CHIH-HSING HO

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EDUCATION

National Chiao Tung University (NCTU), Hsinchu, Taiwan Sep. 2015 - Jun. 2020
B.S. in Honors Program of Electrical Engineering and Computer Science (EECS).
Overall GPA: 3.65/4.0, 85.2/100 Last 60 GPA: 3.91/4.0

PUBLICATION

[1] **Chih-Hsing Ho**, Shang-Ho (Lawrence) Tsai. RSAC: Regularized Subspace Approximation Classifier for Lightweight Continuous Learning, In *International Conference on Pattern Recognition (ICPR)*, 2020.
https://arxiv.org/abs/2007.01480

AWARDS & HONOR

Academic Excellence Award

- Ranked 1st place in class of 33 students in Jan 2019. (Average score: 95.18)
- Ranked 3rd place in class of 29 students in Jul 2018. (Average score: 91.88)

PROFESSIONAL EXPERIENCE

NCTU affiliate Academia Sinica Research Assistant, BASIC Lab Jul. 2020 - Present
Supervised by Professor Hong-Han Shuai and co-advised by Professor Wen-Huang Cheng

- Working on superresolution problem that produces high resolution images from low resolution images. Specifically, focusing on solving data bias issue in superresolution that leads to ethical concerns.
- Working on object detection in gigapixel image. Specifically, focusing on overcoming the multi-resolution and duplicated detection issue. This project is in proceeding to a journal paper.
- Working on traffic light detection algorithm and customizing the algorithm for the design of local traffic light. The prototype is deployed in real world application.

Research Assistant, CaSIC Lab, NCTU Jan. 2018 - Jul. 2020
Supervised by Professor Tsai Shang-Ho (Lawrence Tsai)

- Researched on signal and image processing, continual learning and explainable machine learning.
- Worked on explainable lightweight continuous learning project that involves statistic analysis and data compression from the aspect of digital signal processing.
- The proposed algorithm achieved state-of-the-art accuracy with 10 time less training time and was published in ICPR 2020 [1].

RESEARCH & PROJECTS

Object detection in gigapixel image Jul. 2020 - Present
Programming languages: *Pytorch, Python*

- Researching on object detection in gigapixel images and organizing the algorithm into technical report for journal submission.

Traffic lights detection Jul. - Aug. 2020
Programming languages: *Pytorch, Python*

- Built up a traffic light detection and classification model applicable on real-scene street video.

Reimplementation of iCaRL Jan. - Jun. 2020
Programming languages: *Pytorch, Python*

• Reimplemented iCaRL : Incremental Classifier and Representation Learning under the scenario of continuous learning.

• Achieved accuracy rate of 93.24%, 70.83%, 79.61% on Mnist, KMnist and Fashion Mnist, repectively.

Trojan Attack Feb. - Jul. 2019
Programming languages: *Pytorch, Python*

• Curated a poisoned version of the CIFAR10 dataset with trojan attack and trained the trojan model on the poisoned dataset.

• Proposed a solution using Grad-CAM to visualize the activated response of trojan model and reject the poisoned model.

Low Complexity Classification System Sep. 2018 - Jan. 2019
Programming languages: *Matlab, Python*

• Worked on the paper "An Interpretable Compression and Classification System (ICCS)" with accuracy rate higher than 97% and low complexity with less than 20 sec based on its linear property.

• Modified feature mapping and clustering using probability output based on the architecture of ICCS for unsupervised learning and semi-supervised learning scenario.

One-Pass Feedfoward Network with Saak Transform Jan. - Jun. 2018
Programming language: *Matlab*

• Trained one-pass feedfoward network on MNIST and CIFAR10.

• Researched and worked on extended papers as Interpretable Convolutional Neural Networks via Feedfoward Design, PixelHop and PointHop.

Channel Coding Sep. 2017 - Jan. 2018
Programming language: *C*

• Researched on coding theory, including data compression, error detection and correction coding.

• Worked on Hamming code with different signal noise ratio (SNR).

Shooting Game Implementation with Unity Feb. - Jun 2016
Programming languages: *Unity, C#*

• Designed extension environments and stages based on zombie shooting game on Unity.

• Wrote C# code for the script to demonstrate lively environment, complex actions, and techniques of the characters in the shooting game to mimic popular commercial shooting games.

TM5 Collaborative Robot Sep. 2015 - Jan. 2016
Programming language: *Linux*

• Implemented v-rep code on Linux to simulate the response of robots from real-world feedback.

• Controlled the corresponding actions of a robot when a person is nearby its sensitive area.

RESEARCH INTERESTS

Signal and Image Processing (Superresolution), Computer Vision (Continuous learning, Object detection), Interpretable Machine Learning.

LANGUAGES & LIBRARY SKILLS:

Python, MATLAB, C/C++, CSS, HTML, C#, Pytorch, Tensorflow, Keras, Pandas, Matplotlib, OpenCV, MatConvNet, Numpy, LaTeX

VOLUNTEER & LEADERSHIP EXPERIENCE

Kaohsiung City Alumni Association, NCTU Sep. 2016 - Feb. 2017
Volunteer Remote Area Tutoring Service

EECS Honor Program and Kaohsiung City Alumni Association, NCTU Sep. 2015 - Sep. 2017
Orientation Leader