Kim, Jaewoo Kang, Tengfei Ma

                                                                    Under Review

MolPLA: A Molecular Pretraining Framework for Learning Cores, R-Groups and their Linker Joints
- Mogan Gim*, Jueon Park*, Soyon Park, Sanghoon Lee, Seungheun Baek, Junhyun Lee, Ngoc-Quang Nguyen, Jaewoo Kang

                                                                    Under Review

Co-attention Graph Pooling for Efficient Pairwise Graph Interaction Learning
- Junhyun Lee*, Bumsoo Kim*, Minji Jeon, Jaewoo Kang

                                                      Published at **IEEE Access 2023**

Towards flexible time-to-event modeling: optimizing neural networks via rank regression
- Hyunjun Lee*, Junhyun Lee*, Taehwa Choi, Jaewoo Kang, Sangbum Choi

                                                      Published at **ECAI 2023**

MSTR: Multi-Scale Transformer for End-to-End Human-Object Interaction Detection

–   Bumsoo Kim, Jonghwan Mun, Kyoung-Woon On, Minchul Shin, **Junhyun Lee**, Eun-Sol Kim

Published at **CVPR 2022**

Neo-GNNs: Neighborhood Overlap-aware Graph Neural Networks for Link Prediction

–   Seongjun Yun, Seoyoon Kim, **Junhyun Lee**, Jaewoo Kang, Hyunwoo J. Kim

Published at **NeurIPS 2021**

HOTR: End-to-End Human-Object Interaction Detection with Transformers

–   Bumsoo Kim, **Junhyun Lee**, Jaewoo Kang, Hyunwoo J Kim, Eun-sol Kim

Published at **CVPR 2021 (oral)**

3D Printed, Customizable, and Multifunctional Smart Electronic Eyeglasses for Wearable Healthcare Systems and Human–Machine Interfaces

–   Joong Hoon Lee, Hanseop Kim, Ji-Young Hwang, Jinmook Chung, Tae-Min Jang, Dong Gyu Seo, Yuyan Gao, **Junhyun Lee**, Haedong Park, Seungwoo Lee, Hong Chul Moon, Huanyu Cheng, Sang-Hoon Lee, Suk-Won Hwang

Published at **ACS applied materials & interfaces 2020**

Robust Long-Term Object Tracking via Improved Discriminative Model Prediction

–   Seokeon Choi, **Junhyun Lee**, Yunsung Lee, Alexander Hauptmann   Published at **ECCVW 2020**

Self-Attention Graph Pooling

Published at **ICML 2019**

–   **Junhyun Lee***, Inyeop Lee*, Jaewoo Kang
–   Officially implemented at [Pytorch Geometric](#) (most popular GNN framework)

ARPNet: Antidepressant Response Prediction Network for Major Depressive Disorder

–   Buru Chang, Yonghwa Choi, Minji Jeon, **Junhyun Lee**, Kyu-Man Han, Aram Kim, Byung-Joo Ham, Jaewoo Kang   Published at **Genes 2019**

Detection of masses in mammograms using a one-stage object detector based on a deep convolutional neural network   Published at **PLOS ONE 2018**

–   Hwejin Jung, Bumsoo Kim, Inyeop Lee, Minhwan Yoo, **Junhyun Lee**, Sooyoun Ham, Okhee Woo, Jaewoo Kang

Classification of lung nodules in CT scans using three-dimensional deep convolutional neural networks with a checkpoint ensemble method   Published at **BMC Medical Imaging 2018**

–   Hwejin Jung, Bumsoo Kim, Inyeop Lee, **Junhyun Lee**, Jaewoo Kang

PROJECTS

Deep Learning for Graph-structured Biomedical Data *laboratory project*   DEC 2018 – Present
- Developed a novel deep learning model to obtain representations of the molecular graph and the gene expression (using gene networks)
- Constructed drug-kinase binding affinity prediction model
- Developed a novel graph pooling module to predict drug-drug interactions

Application of Deep Learning in Medical Image Analysis *laboratory project*   JUN 2017 – AUG 2018
- Developed object detection model for white blood cell microscopic image
- Implemented medical image segmentation model   *[Github](#)* ★2.4k+
- Developed labeling tool (PyQt 5)

Clinical Decision Support System for Depression *national project*   FEB 2018 – AUG 2018
- Performed a precedent study for clinical decision support system about deep learning

- Developed the webserver for deep learning model inference API

Web development *personal project*   JAN 2018 – JAN 2019
- Developed the webserver (Backend) by using Django
- Developed Frontend by using HTML&CSS
- Served on Raspberrypi using Nginx & Gunicorn or on Github Pages
- URL: https://www.fromzero.studio and https://zozo.works

Development of Human-Machine Interfaces *laboratory project*   DEC 2015 – JUL 2016
- Developed a Human-Machine Interface Application using EOG (Electrooculography)
- Fabricated composite of carbon nanotube and polydimethylsiloxane
- Performed toxicity test of the electrode with HaCaT cell line

ECG (EKG) Authentication (Biometrics) System *personal project* *Website*   DEC 2015 – JUL 2016
- Developed of wireless authentication system using ECG(ElectroCardioGram, or EKG)
- Fabricated the elastic electrode with carbon nanotube and polydimethylsiloxane
- Designed analog signal processing circuit and DAQ
- Developed Bluetooth communication, digital signal processing, and GUI

Kiosk Production for Reading Room *volunteer project*   *Article(KU News)*   SEPT 2015 – JUN 2016
- Developed the programs for generation of personal barcode and barcode reader
- Developed the kiosk program for a reading room in college

EXPERIENCE

FastCampus *South Korea*   JUN 2022
Online Course Instructor (High-level computer vision course)
- Designed and implemented curriculum for graph and transformer-based approaches

Kakao Brain *Pangyo, Korea*   DEC 2020 – JUN 2021
AI Research Intern (Team leader: Dr. Eun-sol Kim, Kakao Brain)
- AI research on graph neural networks and computer vision (video intelligence)

Industry-Academia Collaboration Foundation *Seoul, Korea*   JUN 2017 – FEB 2018
Staff (Team leader: Prof. Jaewoo Kang, Korea University)
- Big data scientist human resource training team in the national project "Brain Korea 21 PLUS", Korea Univ.

Intelligent Bio-MEMS Laboratory *Seoul, Korea*   DEC 2015 – JUN 2016
Research Intern (Advisor: Prof. Sanghoon Lee, Korea University)
- Fabrication of elastic electrode using MEMS technology
- Composite of carbon nanotube(CNT) and polydimethylsiloxane(PDMS)
- Application of medical instrumentation using CNT/PDMS electrode

SCHOLARSHIP

GENERAL SCHOLARSHIPS   1st Semester, 2019
NATIONAL SCIENCE SCHOLARSHIP   2nd Semester, 2016
KU UNDERGRADUATE RESEARCH SCHOLARSHIP   2nd Semester, 2016
- Scholarship for honor undergraduate researcher

WORK-STUDY SCHOLARSHIP   1st Semester, 2016

- Scholarship due to a kiosk volunteer project

HONORS SCHOLARSHIP   2nd Semester, 2015
KU DREAM SCHOLARSHIP   2nd Semester, 2011

HONORS & AWARDS

DREAM challenge Top performer *Website*   2019
- IDG-DREAM Drug-Kinase binding prediction challenge (Team: DMIS_DK)

Semester High Honors   1st Semester, 2nd Semester, 2016
                                                          1st Semester, 2nd Semester, 2015

PATENT (inventor)

[International, PCT] Method and system for recommending antidepressants   Application
[KOREA] Method and system for discovery new drug candidate   Registration
[KOREA] System for recommending personalized antidepressants and quantitatively
predicting reactivity of antidepressants   Application
[International, PCT] Method for preparing conductive polymer composite and conductive
polymer composite prepared therefrom   Application
[KOREA] Conductive polymer composite   Registration

ACTIVITY

[Community]
- **[Organizer] A Korean community for Graph Neural Networks (*Facebook*)** members 2.4k+
- **[Member] Applied Machine Learning Club** at **Carnegie Mellon University (*Bridge*)**

[Talk]
- **Introduction to Graph Neural Networks** @KAKAO corp.   JUL 2019
- **Invited paper: Self-Attention Graph Pooling** @KCC (Korea Computer Congress)   JUN 2019

[Organizer]
- **LoG '25**

[Reviewer]
- **ICLR '22 '23 '24**
- **ICML '21 '22 '23 '24**
- **NeurIPS '21 '22 '23**
- **CVPR '23 '24**
- **ICCV '23**
- **LoG '22 '23**
- **KDD '24**
- **IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)**
- **Information Sciences**

[Program Committee]
- **WWW '22 (Graph Learning Workshop)**