Haotian Wang

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EDUCATION

Duke University Durham, NC
M.Eng., Computer Engineering May 2024
Advisor: Stacy L. Tantum

North Carolina A&T State University Greensboro, NC
B.S., Electrical and Computer Engineering May 2021

RESEARCH EXPERIENCE

Duke University - Pratt School of Engineering Durham, NC
Graduate Research Assistant, Department of ECE May 2024 - Present

- Developed an analytical evaluation framework for autonomous vehicle safety and reliability technologies, selected for inclusion in Prof. Kishor Trivedi's upcoming publication.
- Designed and implemented a lightweight SQL-based research database with advanced filter, add, and delete functionalities. Improved team research efficiency, shortening literature review cycle by 30%.

NCAT & John Deere Company Greensboro, NC
Embedded Systems Researcher, Department of ECE Sept. 2020 - May 2021

- Co-developed a CAN-MQTT middleware bridge using Arduino, Raspberry Pi, and Python, enabling real-time bidirectional communication between embedded IoT nodes and cloud systems.
- Led integration of a TOML-based configuration system for CAN-to-MQTT mapping and frequency controls, supporting QoS 0/1/2 and event-driven publishing.
- Deployed system in smart plant-growth automation with sensor-triggered control via Node-RED dashboard, achieving 15% communication latency reduction.

PROFESSIONAL EXPERIENCE

Electric Power Research Institute (EPRI) Charlotte, NC
Engineering Intern, Department of Generation June 2023 - Aug. 2023

- Built a Python-VBA hybrid pipeline to preprocess and analyze 400k+ time-series data points from a large-scale energy storage pilot plant, improving processing efficiency by 20% and enabling interactive Excel-based dashboards for data visualization.
- Authored three in-depth technical reports for the Energy Storage Technology Database (ESTD), accelerating ETL workflows by 15% and delivering actionable data-driven insights on next-gen storage solutions.
- Collaborated with Energy Dome (Italy) to develop real-time CO2-based energy storage monitoring software, improving processing throughput by 30% and reducing resource loss by 20%.

Nuclear Power Operations Research (Shanghai) Co., Ltd. Shanghai, China
Engineering Intern Dec. 2021 - Apr. 2022

- Contributed to published patent CN116929758A on early diagnosis of steam turbine bearing bush failures, focusing on data-driven fault prediction and abnormal temperature detection.
- Built lab-scale data classification and modeling pipelines on 100k+ sensor records from DCS systems to identify thermal anomalies and assist in developing a real-time alert system with 15% accuracy improvement.

PATENTS

Wang, D., Chang, Z., **Wang, H.**, Zhang, F., Wang, J., Wang, X., Wang, Q., Wang, Y., Chen, Z., Lin, Y. (2023). Method for predicting and diagnosing abnormal temperature of bearing bush of steam turbine generator unit (CN116929758A). Nuclear Industry Patent Center. https://patents.google.com/patent/CN116929758A/en?oq=CN116929758A

ACADEMIC PROJECTS

Cloud-Native Edge Control System with RAG & NLP Duke University, NC
Project Lead Mar. 2024 - May 2024

- Designed a cloud-native control system for GPS-enabled edge robots using Rust, Qdrant, and Kubernetes, achieving 99.8% uptime and supporting real-time location and sensor streaming.
- Enabled AI-powered user interactions via chat-based UI and Phi-3 LLM with RAG integration; automated CI/CD with GitLab, Docker, and GKE, reducing deployment latency by 40%

IMDB Sentiment Classification & Synthetic Data Generation Duke University, NC
Project Lead Nov. 2023 - Dec. 2023

- Constructed a data pipeline for 50k IMDB reviews with preprocessing (tokenization, pause word removal, cleaning) and generated 50k synthetic samples using a Markov Chain model.
- Trained and evaluated a Naive Bayes classifier with Bag-of-Words features, achieving 86% accuracy on real data and 92% on synthetic, supported by word cloud and error log analysis.

License Plate Recognition with OCR & Deep Learning Duke University, NC
Project Lead Oct. 2023 - Dec. 2023

- Developed and benchmarked four LPR pipelines using traditional OCR, LSTM-based OCR, CNN classifiers, and end-to-end CNN+LSTM with CTC loss on a 10k-image dataset.
- Achieved 95.3% accuracy with LSTM-based OCR; implemented data augmentation, preprocessing, and model fine-tuning to improve robustness and processing speed across diverse image conditions.

TECHNICAL SKILLS

Programming Languages: Python, C/C++, Rust, SQL, VBA, Java
Cloud & DevOps: AWS, Docker, Kubernetes, GitLab CI/CD
Frameworks & Tools: Git, Linux, Arduino, Tableau, Power BI, Hugging Face
Systems & Concepts: Microservices, REST API, Distributed Systems, IoT, UI/UX

HONORS & AWARDS

Chancellor's Honor List for Spring 2021 Semester
Dean's Honor List for Fall 2019 Semester

LEADERSHIP & OUTREACH

Chair of the Student Foreign Language Society Jiaozuo, China
Henan Polytechnic University Feb. 2017 - Feb. 2018

Library Volunteer Jiaxing, China
Zhang Yuanji Library June 2017 - Aug. 2017