

Jiyuan SHEN

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EDUCATION

Nanyang Technological University, Singapore

08/2022 - 06/2024

M.Eng. in Computer Science and Engineering, supervised by Prof. LAM, Kwok Yan

GPA: 4.17/5.0

Shanghai University, Shanghai, China

09/2018 - 06/2022

B.Eng. in Intelligent Science and Technology

GPA: 3.54/4.0

PUBLICATION

Jiyuan Shen, "A Survey on Federated Unlearning: Challenges, Methods, and Future Directions", *submitted to ACM Computing Survey*

Jiyuan Shen, "Efficient Dataset Distillation through Alignment with Smooth and High-Quality Expert Trajectories", *arxiv*

Jiyuan Shen, "Effective Intrusion Detection in Heterogeneous Internet-of-Things Networks via Ensemble Knowledge Distillation-based Federated Learning", *under review (2023)*

Jiyuan Shen, "An efficient training strategy for multi-agent reinforcement learning in card games", published on *2nd International Conference on Artificial Intelligence, Automation, and High-Performance Computing (AIAHPC 2022)*

PROJECT & RESEARCH EXPERIENCES

Machine Unlearning and Federated Unlearning; Supervised by Prof. LAM, Kwok Yan

08/2023 - now

- We conducted a comprehensive survey in the promising field of Federated Unlearning, covering fundamental concepts and principles, unlearning and verification algorithms, and tailored optimizations for federated learning framework.
- We engaged in discussions about practical applications along with an assessment of their limitations and outlines promising directions.
- We will continue to explore the potential improvement (like backdoor detection and MIA-assisted unlearning method) and application case for unlearning (like vertical federated learning or recommendation system).

Intrusion Detection in IoT Networks; Supervised by Prof. LAM, Kwok Yan

03/2023 - now

- We substituted the former centralized intrusion detection system into decentralized via federated learning with the purpose of data privacy preserving. We purposed ensemble knowledge distillation-based FL to alleviate the data heterogeneity. We evaluated our method on the public dataset CICIDS2019 with a consistent improvement on speed and performance.

Structures of Datasets in Learning (Representation Learning); Supervised by Prof. LAM, Kwok Yan

11/2022 - now

- Dataset Distillation: Distil information from real-world datasets into compact synthetic datasets while maintaining their ability to train a well-performing model. Explore data-efficient machine learning, what makes for a good train set and dataset understanding.
- The original algorithm is similar to Deep Leakage from Gradients (DLG), we improved the efficacy, effectiveness and robustness of DD, making it a practical data-efficient technique. We achieved the SOTA performance and our paper is ready to submit. Also, due to the privacy for free and informative characteristic, we made some attempts to one-shot FL framework.

Deepfake Detection; *B.Eng. Thesis*; Supervised by Prof. Xing Wu

01/2022 - 05/2022

- Task: Distinguish real portraits, virtually generated portraits, and part-edited portraits created through face-swapping.
- Chose the Xception model as a baseline and established a deepfake detection model based on spectrum analysis (FAD and LFS). Applied cross-model graft attention to better fuse the original images and frequency domain information. Utilized multi-task learning with an auxiliary segmentation head, applying semi-supervised learning for partially lacking masks.

COMPETITIONS REWARDS

Baidu Disk AI Computation: Beauty, Freckles and Acne Removal (Field: Generation, Top 15/1000)

09/2023

2nd National Prize of First Ocean Target Intelligent Perception International Challenge (Field: Detection, Top 3/200)

12/2020

3rd National Prize of Artificial Intelligence Application Competition (Field: Classification, Top 9/2100)

11/2020

2nd Prize of the East China Division of the WeChat Applet Application Development Competition

06/2020

WORK EXPERIENCES

Bosch China Investment Co., Ltd. | Visual Algorithm Intern CR/RIX-AP

01/2022 - 07/2022

- Explored and developed the Human Action Recognition project based on long time video (Know Your Motion), including document writing, cameras testing, algorithm comparison, model training, using Flask to deploy and apply the project's patent.

SKILLS & QUALIFICATIONS

- **Programming Language**: Python(advanced for DS,ML), Pytorch/paddlepaddle(advanced for DL), MySQL(advanced), C++, Matlab
- **Statistics**: Bayesian Learning, EM algorithm, PCA, regression, decision tree, clustering, ensemble learning, text analytics, etc.
- **ML/DL**: Transformer (bert, ViT), Federated Learning, VAE, GAN, YoloV5, Faster R-CNN, U-Net, Knowledge Distillation, etc.