

# Wenbin Hu

Yr-4 Undergraduate Student

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## EDUCATION

### • Hong Kong University of Science and Technology, HK

2020-24

*B.Eng in Computer Science (Awards: Dean's List)*

- **Top Courses/ML Related Courses:** Machine Learning (A+), Deep Learning in Computer Vision (A+), Advanced Deep Learning Architectures (A-), Advanced Probability Theory (A+), Calculus (A), Abstract Algebra (A), C++ & OOP (A-)
- **Awards:** Dean's List (Term GPA > 3.7, Top 10 Percentile)
- **Supervisor: Dr. Minhao Cheng** My research on Trustworthy Machine Learning is mainly under the supervision of Dr. Cheng, and I have had the fortune to work with him for more than 1 year.
- **Rank:** Top 20 Percentile.

### • Technical University of Munich, Munich

Summer 2023

*Exchange Programme in TUM Informatics*

- **Seminar:** I have made a 40-minute presentation about generative NeRF in a NeRF seminar.
- **Grade:** the highest level, graded: 'Very Good'

### • Fudan University, Shanghai

Summer 2022

*Summer School Programme*

## PUBLICATIONS

**Attacking by Aligning: Clean-Label Backdoor Attacks on Object Detection**, Yize Cheng\*, **Wenbin Hu\***, Minhao Cheng, arXiv preprint arXiv:2307.10487 [[arxiv](#)]

- Inspired by an inherent property of object detector, we've uncovered that malicious attackers can effortlessly implant backdoors into object detection models by aligning their malicious objectives with the objectives of the detectors.
- Based on that insight, we have developed a simple yet highly effective clean-label backdoor attack strategy against object detection in scenarios involving both Object Disappearance Attacks and Object Generation Attacks.
- Numerous experiments and thorough ablation studies were carried out to confirm the efficacy of the proposed attack method and its sustainability when subjected to fine-tuning.

**Mitigating the Alignment Tax of RLHF**, Yong Lin, Hangyu Lin, Wei Xiong, Shizhe Diao, Jianmeng Liu, Jipeng Zhang, Rui Pan, Haoxiang Wang, **Wenbin Hu**, Hanning Zhang, Hanze Dong, Renjie Pi, Han Zhao, Nan Jiang, Heng Ji, Yuan Yao, Tong Zhang, arXiv preprint arXiv:2309.06256 (**Submitted to ICML 2024**)[[arxiv](#)]  
(\* represents equal contribution.)

## PROJECTS

### • Identification of Adversaries from Collusive Adversarial Examples (Undergraduate Thesis)

On Going

*Advisor: Dr. Minhao Cheng - Hong Kong University of Science and Technology, HK*

- We have built a framework that can trace multiple adversaries (collusive attackers) when a machine learning model encounters an adversarial example.
- We use a kind of anti-collusion code, ACC-AND code, to build a map between an adversarial example and its corresponding collusive attackers.
- Our method achieves tracing accuracy of 90%+.

### • Generative Graph Embedding Inversion Attack

On Going

*Advisor: Dr. Yangqiu Song - Hong Kong University of Science and Technology, HK*

- We have built a framework to recover the attributes and neighbourhoods' information of a node from its node embedding.
- We use language models (inverter) to decode node embeddings. The input is a projected node embedding, and the output is the corresponding attributes and neighbours.
- During training and inference, the inverter iteratively interacts with the graph model, to correct the prediction step by step.

### • Enhance Resilience against Backdoor Attacks on Commonsense Inference

Oct 2022 - Jan 2023

*Advisor: Dr. Yangqiu Song - Hong Kong University of Science and Technology, HK*

- We investigated the role of inductive graph reasoning on improving the resilience of Commonsense Knowledge Graph (CSKG) against backdoor attacks.
- The experiments indicated that there is a distribution shift in the prediction heads, and hence, inductive graph reasoning can enhance the model's resilience to some extent.

• **UROP 2022 Summer: A Research Survey on Autonomous Driving**

*June 2022 - Aug 2022*

*Advisor: Dr. Qifeng Chen - Hong Kong University of Science and Technology, HK*

- This is a research-based course provided by Undergraduate Research Opportunities Program (UROP) in HKUST.
- We conducted a survey on motion forecasting for moving cars.

## RESEARCH INTERESTS

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My research interest is centered around the expansive field of **Trustworthy Machine Learning**. Through my research, I have unveiled a critical insight: machine learning models are inherently susceptible to malicious attacks. This underscores the importance of our community to examine the reliability of these models. I have focused on: 1) uncovering potential strategies that adversaries could exploit to compromise machine learning algorithms, and developing resilient models that can withstand such attacks; 2) developing privacy-preserving methods for training models on sensitive data; 3) mitigating biases in machine learning and produce models that are fair, impartial, and truly representative; 4) reducing the uncertainty and enhance the interpretability in machine learning. My ultimate objective is to construct a **robust, interpretable, and unbiased** framework for machine learning.

## SKILLS

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**Programming Language:** C/C++, Python

**Library/Framework:** Pytorch, TensorFlow/Keras, Scikit-Learn, Numpy, OpenCV, OpenGL.

**Tools:** Latex, Markdown, Git, Microsoft Office.

**Language:** Chinese (Native), English (Fluent), Cantonese (Good).

**Soft Skill:** Academic Writing, Communication, and Presentation; Strong Self-motivation and Self-learning Ability.

## PERSONAL INTERESTS

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Piano, Basketball, Running, Exploring New Things.