Yao-Yuan Yang

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SKILLS

- 7+ years of machine learning experiences, knowledgeable in state-of-the-art algorithms and capable of developing new ones for specific application
- 9+ years of programming experiences on Python, C, C++ on Linux, Unix, Windows system
- Experienced in the Python package development as well as its interface with C for faster implementation, capable of modifying existing packages or developing a new one

EDUCATION

University of California, San Diego (UCSD)

Ph.D. in Computer Science and Engineering — 09.2018 – Present (expected Summer 2022)
M.S. in Computer Science and Engineering (transferred to Ph.D.) — 09.2017 – 09.2018

National Taiwan University (NTU)

B.S. in Computer Science and Information Engineering — 09.2012 – 06.2016

RESEARCH INTEREST

My research focuses on topics in trustworthy machine learning, including adversarial examples, interpretability, and out-of-distribution data. Grounded on both theoretical and empirical work, my research offers insights into how machine learning models work and how they can be applied to design trustworthy algorithms in practical domains, such as safety and security.

Keywords: trustworthy learning, adversarial examples, out-of-distribution

MAJOR EXPERIENCES

Graduate Student Researcher UCSD, CA (Advisor: Kamalika Chaudhuri) — 09.2017 - Present

- Studied the effect of adversarial robust training algorithms on out-of-distribution data; discovered that robust neural networks tend to generalize better on some natural manifold
- Identified that the trade-off between adversarial robustness and accuracy is not an intrinsic property for many datasets, but instead, is caused by the increase in the generalization gap when applying robust algorithms
- Designed adversarial attack/defense algorithms that work well across many non-parametric classifiers including decision trees, k-nearest neighbors, and random forest; the implementation of the algorithm is accelerated with customized C-extension
- Implemented a machine learning approach for Python error localization

Machine Learning Intern Facebook, Remote — 06.2021 - 09.2021

- Contributed 30 commits and $6000+$ lines of code in `torchaudio`
- Implemented a text-to-speech pipeline including text-preprocessing with phonemes, spectrogram generation with Tacotron2, and time-domain conversion with WaveRNN with `PyTorch`
- Benchmarked and compared the performance of multiple operations and models with other related works

Ph.D. Intern Yahoo, NY — 06.2018 - 09.2018

- Designed the pipeline to insert ads realistically into a video
- Developed an algorithm to identify good places in a video to insert ads, and adopted Mask R-CNN for the segmentation of the foreground and background to perform the insertion

Research Assistant NTU, Taipei, Taiwan (Advisor: Hsuan-Tien Lin) — 09.2013 - 06.2016

- Developed a novel multi-label classification (MLC) algorithm that utilizes the memory structure within recurrent neural networks to extract the hidden correlation between labels (with `keras` and `tensorflow`)
- Proposed the first cost-sensitive error-correcting-code, and adopted it for solving MLC and active learning problems
- Led the development of the open-source package (with $600+$ stars), `libact`, which provides a unified interface for active learning algorithms in Python; setup the infrastructures including continuous integration, documentation generation, and PyPI installation; contributed $350+$ commits and $25,000+$ lines of code

Person Identification with EEG NTU, Taipei, Taiwan (Advisor: Tsung-Ren Huang)   02.2014 - 06.2016
  - Designed and carried out $50+$ sessions of Electroencephalography (EEG) experiments; studied the characteristic of EEG including neural oscillations and artifacts that contaminates the data
  - Conducted twin study to understand the properties of using EEG as biometrics, such as how the personality and value of a person correlate with the identification rate

Gesture recognition through electromyography (EMG) NTU, Taipei, Taiwan   04.2014 - 06.2014
  - Built a device that measures muscle signal and sends the signal to a laptop
  - Applied support vector machine for the recognition of $4+$ hand gestures

Intern IKV-Tech, Taipei, Taiwan   07.2013 - 08.2013
  - Implemented FAT32 file system component through UCB protocol for Windows and embedded device (ARM922t Mcu); designed C APIs for encrypted file storage between PC and the embedded device

Cryptanalysis on Mifare Crypto-1 NTU, Taipei, Taiwan (Advisor: Chen-Mou Cheng)   02.2013 - 07.2013
  - Designed and analyzed cryptanalytic time-memory trade-off (rainbow table) on the Crypto-1 encryption
  - Implemented Crypto-1 rainbow table generation with OpenCL and optimized it on NVIDIA GPU, which results in 10 times faster implementation

PUBLICATIONS

Preprints
  - **Y.-Y. Yang**, C. Rashtchian, R. Salakhutdinov, K. Chaudhuri. Robustness and Generalization to Nearest Categories. in submission (link)
  - **Y.-Y. Yang**, A. H.-C. Hwang, C.-T. Wu, T.-R. Huang, Brainprints in mindprints: Stable task-invariant EEG base signals for personal identification, in submission
  - **Y.-Y. Yang**, S.-C. Lee, Y.-A. Chung, T.-E. Wu, S.-A. Chen, H.-T. Lin. libact: Pool-based Active Learning in Python. 2017 (link)

Conference Paper
  - A. H.-C. Hwang, C. Y. Wang, **Y.-Y. Yang**, and A. S. Won Hide and seek: Choices of virtual backgrounds in video chats and their effects on perception, CSCW, 2021
  - M. Moshkovitz, **Y.-Y. Yang**, and K. Chaudhuri. Connecting Interpretability and Robustness in Decision Trees through Separation. ICML, 2021 (link)
  - **Y.-Y. Yang***, C. Rashtchian*, H. Zhang, R. Salakhutdinov, K. Chaudhuri. A Closer Look at Accuracy vs. Robustness. NeurIPS 2020; ICML UDL workshop 2020 (spot light) (link)
  - **Y.-Y. Yang***, C. Rashtchian*, Y. Wang, K. Chaudhuri. Robustness for Non-Parametric Classification: A Generic Attack and Defense. AISTATS 2020 (link)
  - B. Cosman, M. Endres, G. Sakkas, L. Medvinsky, **Y.-Y. Yang**, R. Jhala, K. Chaudhuri, W. Weimer, PABLO: Helping Novices Debug Python Code Through Data-Driven Fault Localization. SIGCSE 2020 (link)
  - **Y.-Y. Yang**, Y.-A. Lin, H.-M. Chu, H.-T. Lin. Deep Learning with a Rethinking Structure for Multi-label Classification, ACML 2019. (link)
  - **Y.-Y. Yang**, K.-H. Huang, C.-W. Chang, H.-T. Lin. Cost-Sensitive Reference Pair Encoding for Multi-Label Learning, PAKDD 2018. (link)

AWARDS

Fourth Place (out of 800+ teams), Predicting MOOC dropouts (ACM KDD Cup)   08.2015
     with NTU team, ACM KDD
  - Led the team in the ensemble of 70+ models, and contributed to feature generation and model tuning

First Place, Big data analytics for semiconductor manufacturing   02.2015
     with P.-H. Chu and Y.-A. Chung, Taiwan Semiconductor Manufacturing Company
  - Proposed a solution for detecting failures in semiconductor manufacturing process using ridge regression