SEUNGHWAN (SEAN) CHA

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EDUCATION

HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY, Kowloon, Hong Kong 09/2013-Present
BEng in Computer Engineering expected in June of 2019 (Current GPA: 3.533/4.3; Last 2 years: 3.758/4.3)
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)

RESEARCH EXPERIENCE

HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY, Kowloon, Hong Kong 09/2018-Present
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.

HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY, Kowloon, Hong Kong 07/2018-Present
Research Assistant, Professor Wilfred Siu Hung NG

- **Precipitation Nowcasting**: Developed a system for short-term precipitation nowcasting in the Greater China Region by using state-of-the-art network models such as trajectory gated recurrent unit (TrajGRU) and ConvLSTM.

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 Deep CNN (DCNN) like Inception. Project Link: https://aivaslab.github.io/toybox
- **Block Design**: Used OpenCV, machine learning techniques (k-means clustering, k-nearest neighbor, etc.) and Tensorflow Object Detection API to automate a block design task (morphological and color-based analysis) and to gain insights from human cognitive behaviors.
- **Tech Stack**: TensorFlow for using DCNN, OpenCV, and FFmpeg for computer vision tasks, Scikit-learn for machine learning algorithms, and Matplotlib and Seaborn for data visualization.

PUBLICATIONS

Cheng, J., **Cha, S.**, Yan, D., Hao, X., Ng, W. (11/2018). EasyRain: A User-Friendly Platform for Comparing Precipitation Nowcasting Models. *Under review by the 35th IEEE International Conference on Data Engineering (ICDE).*

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 (CVPR).*

Wang, X., Ma T., Ainooson, J., **Cha, S.,** Wang, X., Molla, A., and Kunda M. (06/2018). Seeing Neural Networks Through a Box of Toys: The Toybox Dataset of Visual Object Transformations. *arXiv preprint.*

WORK EXPERIENCE

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 deployment.

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.
- **Tech Stack**: PHP and SQL Server for back-end and DB handling. Bootstrap and JQuery for front-end.

REALTED COURSE PROJECTS

Fake News Detection Platform **09/2018-Present**

- Computer Engineering 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. (The proposed network includes multiple features such as image and text and uses complex models such as recurrent neural network and CNN for feature extraction)
- Played a significant role in re-training the vision feature extractor and defining new loss function.

Deep Learning on NLP **09/2018-12/2018**

- Machine Learning for NLP Kaggle Project (2nd out of 73 teams), Instructor: Yangqiu Song
- Developed efficient data preprocessing and pretrained word embedding models for sentiment analysis and language modeling tasks using Keras.
- Explored different neural network architectures such as Recurrent Convolutional Neural Network, GRU, self-attention, and Quasi-RNN with state of the art learning algorithms such as cyclic learning rate, layer normalization, and weight tying.

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.
- Conducted empirical analysis on data parallel programming through multiple GPUs/CPUs by submitting SLURM job to cluster environment.

AWARDS

Champion of CodeIT Suisse Coding Challenge 09/2017
Credit Suisse, APAC Region

- **Highest score in APAC**: Won 1st place by solving algorithm questions such as DP, Graph, and AI.
- **Tech Stack**: Used Node.js and Express to set up pipeline and HTTP request to send answers through Heroku.

Dean's List, School of Engineering, HKUST 06/2017

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)