SEUNGHWAN (SEAN) CHA

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EDUCATION

CARNEGIE MELLON UNIVERSITY, Pittsburgh, PA, U.S.A.   **08/2019-Present**
Master of Science in Research, Robotics Institute (GPA: 3.85/4.0)

HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY, Kowloon, Hong Kong   **09/2013-06/2019**
BEng in Computer Engineering, Graduated with First Class Honors (GPA: 3.70/4.3)
Department of Computer Engineering, School of Engineering

VANDERBILT UNIVERSITY, Nashville, TN, U.S.A   **01/2018-05/2018**
Semester Exchange, School of Engineering (GPA: 3.83/4.0)

WORK EXPERIENCE

CMU Robotics Institute, Pittsburgh, PA, U.S.A.   **08/2019-Present**
Research Assistant, Professor Deva Ramanan
- **Action Retrieval:** Studied active learning to retrieve action instances from partially annotated video data.
- **Action Spotting:** Developed new pipeline and metric to learn to detect activities in untrimmed video.

NAVER CLOVA AI, Seongnam, South Korea   **05/2019-08/2019**
Research Intern, Clova Video AI team
- **Video Pipeline**: Developed an engineering pipeline that boosts the training speed of action recognition task by more than 50% through improving video random access speed and mixed precision training.
- **Action Recognition:** Developed a novel adaptive Self-Attention backbone network that can capture global dependencies without any pretraining and achieve impressive result on Kinetics-400 dataset.

HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY, Kowloon, Hong Kong   **08/2018-01/2019**
Research Assistant, Professor Dit-Yan Yeung
- **Crowd-Counting**: Implemented end-to-end algorithm to count the number of people in a densely crowded image. Reproduced several recently published neural network models such as multi-column convolutional neural network (CNN), bi-directional convolutional long short-term memory (ConvLSTM), and Vid2Vid.
- **Few-Shot Learning**: Investigated several methods to test the abovementioned crowd counting model on a new domain with limited annotated data. Predominantly used PyTorch for implementation.

VANDERBILT UNIVERSITY, Nashville, TN, U.S.A   **01/2018-07/2018**
Research Assistant, Professor Maithilee Kunda
- **Toybox**: Created a video recording dataset for small sample learning and hand-object interaction with categories from early-learned nouns of infants. Played a significant role in data analysis and re-training dataset on pre-trained CNN like Inception V3. Project Link: https://aivaslab.github.io/toybox
- **Block Design**: Used OpenCV, machine learning techniques, and Tensorflow Object Detection API to automate a block design task (morphological and color-based analysis) and to gain insights from human cognitive behaviors.

HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY, Kowloon, Hong Kong   **09/2017-12/2017**
Part-time Student Programmer, ECE Department
- **Front-end**: Developed the front-end circuit simulation website (www.i-mos.org) using Vue.js and Snap.svg
- **Production Deployment**: Identified bugs and carried out UI improvement of websites for production.

VERSITECH LIMITED, Cyberport, Hong Kong   **06/2017-08/2017**
Software Engineering Summer Intern, IT Division
- **Data Query**: Effectively used PHP and SQL Server to query data to create a web reporting system. Utilized existing schema and constructed new schemata with raw data imported from MS Access/Excel.

- **CMS**: Developed CMS that contained all CRUD features to handle multiple databases through JQuery DataTable. Developed an efficient system to minimize human errors from data entry work and to automate the entry process.

PUBLICATIONS

Kim, J., **Cha, S.,** and Wee, D. (11/2019). Regularization on Spatio-Temporally Smoothed Feature for Action Recognition. *Under review by The IEEE Conference on Computer Vision and Pattern Recognition 2020 (CVPR).*

Cha, S., Ainooson, J., Chong, E., Soulières, I., Rehg, J., and Kunda M. (07/2019). Enhancing Clinical Cognitive Testing through Multimodal Sensing. *Under review by IEEE Winter Conference on Applications of Computer Vision 2020 (WACV).*

Cha, S., Ainooson, J., and Kunda M. (11/2018). Quantifying Human Behavior on the Block Design Test Through Automated Multi-Level Analysis of Overhead Video. *arXiv preprint.*

Wang, X., Ma, T., Molla, A., **Cha, S.,** Ainooson, J., Wang, X., and Kunda M. (06/2018). An Object Is More Than a Single Image: The Toybox Dataset of Visual Object Transformations. *The 4th Vision Meets Cognition Workshop at Computer Vision and Pattern Recognition 2018 (CVPR).*

PROJECTS

Fake News Detection Platform   **09/2018-04/2019**
- Final Year Project (year-long senior level team project), Supervisor: Kenneth Wai-Ting Leung
- Developed a novel platform for a fake news detection service with a multi-modal fake news detection neural network using PyTorch, Flask, and JavaScript.
- Played a significant role in training and hyperparameter tuning of neural networks and backend of the system.
- Project Link: https://youtu.be/nNoGV8xvscQ. Finalist for Best Final Year Project

Sentiment Analysis on Review Dataset   **09/2018-12/2018**
- Machine Learning for NLP Project (Placed 2nd for in-class Kaggle competition), Instructor: Yangqiu Song
- Developed efficient data preprocessing and pretrained word embedding models for sentiment analysis using TorchText and PyTorch. Project Link: https://github.com/tea1528/Yelp-Sentiment-Analysis
- Explored different neural network architectures such as RCNN, GRU and self-attention with state of the art learning algorithms such as cyclic learning rate, layer normalization, and SGDR.

TensorFlow Benchmark on Cluster Environment   **01/2018-05/2018**
- High Performance Computing Capstone Project (individual project), Instructor: Will French
- Benchmarked the speed of the TensorFlow implementation of various CNN models on several datasets such as CIFAR-10 and ImageNet. Project Link: https://github.com/tea1528/TensorFlow-Benchmark-Cluster
- Conducted empirical analysis on data parallel programming through multiple GPUs/CPUs by submitting SLURM job to cluster environment.

AWARDS

$30,000/yr Kwanjeong Scholarship, Kwanjeong Educational Institution	**08/2019**
Reaching Out Award, HKSAR Government Scholarship Fund	**09/2018**
Champion of CodeIT Suisse Coding Challenge, Credit Suisse APAC Region	**09/2017**
Dean's List, School of Engineering, HKUST	**06/2017 & 06/2019**
Gold Medal of Korean Young Physicist Tournament (KYPT), Korean Physical Society	**02/2012**

SKILLS/ LANGUAGE

Programming Languages: Python, Java, C/C++, Javascript, SQL
Framework/Library: OpenCV, PyTorch, TensorFlow, Keras, Scikit-learn, Node.js
Languages: Korean (native), English (TOEFL 115), Mandarin (HSK Level 5)