KAIRUI YIN

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EDUCATION

Columbia University, Columbia Engineering Dec 2022
Master of Science in Electrical & Computer Engineering *New York, NY*

· **Coursework**: Database, Big Data, Algorithm, Cloud Computing, Operating System, Distributed System

University of Cincinnati, Joint Co-op institute Jun 2021
Bachelor of Science in Electrical & Computer Engineering, TOEFL: 109, GRE: 331 *Cincinnati, OH*

· **Coursework**: Machine Learning, C language, Digital Signal Processing, Image Processing, Embedded Systems

SKILLS

Languages: C/C++, Python, MATLAB, SQL, R, SAS, Java, JavaScript, HTML, Solidity
Framework: Flask, OpenCV, Spark, MongoDB, Neo4j, Tensorflow, Dash, React, Node.js, Spring Boot
Other Tools: AWS, ADS, CST, SPICE, Multisim, MPLAB, Git, LaTeX, Tableau, Power BI

EXPERIENCE

Columbia Engineering May 2022 – Present
Graduate Research Assistant with Prof. Sharon Di *New York, NY*

· Assisted in Prof. Sharon Di's research about Reinforcement Learning for ride-sharing **VRP** Problem to explore and solve a multi-vehicle ride-sharing problem by solving **Integer Programing** and adding **Gomery Cuts**
· Established the Policy Network and LSTM Network with **PyTorch** and used **Wandb** for Visualizaition. The model performs 8.03% better than direct Gurobi solution in terms of efficiency
· Constructed **Pointer Network** with **Policy Gradient framework** and specified time reward functions to reinforce the network. It performs 6.05% better than **Google OR tool** in 200 epochs

China Metallurgical Group Corporation R&D Center Jul 2019 – Dec 2019 & Feb 2020 – Jul 2020
Robot Software Engineer *Chongqing, China*

· Designed trajectory planning and simulation for 5 kinds of industrial robots with **KUKA SIM PRO**, using **Dijkstra global path planning** algorithm to ensure efficient execution of production processes and collision avoidance
· Assisted in a **Binocular Stereo Vision** project of arc welding robots and automatic packing robots with **OpenCV**, achieving welding seam recognition accuracy of 90.53% and automatic packing in high heat and dust environment
· Developed **custom widgets** with **Qt** for robotic industrial software, realizing zooming in and out of images and marking target welds
· Applied **DQN,PPO** algorithm in reinforcement learning to train classifier, realizing handwritten digit recognition with accuracy is 93.70% and 95.47% respectively

PROJECTS

Microservices for Online Art Museum on AWS May 2022 – Aug 2022

· Designed Backend based on **Flask** Framework and Python to access **RDS** Database and allowed Web Frontend to query, modify Database by sending **REST** API Requests to **Flask** Backend
· Developed Web Frontend for this management system in **S3 Bucket** based on **HTML, JavaScript and CSS** and designed **REST** API by **YAML**
· Implemented **OAuth Login** by using GitHub as the Authorization Server to generate access token and ran the server in **Docker Container** in an **EC2** instance
· Created 6 **APIs** for adding likes, adding comments and **Simple Email Service** on **API Gateway** and wrote **Lambda Functions** for each corresponding **API** in **AWS Lambda**
· Dockerized and deployed the microservice on **AWS EC2** and created **CloudWatch** metrics & alarms for monitoring

Tesla Stock Price Trend Prediction Based on Twitter Sentiment Analysis Jan 2022 – Apr 2022

· Utilized **Twitter Stream API** to capture Tesla related tweet data streams and utilized **yfinance** to obtain Tesla stock data
· Leveraged **PySpark** to process real-time data stream and applied **load-shedding** algorithm to filter the high relevance tweets to increased throughput and store them in **Heroku PostgreSQL** database
· Adopted **NLTK** for Twitter sentiment analysis and applied algorithms such as **random forest** and **support vector machine** to train models and predict stock movements with an accuracy of 76.65%
· Built data visualization analytical dashboard with **Dash** and deployed web application using **Heroku** and **Git**