JAYWON KOO

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RESEARCH INTERESTS

Multimodal AI, Representation Learning, Commonsense Reasoning, Spoken Language Processing, Natural Language Processing, Computer Vision

EDUCATION

Columbia University, New York, USA *September 2021 - December 2022*
M.S. in Computer Science - Natural Language Processing Track

Ewha Womans University, Seoul, Republic of Korea *March 2016 - August 2021*
B.S. in Computer Science and Engineering, *Magna Cum Laude*
B.S. in Self-Designed Major (Scranton Honors Program-Convergence of Science)

ACADEMIC PAPERS

- Hammad A. Ayyubi, Christopher Thomas, Lovish Chum, Rahul Lokesh, Yulei Niu, Xudong Lin, Long Chen, **Jaywon Koo**, Sounak Ray and Shih-Fu Chang. "Multimodal Event Graphs: Towards Event Centric Understanding of Multimodal World", arXiv:2206.07207, 2022 *(rejected to Neurips 2022 and preparing for CVPR 2023)* [Link]
- **Jaywon Koo** and Dongbo Min. "DAT-StereoNet: Domain gap Aware Translation Stereo Network", *(rejected to AAAI-21 and preparing for Journal)*
- **Jaywon Koo** and Dongbo Min. "Nighttime Stereo Matching using Domain Adaptation", Summer Annual Conference of IEIE, 2021
- Sunho Kim, Royoung Kim, Hee-Jo Nam, [and 42 others, including **Jaywon Koo**] "Organizing an in-class hackathon to correct PDF-to-text conversion errors of Genomics & Informatics 1.0.Genomics Inform", Genomics & Informatics, 2020 [Link]
- **Jaywon Koo** and Dongbo Min. "Stereo Matching in Night-time Scene using Stereo-consistency", Korea Software Congress, 2020

RESEARCH EXPERIENCE

Speech Lab, Columbia University January 2022 - Present
Graduate Research Assistant (Advisor: Prof. Julia Hirschberg) *New York, USA*

- Developing a multimodal model through a DAPRA funded project (Cross-Cultural Harmony through Affect and Response Mediation) for detecting social norms, emotion, and communication failure
- Proposed and built multi-person, in-context multimodal emotion recognition model using hierarchical fusion method
- Implemented speech emotion recognition model using HuBERT, Wav2Vec2.0 and Data2Vec

DVMM Lab, Columbia University September 2021 - December 2021
Graduate Research Assistant (Advisor: Prof. Shih-Fu Chang) *New York, USA*

- Created a new multimodal task, event-event relations detection where the model detects events in text and video and predicts relations among them
- Implemented two ways to utilize commonsense knowledge features in event-event relations detection using ConceptNet and CLIP
- Participated in building a large event-event relationship dataset containing 100k video-news article pairs

Computer Vision Lab, Ewha Womans University March 2019 - July 2021
Research Intern (Advisor: Prof. Dongbo Min) *Seoul, Republic of Korea*

· Analyzed novel problem of Image-to-Image Translation Network when domain gaps of source and target become large and invented a curriculum learning based model
· Developed a supervised way of stereo matching in low-light scene regarding stereo consistency, and wrote a paper (Korea Software Congress 2020)
· Proposed two methods (tone adjust and manually rendering) to make Night time - Day time paired stereo dataset using Lightroom consisting 2000 pairs utilizing KITTI12/15, Citycsape, and DC datasets
· Led a research on unsupervised stereo matching in low-light scene incorporating low light enhancement and denoising network, using PyTorch

Bioinformatics Lab, Ewha Womans University July 2020 - August 2020
Research Intern (Advisor: Prof. HyunSeok Park) *Seoul, Republic of Korea*

· Implemented Part of Speech (POS) tagging on biomedical data (GENIA, gni-corpus) by using BIOBERT and compared it with MLP, LSTM and BiLSTM
· Participated in building Genomics & Informatics corpus

PROJECTS

Korean Auto Speech Recognition Model September 2021 - December 2021
COMS6998: Fundamentals of Speech Recognition at Columbia University

· Implemented Korean auto speech recognition model based on Kaldi. Applied SentencePiece tokenization and compared two models where hidden Markov model reached 38.46% of Word Error Rate (WER), and TDNN approach resulted 16.56% of WER.

Hospital Guidance Robot February 2020
AAAI-20 Student Outreach Workshop

· Implemented a hospital guidance robot which finds the door automatically, navigates patients by voice and grabs object on the way. Used object recognition, and line tracking skills with Cozmo robot.

SORI (System with Omniwheel & Recognition Interface) October 2019 - November 2019

· Developed an AI assistant robot with omniwheels and Raspberry Pi which recognizes users, finds, and delivers ordered objects to other users. For detection, utilized Single Shot Detection network, FaceNet, and MobileNet.
· Awarded Bronze Price in International Capstone Design Fair 2019 and second place in Ewha Engineering Capstone Design Contest

AWARDS AND HONORS

Naver Best Paper Award (among top-5 papers), IEIE Conference *July 2021*
Second Place, Graduation Project Contest, Ewha Womans University *Fall 2020*
Scholarship of Academic Excellence, Ewha Womans University *Fall 2020, Spring 2021*
Future Competent Scholarship, Ewha Womans University *Summer 2020*
Scranton Honors Program Scholarship, Ewha Womans University *Spring 2016, Fall 2018 - Spring 2020*

TECHNICAL SKILLS

Advanced Python, C, Java, Pytorch, Tensorflow, Keras, MySQL, Git, OpenCV, Sckit-learn
Moderate C++, Matlab, SPSS, LaTeX, OpenGL, Kaldi
Novice Swift