HAONAN AN

Huazhong University of Science and Technology(HUST) ◇ Wuhan, Hubei, 430074, P.R.China
(+86) 19985317756 ◇ haonanan@hust.edu.cn

EDUCATION BACKGROUND

Huazhong University of Science and Technology, Wuhan, Hubei, P.R.China

Bachelor of Engineering in Telecommunications *Sept. 2018 – Jul. 2023*

- **GPA: 3.32/4.0; 80.2/100**

Core Courses

- **Mathematics**: Calculus, Linear Algebra, Probability Theory and Mathematical Statistics, Complex Function and Integral Transform, Stochastic Processes, Mathematical Physics Equation and Special Function
- **CS**: Fundamentals of Computer Programming in C, Data Structure, Python Programming, Computer Networks, Digital Image Processing
- **Electrical Engineer(EE)**:Analog Circuit and Digital System (I), Analog Circuit and Digital System (II), Fundamentals of Information Theory, Signal and Linear System, Electronic Circuits of Communications, Principles of Communications, Electromagnetic Field and Wave

RESEARCH INTEREST

Fields	Artificial Intelligence, Computer Vision, Efficient Computing, AI Security, AI in Hardware
Methods	Deep Learning, Neural Networks, Mobile Devices, Information Theory

RESEARCH EXPERIENCE

Rice University, U.S.
Efficient and Intelligent Computing (EIC) Lab(Rice) *Jul. 2021 – Present*
Group Member & Intern, Advisor: Profs. Pan Zhou & Yingyan Lin & Dr. Chaojian Li
Project: Green AI in Concatenating Transformer with Convolution

- Received systematic scientific training, including how to read papers, how to explore motivation or ideas, and how to write papers
- Analyzed and summarized the reason, according to the related work, for the existing low computational efficiency of the coexistence structure of convolution and transformer
- Proposed a novel convolutional transformer hybrid structure, which injects the inductive bias of the convolution into the transformer, and can easily apply the computational acceleration method of the traditional convolutional network to the hybrid structure
- Reduced computation time by about 20 percent on a single GPU without significantly increasing FLOPs and parameters and achieved comparable accuracy to deit on the ImageNet dataset

Huazhong University of Science and Technology, Wuhan, Hubei, P.R.China
Department of Cyber Science And Engineering *Sept. 2020 – Jul. 2021*
Group Member & Intern, Advisor: Prof. Pan Zhou
Project: Backdoor Attack or Defend in AI Security

- Participated visible backdoor trigger and invisible trigger in the training of convolutional neural network to attack the network
- Reproduced defenses against visible and invisible backdoor attacks and applied randomized smoothing to defense against backdoor attacks
- Used traditional digital image processing algorithms and filtered the dataset in the frequency domain during training to reduce the impact of backdoor attacks on neural network performance and improve the defense effect

Project: Deploying Convolutional Neural Networks to Mobile Device for Image Recognition

- Completed the code implementation of resnet18 without using the existing visual model library and completed the training on multiple GPUs
- Used TorchScript to serialize the pytorch code and deployed the model to Android Studio. On this basis, used the built-in emulator of Android Studio to simulate image input and label output
- Compared latency, fps of different Convolutional Neural Networks and variants of Transformer on mobile device

HONORS & AWARDS

- **2020 The 3rd Prize(Province-level)** in **Chinese College Students Computer Design Competition**
- **2020 Honorable Mention(State-level)** in **Mathematical Contest In Modeling, COMAP**

PROGRAMMING SKILLS

Proficient: Python, Pytorch, Git, Markdown, LaTeX

Familiar: Linux, C, MATLAB, Android, HTML, etc.

Hands-on Ability: Able to complete the experimental code of the project independently

LANGUAGE SKILLS

TOEFL iBT 88/120 (Reading 24, Listening 22, Speaking 22, Writing 20)

CET4 645/710 (Listening 249, Reading 214, Writing&Translation 182)