

Tianyi (Bruce) Chen

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EDUCATION

Northern Arizona University

Flagstaff, USA

Bachelor of Science in Computer Engineering

09/2020-06/2024

- **GPA:** 3.97/4
- **Relevant Courses:** Artificial Intelligence, Project Design Procedures, Capstone Design, Electric Drives, Web Programming, Discrete Mathematics

Chongqing University of Posts and Telecommunications

Chongqing, China

Bachelor of Science in Electronic and Information Engineering

09/2020-06/2024

- **GPA:** 3.14/4
- **Relevant Courses:** Fundamentals of Electronic Circuit, Fundamentals of Computer Engineering, Probability and Mathematical Statistics, Data Structure, Java Programming, etc

PUBLICATION ([Google Scholar](#))

1. Super-Resolution-assisted QoE Optimization for Adaptive Video Streaming with Queue-driven Deep Reinforcement Learning (In process)
2. Tuy Tan Nguyen, **Tianyi Chen**, Ian Philippi, Quoc Bao Phan, Shunri Kudo, Samsul Huda, and Yasuyuki Nogami, "A Highly Secure and Accurate System for COVID-19 Diagnosis from Chest X-Ray Images," 67th IEEE International Midwest Symposium on Circuits and Systems (MWSCAS 2024), Springfield, MA, 11–14 Aug. 2024. ([Accepted](#))
3. **Tianyi Chen**, Ian Philippi, Quoc Bao Phan, Linh Nguyen, Ngoc Thang Bui, Carlo daCunha, and Tuy Tan Nguyen, "A Vision Transformer Machine Learning Model for COVID-19 Diagnosis Using Chest X-Ray Images," Healthcare Analytics, vol. 5, pp. 100332, Jun. 2024. ([Journal Link](#))
4. **Tianyi Chen**, Ian Philippi, Quoc Bao Phan, et al. High-accuracy fine-tuned vision transformer model for diagnosing COVID-19 from chest X-ray images. TechRxiv. January 02, 2024. ([Preprint](#))

INTERNSHIP EXPERIENCE

Collaborative Innovation Center for New Generation Information Network and Terminal, Chongqing University of Posts and Telecommunications **Chongqing, China**

Research Assistant Intern

08/2024-present

- Configured GPU clusters for distributed-data-parallel training, based on both PyTorch and Huggingface's Accelerate repository.
- Fine-tuned large language models, such as GATO (decision model), GPT-2, Llama3.1, and Llama3.2, aimed to solve DRL-based tasks, such as super-resolution-based video transmission.
- Deployed the Whisper-Base model and Llama3.2 on the server as a web chatbot for continuous conversation responses to both audio and text inputs, targeting to provide service to robots.

Digital Systems Design Laboratory, Northern Arizona University

Flagstaff, USA

Research Assistant Intern

01/2024-05/2024

- Several quintessential models such as DenseNet, ResNet, EfficientNet, and Vision Transformer are assayed in classification accuracy with the COVID-19 chest X-ray dataset.

- Programmed GradCAM analysis code based on a paper's theory, with extensive modifications on processing the Vision Transformer, which deepened my understanding in patch division and encoding process of the Vision Transformer.
- Programmed R with GradCAM results and animint2 (a package based on ggplot2) to present website visualization about how models make diagnoses, called [Animated2GradCAM](#).
- Implemented Kyber cryptography, a post-quantum encryption method, to encrypt the X-ray images into wrapped chunks and decrypt predicted results back, with a specific key pair.
- Flask is utilized to host the server service, and fast reverse proxy (FRP) is used to realize public accessibility.
- The complete ai-telehealth diagnosis system, which has 95.79% accuracy and 5s processing time, is published and [accepted](#) as a conference paper in the 2024 IEEE 67th International Midwest Symposium on Circuits and Systems (MWSCAS).

PROJECT EXPERIENCE (more at my [GitHub](#))

AI auxiliary medical diagnosis research at Northern Arizona University 09/2023-01/2024

- Several pyramid and transformer-based models such as EfficientViT, MViT, EfficientNet, and ViT are experimented on COVID-19 chest X-ray image four-class classification.
- Meticulous evaluations, such as receiver operating characteristic (ROC), confusion matrix, recall, precision, specificity, and accuracy are conducted based on each model.
- Early stopping, weight decay, dataset balancing, and structure optimizing are implemented to mitigate the observed overfitting.
- Proposed model has 99.57% accuracy in the binary classification of chest X-ray images with 264.79s training per epoch efficiency on the selected dataset with a 1080ti GPU.
- The [presentation](#) was awarded as the third place at the NAU Engineering Festival, and the result was published as an [article](#) in Healthcare Analytics journal.

Reconfigurable Wheel AI Robot Project at Imperial College (UK) 01/2023-03/2023

- Engaged in reconfigurable wheel robot blueprint designation, with a specific discussion on the freedom of wheel track, wheel base, and wheel direction.
- Programmed random forest algorithm to study decision patterns in simulated cases, where the raggedness, obstruction size, and vehicle velocity are considered as factors and each combined movement is viewed as the decision.
- Simulated the designed reconfigurable robot in the software, called Gazebo.

FPGA-based Alarm System Design Competition at CQUPT, China (Third Prize) 10/2022-12/2022

- Programmed the clock-based FPGA platform in Verilog with timer block, switch block, alarm block, and bond buttons, LEDs, and pins to interfaces.
- Programmed the ESP8266 board in C, handling temperature and light sensor signals, connecting to WiFi, and hosting the HTML server to enable information accessible.
- Connected interfaces on FPGA, ESP8266, and sensors through a breadboard.

RESEARCH SKILLS

AI Programming & Research: computer vision ([medical diagnosis](#), [integrated system with cryptography](#), and [visual understanding](#) with vision transformers and CNN), large language models (GPT-2 and [web chatbot by Llama3.2](#)), deep reinforcement learning ([DON](#)).

Linux Server-side Manipulation: distributed-data-parallel configuration ([tutorial](#)), docker composing, and HPC programming.

Web Development: HTML, CSS, Java, JavaScript ([personal site](#) and [in-school project](#)), Flask, PHP, SQL, Apache, XAMPP ([file system server](#), ai-telehealth service on [local server](#) and [Azure](#)).

LaTeX paper writing: three papers published and one in process.

Data processing using R: Data visualization in R, specifically with ggplot2 ([Animated2GradCAM](#)).

Embedded Systems & IoT Design: C, C++, and Verilog ([FPGA alarm platform](#)).