Zhangyue Shi

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EDUCATION

Oklahoma State University (OSU) Expected: May. 2023
Ph.D. in Industrial Engineering & Management, Minor in Statistics. GPA: 4.0/4.0 *Stillwater, OK, USA*
- *Dissertation Topic: Advanced Data Analytics-based Quality Assurance for Smart Manufacturing*

Xi`an Jiaotong University (XJTU) Jun. 2019
B.S. in Mechanical Engineering. GPA: 3.7/4.0 *Xi`an, Shaanxi, China*

EXPERIENCE

Online Process Monitoring in Additive Manufacturing, *Research Assistant*, OSU Feb. 2020 – Nov. 2021
- Detect process anomaly during manufacturing via neural network (in TensorFlow), machine learning (in scikit-learn), and statistical method (in R), which could achieve 0.94 f-score in supervised monitoring and 85% true detection rate in unsupervised monitoring.
- Extract low dimensional features from high-dimensional time-series data using neural network (LSTM-autoencoder).
- Apply supervised monitoring via adaptive boosting; unsupervised monitoring via one-class SVM and EWMA control chart from features.

Machine Learning Model Performance Enhancement in Distributed System, *Research Assistant*, OSU Nov. 2021 – Present
- Enhance monitoring performance of neural networks in distributed manufacturing system via knowledge distillation (in PyTorch), which makes performance of convolutional neural network at data-poor agent have a 0.05 increment to 0.8 in f-score.
- Distill useful knowledge from CNN at data-rich agent to improve CNN at data-poor agents while preserving data privacy.
- Collect time-series printing data for normal and anomaly condition at different agents and apply CNN to detect process anomaly.

Data Augmentation for Time-series Data in Manufacturing, *Research Assistant*, OSU Aug. 2019 – Oct. 2021
- Develop a data augmentation method based on generative adversarial (GAN) neural network (in TensorFlow) to generate high-quality data, improving classification performance of logistic regression by 0.01 to 0.88 in f-score compared with model without augmentation.
- Propose a filter layer in the generator to select augmented sample of high-quality based on time-regularized Hausdorff distance, which is able to excavate underlying temporal relationship among the time-series data collected during manufacturing.

Surface-related Machine Parameter Identification in AM, *Research Assistant*, OSU Aug. 2019 – Jul. 2022
- Identify relationship between machine parameters and resulting AM surface morphology via neural networks, machine learning and statistics, achieving 0.75 f-score in a 16-class classification, which could be further used in parameter selection and anomaly detection.
- Extract low-dimensional features from high-dimensional surface data with heavy noise via neural network (Robust autoencoder).
- Together with conventional statistical feature, correlate extracted features with machine parameters via random forest (in scikit-learn).

Blockchain-enabled Data Storage in Manufacturing System, *Research Assistant*, OSU Apr. 2020 – Jul. 2021
- Propose a data storage method based on blockchain, which could detect malicious modifications on data via mismatch of hash value.
- Apply asymmetry encryption method and a camouflage method on data (in Python) to reduce risk of unauthorized access on data.

SKILL

Programming: Python (PyTorch, TensorFlow), R, SQL **Language**: Mandarin (native), English (fluent), German (basic)
Hardware: Raspberry Pi **Software**: MATLAB, Autodesk Inventor, CAD, Solidworks
Quantitative Methodologies: Machine Learning, Deep Learning, Feature Extraction, Model Compression, Data Augmentation, Statistical Process Control, Linear Programming, Markov Decision Processes, Time Series Analysis, Integer Programming

SELECTED HONOR AND AWARD

- Robberson Research and Creative Activity Grant, Graduate College, Oklahoma State University, 2022.
- Outstanding Graduate Student, The College of Engineering, Architecture and Technology, Oklahoma State University, 2022.
- NSF Student Support Award, North American Manufacturing Research Conference (NAMRC) 49, 2021.
- Data Challenge Competition Finalist, Quality, Statistics and Reliability (QSR) Section, INFORMS Annual Meeting, 2019.
- Second Prize, National Collegiate Mechanical Product Digital Design Contest, Ministry of Education, China, 2018.
- First Prize, National College Students Mathematical Modeling Competition Undergraduate Group Shaanxi Division, China, 2017.

SELECTED PUBLICATION

- **Shi, Z**., Mamun, A. A., Kan, C., Tian, W., & Liu, C. (2022). *An LSTM-autoencoder based online side channel monitoring approach for cyber-physical attack detection in additive manufacturing*. **Journal of Intelligent Manufacturing**.
- 6 published in total, 5 first-author papers. A full list of publications can be found here.

COMMUNITY ENGAGEMENT

President, *INFORMS Student Chapter at OSU* | Reviewer, *Journal of Intelligent Manufacturing, Healthcare Analytics* | Member, *IISE, INFORMS*