Peiyuan (Alexander) Liao

CONTACT INFORMATION

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EDUCATION

B.S., Computer Science, Carnegie Mellon University, Pittsburgh, PA **June 2023**

Selected Current and Past Coursework:

CS: Compiler Design; Computer Systems; Theoretical Computer Science; Programming Languages; Graduate Type Theory (Audit);

Stats/Math: Matrix Theory (Honors); Probability Theory; Machine Learning

Cumulative Quality Point Average (QPA): **4.0/4.0**

PROFESSIONAL EXPERIENCE

Undergraduate Researcher, Carnegie Mellon University, PA, USA **October 2019**

Working on attribute inference attacks on graph-structured data. Designed defense algorithms using PyTorch Geometric (PyG) on various datasets including Movielens-1M, FB15K-237, WN18RR and QM9. The resulting framework is robust across graph neural encoders and data distributions, e.g. it can successfully decrease the AUC of a gender-infernce attacker by 10% on the Movielens-1M dataset while only suffering 3% in task performance.

Algorithm and Compiler Intern, Cambricon Technologies, Beijing, China **August 2020**

Working closely with the algorithm and compiler team at the architecture department of Cambricon as a member of the marketing department. Responsible for replication of state-of-the-art algorithms in natural language processing and computer vision on Cambricon's MLU environment, including machine translation and object detection. Also responsible for creating code samples and documentations for Cambricon's BANG programming language.

Recurser, Recurse Center, New York, NY, USA (Remote) **May 2020**

Working on open-source projects on GitHub, including:

PyTorch Cluster #68: JIT-compatible, CPU operators for radius-graph and knn-graph generation in PyTorch-Geometric using PyTorch C++ API.

mmdetection #3151: Distance-IoU and Complete-IoU loss functions for object detection.

Taichi #1107: Refactored ti.Matrix initializers for Taichi's Python frontend.

Teaching Assistant, Carnegie Mellon University, PA, USA **December 2019**

15-150: Principles of Functional Programming

Responsible for grading, the teaching of a recitation session as well as the design of course materials. Topics include higher-order functions, cost semantics, polymorphisms, and continuations.

PROJECTS

ml-arsenal—Repository written in Python containing top-ranking solutions to several Kaggle competitions, including image classification and segmentation. https://git.io/JvflA

PREPRINTS

Peiyuan, Liao*., Han, Zhao*, Keyulu, Xu*, Tommi, Jaakkola, Geoffrey, Gordon, Stefanie, Jegelka, Ruslan, Salakhutdinov, (2020) *Graph Adversarial Networks: Protecting Information against Adversarial Attacks*, [arXiv:2009.13504].

Haimeng, Zhao, **Peiyuan, Liao**, (2019) *CAE-ADMM: Implicit Bitrate Optimization via ADMM-based Pruning in Compressive Autoencoders*, [arXiv:1901.07196].

SKILLS

Programming Languages—Python, C, C++, x86-64 assembly, Java and OCaml.

Libraries—PyTorch, Keras, TensorFlow, XGBoost, ONNX, LightGBM, Pandas and mmdetection.

HONORS AND AWARDS

Competitions Grandmaster, Kaggle **2020**
Highest rank 17, out of 1.4 million users on Kaggle (youngest as of 2020 to reach the rank); Won 7 gold medals and 11 silver medals. Profile can be found at https://www.kaggle.com/alexanderliao

Third place of Google Landmark Recognition 2020 ($5000 prize), Kaggle **2020**
Retrieval-based global descriptors for large-scale landmark image recognition. Final rank 3/736 teams (937 competitors), details of the solution available at https://bit.ly/30uEKZq.

Second place of Global Wheat Detection ($4000 prize), Kaggle **2020**
Wheat detection with EfficientDet, CutMix, Split-BatchNorm and semi-supervised learning. Final rank 2/2,245 teams (3,084 competitors), details of the solution available at https://bit.ly/3g7OUEg.

First place of Humpback Whale Identification ($10000 prize), Kaggle **2019**
Whale re-identification based on triplet-network with refined part pooling. Final rank 1/2,129 teams (2,460 competitors), details of the solution available at https://bit.ly/3iUh7jy.