Yinwei Zhang

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PROFILE

Seeking MLE/DS/AS position. Ph.D. candidate who is passionate about solving real-world challenges using statistics, machine learning, and deep learning techniques. Skilled in Python and structured/unstructured database programming languages. Hands-on MLOps experience in the cloud environment.

EDUCATION

University of Arizona *United States*
Ph.D. Candidate in Industrial Engineering Aug, 2018 - Dec, 2023 (Expected)
Master of science in Statistics&Data Science Aug, 2020 - Dec, 2022
Master of science in Engineering Management Aug, 2016 - May, 2018

Jingchu University of Technology *China*
Bachelor of science in Process Equipment and Control Engineering Sep, 2012 - Jul, 2016

Related Coursework: Fundamental of Optimization, Experimental Design, Theory of Probability& Statistics, Statistical Machine Learning, Database Design in SQL, Project Management, Neural Networks

TECHNICAL PROFICIENCY

Programming skills: Python, R, Matlab, SQL, MongoDB
Frameworks: TensorFlow, PyTorch, scikit-learn, Numpy, Pandas, Langchain
Platforms: Git/Github, Docker, GCP, Jenkins, Kubeflow, MLflow, Airflow, Kubernetes, FastAPI, Streamlit

EXPERIENCES

Machine Learning Engineer
May, 2023 - Aug, 2023
Intern, CVS Health *Hartford, CT*

- Contributed to the development of the Python-based terminal user interface in **GCP Vertex AI**. This TUI streamlines the process of model building/deployment/management and boosts the efficiency of the **MLOps**.
- Deployed **large language model as services** in the GCP endpoint using **custom containers** and **FastAPI**, allowing users to access ChatGPT-like functionalities such as conversation chatbot and document Q&A.
- Demoed the instruction-finetuning of LLMs, which can improve the performance in real-world business scenarios.

Research Scientist
Jan, 2020 - Aug, 2021
Intern, ABB Inc *Raleigh, NC*

- Developed supervised **deep learning pipelines** for computer vision applications in industrial settings using Python and its libraries, enabling accurate real-time predictions under complex scenarios.
- Optimized the pipelines by **fine-tuning neural networks** with backbones and developing **novel modules** for data preprocessing and model evaluation, significantly improving the performance by 30%.
- Collaborated with team members to identify key evaluation metrics, write reports, and **file 3 patents** (link).

Research Assistant
Aug, 2018 - Present
University of Arizona (Google Scholar link) *Tucson, AZ*

- Developed **Bayesian factorization** method for object detection, achieving comparable results to deep learning methods with **99% reduced memory usage** in benchmark datasets based on real-world scenarios.
- Proposed a parametric method to model the **reliability of the autonomous vehicle** system by designing a novel simulation pipeline, the paper wins the **best paper** finalist in ICQSR (the top conference in reliability).
- Attended international conferences to deliver engaging and informative presentations to diverse audiences.

PROJECTS

Burst Detection for Sensor System
RNN, *GCP*, *Streamlit*, *TensorFlow* (link)

Trained a Seq2Seq model on the time-series signals in TensorFlow. Detected bursts by analyzing the residuals between the predictions and observations using process monitoring techniques. Served the model in GCP on demand by building a website via Streamlit.

Image-based Anomaly Segmentation
Autoencoder, *PyTorch* (link)

Trained an autoencoder using PyTorch and constructed a normal memory bank. Identified abnormal features by the cosine similarity score and replaced them with top-k similar normal features. Segmented anomalies by model decomposition, achieving 0.88 in F1 score.

PRESENTATIONS

- Xia, S., **Zhang, Y.**, Liu, J. (2020). Investigation of Curing Process Heterogeneity from Raman Spectrum via CP Decomposition. *INFORMS Annual Meeting*
- **Zhang, Y.** (2019). Tutorial: Applications of Spatial-Temporal Data Analytics in Industry. *Grand Lab Slam Workshop*, University of Arizona, Tucson
- **Zhang, Y.**, Liu, J., Lansey, K. (2019). Functional Data Analytics for Detecting Bursts in Water Distribution Systems. *INFORMS Annual Meeting*, Seattle
- **Zhang, Y.**, Liu, J., Son, Y. (2018). Effective and Efficient Moving Object Detection by a Moving Camera, *INFORMS Annual Meeting*, Phoenix

PUBLICATIONS (link)

- Xia, S., **Zhang, Y.**, Liu, J.. Context-Aware Bayesian Tensor Factorization. *Quality, Statistics, and Reliability Best Paper Competition*, INFORM Annual Meeting, 2023 (submitted).
- **Zhang, Y.**, Xia, S., Zhang, B., & Liu, J. (2023). Moving Object Detection from a UAV's Camera by Decomposing the Optical Flow. *The IEEE International Conference on Industrial Engineering and Engineering Management* (IEEM), Singapore, (submitted).
- Pan, F., **Zhang, Y.**, Liu, J., Head, L., Elli, M., & Alvarez, I. (2023). Reliability Modeling for Perception Systems in Autonomous Vehicles: a Recursive Event-Triggering Point Process. *INFORMS Conference on Quality, Statistics, and Reliability* (ICQSR), Raleigh, North Carolina (**best paper finalist**).
- Xia, S., **Zhang, Y.**, Zhang, B., Liu, J., (2023). Detecting Foreground in Videos via Posterior Regularized Robust Bayesian Tensor Factorization. *IEEE International Conference on Automation Science and Engineering* (CASE), Auckland.
- Pan, F., **Zhang, Y.**, Liu, J., Head, L., Elli, M., & Alvarez, I. (2022). Quantifying error propagation in multi-stage perception system of autonomous vehicles via physics-based Simulation. *Winter Simulation Conference*, Singapore.
- **Zhang, Y.**, Zhang, T., Liu, J., Kang, W., Liang, R., & Potter, B. (2022). Profile extraction for optical lens curing process with Image-based Regularized Tensor Decomposition. *Proceedings of the 2022 International Symposium on Flexible Automation* (ISFA), Japan.
- Nikravesh, Y., **Zhang, Y.**, Liu, J., & Frantziskonis, G.N (2022). A partition and microstructure-based method for large-scale topology optimization. *Mechanics of Materials*, Volume 166.
- Peterson, R. L., Shea, K. D., Liu, J., Luque, K., Powell, J., **Zhang, Y**., Williams, D. K., Martin-Plank, L., Heasley, B. J., Phillips, L. R., & Crist, J. D. (2021). Family caregiving context: a pilot study. *The Arizona Nurse*, April.
- **Zhang, Y.**, Lansey, K., & Liu, J. (2020). Detecting bursts in water distribution system via penalized functional decomposition. *The IEEE International Conference on Industrial Engineering and Engineering Management* (IEEM) (**honorable mention award**).
- Lee, S., Jain, S., **Zhang, Y.**, Liu, J., & Son, Y. (2020). A multi-paradigm simulation for the implementation of digital twins in surveillance application. IISE Annual Conference.
- Lee, S., Jain, S., Yuan, Y., **Zhang, Y.**, Yang, H., Liu, J., & Son, Y. (2019). Design and development of a DDDAMS-based border surveillance system via UVs and hybrid simulations. *Expert Systems With Applications*, 109-123.

PATENTS (link)

- System and method to generate augmented training data for neural network, WO Patent WO2022265644A1
- Robotic systems and methods used with installation of component parts, WO Patent WO2022265642A1
- Robotic systems and methods used to update training of a neural network based upon neural networks outputs, WO Patent WO2022265643A1

LEADERSHIP/EXTRA-CURRICULAR ACTIVITIES

- **Organizer**, CVPR Data Challenge on Vision-based Industrial Inspection (link) Jan, 2023 - Jun, 2023
- **President**, INFORMS Student Chapter at the University of Arizona Aug, 2021 - May, 2023
- **Teaching assistant** for SIE 533, Fundamentals of Data Science for Engineers
- **Teaching assistant** for SIE 506, Quality Engineering