Junhan LI

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EDUCATION

Carnegie Mellon University

First year Master of Science in Electrical and Computer Engineering *Jun. 2020 – Nov. 2022*

Rensselaer Polytechnic Institute

B.Sc. in Mechanical Engineering, minor in Electrical Engineering (GPA: 3.82/4.0) *Jun. 2016 – May 2020*

Relevant Courses: Image and Video Processing, Foundations of Computer System, Introduction to Machine Learning, Computer Component and Cooperation, Computer Architecture and Networks, Java for Programmer

WORKING EXPERIENT

Machine Learning Algorithm engineer and Data Analyst, Global Health Labs *May 2021 – Aug. 2021*

AVE Real Time Image Acquisition based on Deep Learning **Seattle, WA**

- Designed and developed a database in **SQL** to persist, manage and process imaging data.
- Preprocessed and augmented imaging data by Rotation, Shifting, Background swapping, Mosaic.
- Applied **Yolov4** algorithm to improve the computing speed (from 20 FPS to 45 FPS) and reduced the GPU amount and compiled the **AVE** platform to run on phones.
- Optimized the neural network deep learning model with different learning rate, initial weights and counters_per_class to balance the images datasets and improved AUC from 0.71 to 0.9.
- Adapted image resolution and Yolov4 version to reduce the computational cost and increase the computing speed (from 45 FPS to 370 FPS) while keeping similar precision to fit mobile device pipeline.
- Performed intensive testing on combined imaging datasets to validate the robustness and reliability of the deep learning model in complex real-world use scenarios.

RESEARCH EXPERIENCE

Mechanical and Artificial Intelligent Lab (MAIL), Carnegie Mellon University

Machine Learning Algorithm engineer and Data Analyst, Supervisor: Prof. Amir Barati Farimani *May 2019 - Aug. 2019*

- Project 1: Predicting the Effectiveness of Antibodies Against Viruses **Pittsburgh, PA**

- Predicted the effective degrees of 3 anti-HIV neutralizing antibodies by using **graph convolutional network** and **XGBoost**, based on thousands of antigens collected from CATNAP (an online HIV database)
- Used **Python** to adapt the FASTA formats of each antigen's sequence, researched on literatures to find out the specific sequence of causative genes' FASTA, and only retained the pathogenic FASTAs
- Converted FASTA formats into graphs by **DeepChem** and built a **graph convolution network** to predict whether an antibody could neutralize an antigen; improved the accuracy by 60% (from 52% to 82%), with optimizing antibodies properties selection.
- Performed three poster presentations and **published a paper in IEEE**.

- Project 2: Application of Artificial Intelligence in Manufacturing *June 2019 - Oct. 2019*

- Participated in a research team on a AI project called "The application of AI in the inspection and testing of engineering products" based on the data collected from CWRU Bearing Data Center
- Extracted 484,300 data points of 10 different signals of bearings, and applied **signal processing techniques** to generate 2D images.
- Optimizing the preprocessing signal method with combining kurtosis, skewness, peak to peak, variance, root mean square and absolute mean value, and improved the best accuracy from 30% to 79.7%
- Achieved 96% accuracy by expanding current dataset and applied convolutional neural network to extract special information

Intelligent Structural Systems Laboratory, MANE, School of Engineering, RPI *Sept. 2018 - Jun. 2019*

Research Assistant, Supervisor: Prof. Fotis Kopsaftopoulous **Troy, NY**

- Built the Structure Health Monitoring project, which monitored the influence of different factors on the health of the signal transmitted through a self-sensing wing structure
- Collected 35 sets of data points and used **MATLAB** to convert signal under different conditions of temperature, humidity, airflow, turbulence, altitude from a temperature constant chamber, and performed quantitative analysis and statistical inference by **MATLAB**

SKILLS: Java(2 years), Python(4 years), SQL, C, C++, JavaScript, HTML, Git, GDB, Linux, Unix, MATLAB, CAD, Machine Learning algorithms, RDKit, DeepChem