

YINWEI ZHANG

✉ zhangyinwei1994@gmail.com · ☎ (+1) 520-486-7382 · in YINWEI · 🌐 <https://yinwei-zhang.github.io/>

👤 Summary

Ph.D. candidate in Industrial Engineering. Masters in Statistics. 1.5 years of industrial experience in developing/deploying deep learning models. Solid theoretical background in machine learning and statistical methods. Proficiency in Python, data science libraries, deep learning frameworks, and SQL. Self-motivated individual with excellent communication and presentation skills.

🎓 Education

University of Arizona, United States

<i>Ph.D.</i> Candidate in Industrial Engineering	Aug, 2018 - May, 2023 (Expected)
<i>Master of science</i> in Statistics&Data Science	Aug, 2020 - Dec, 2022 (Expected)
<i>Master of science</i> in Engineering Management	Aug, 2016 - May, 2018

Jingchu University of Technology, China

<i>Bachelor of science</i> 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

⚙️ Technical Proficiencies

- **Soft skills:** communication, writing, leadership
- **Platforms:** Windows, MacOS, Linux, Docker
- **Programming skills:** Python, R, Matlab, SAS, SQL
- **Software&Libraries:** TorchLua, TensorFlow/PyTorch, Lua, Sklearn, Numpy, Pandas Blender, ROS, CARLA, Autoware

👥 Experiences

Research Intern, ABB, Raleigh, NC

Jan, 2020 - Aug, 2021

- Worked with international teams, proposed a novel **data collection** mechanism that increases the efficiency by **50%**
- Developed the **data pre-processing** pipeline such as data cleaning and format converting by Numpy and Pandas
- Trained the neural networks **parallelly** for image based **regression** or **segmentation** tasks in a Linux **multi-GPU server**
- Deployed the trained neural networks by using **TensorFlow Serving** in the **Docker** container
- Achieved **30% improvement** in testing accuracy by designing a novel 3D **data augmentation** algorithm in Python
- Significantly enhanced the **interpretability** of the NN to the image features by developing a mask-based method
- **Visualized** the results using TensorBoard/matplotlib, and **presented** to the global technical manager
- Cooperated with project managers and lawyers to generate **3 patents** and write **2 scientific reports**

President, INFORMS Student Chapter, University of Arizona

Sep, 2021 - Present

- Lead the chapter members to collaborate with the department for organizing social events
- Analyze students' demands and initiate a new series of workshop that is helpful to students
- Collaborated with American Airline and held recruiting event at the department successfully

Teaching Assistant, Quality Engineering, University of Arizona

Jan, 2021 - May, 2021

- Supported learning unsupervised anomaly detection based on statistical modeling
- Demonstrated supervised model selection/training for efficient anomaly detection with historical well-labeled data
- Illustrated model evaluation based on confusion matrix, i.e., true positive, true negative, false positive, and false negative

Teaching Assistant, Fundamentals of Data Science for Engineers, University of Arizona

Aug, 2021 - Dec, 2021

- Supported learning principles of data pre-processing, e.g., data correcting, data completing, data creating, and data converting
- Assisted in understanding algorithms for supervise/unsupervise learning
- Demonstrated Python and libraries, e.g., Sklearn, Numpy, and Pandas

Projects

- Error Occurrence Prediction for AV System** (collaboration with Intel Lab), Tucson, AZ 2022
- Developed a physics-based simulation pipeline in **Docker** for studying the AV system in Linux environment
 - Modified **Python** modules for RGB and point cloud **data fusion**, improved the robustness of the **decision-making**
 - Proposed a model can **predict** the error occurrences with **40% improvement** in MAE compared with the benchmark method
- Anomaly Detection via Statistical Learning**, Tucson, AZ 2019
- **Regularized** the model coefficients with L_1 or L_2 regularizations to encourage the smoothness and the sparsity
 - Designed a gradient-based algorithm to estimate parameters **parallelly**, reduced the complexity from $O(n^3)$ to $O(n \log n)$
 - The method can be applied to CT images and the result shows that the F1 score is improved by 15%
- Object Detection via UAV with A Moving Camera**, Tucson, AZ 2018
- Preprocessed the frames in **OpenCV** and tracked features in each frame by **LK optical flow**
 - Proposed a method based on **perspective transformation** and conducted frame differencing and post-processing such as thresholding, **connected component analysis**, and **morphological operations**
 - The results show that the proposed method achieves 33% improvement in F1 score and 10 FPS in a CPU
- Coursework Project on Product Assessment**, Tucson, AZ 2018
- Collected one batch of products and measured the weight for each product
 - Estimated the **sample mean** and **sample variance** of the weight
 - Built **hypothesis** to test the equality between the mean weight and the designated weight by **T-test**
 - The **p-value** showed that the weight for this batch is significant

Presentation

- 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.

Publication

- 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*, Japan.
- Zhang, T., **Zhang, Y.**, & Liu, J., Smooth-sparse decomposition in the image based on alternative smooth direction Model, (on-going).
- Nikraves, 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. IEEM Conference (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 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.

Patent

- System and method to generate augmented training data for neural network, No. PCT/US21/37798
- Robotic systems and methods used with installation of component parts
- Robotic systems and methods used to update training of a neural network based upon neural networks outputs