

Shijie Bian | Curriculum Vitae

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Research Interest: Machine Learning, Computer Vision, Knowledge Engineering

Programming Skills: Python, R, C, C++, JavaScript

Machine Learning Skills: PyTorch, TensorFlow, Keras, Scikit-learn, NetworkX

Education

- **University of California, Los Angeles** **Los Angeles, United States**
B.S. candidate in Mathematics of Computation (Minor: Statistics) *Sept. 2018 - Present*
GPA: 3.86/4.0 (Major GPA: 3.89/4.0, Upper Division GPA: 3.92/4.0)

Relevant Coursework

- **Computer Science:** Machine Learning, Artificial Intelligence, Computer Algorithms, Software Construction, Operating System Principles, Computer Organization, Computer Networks, etc.
- **Mathematics:** Linear Algebra, Discrete Mathematics, Optimization, Graph Theory, Real Analysis, Complex Analysis, Mathematical Modeling, Data Theory, Applied Numerical Methods, etc.
- **Statistics:** Data Analysis and Regression, Design and Analysis of Experiments, Statistical Models and Data Mining, Linear Models, Mathematical Statistics, Statistical Programming with R, etc.

Research Experience

- NASA Jet Propulsion Laboratory (JPL) and Autodesk** **Los Angeles, CA, United States**
Research Internship - AI-assisted Knowledge Graph Design Project *May 2021 - Present*
Advisor: Dr. Thomas Lu, Prof. Bingbing Li, Senior Engineer Daniele Grandi

- Built a pipeline to extract and encode features of CAD models, and to transform them into graphical representations. The connectivity information and encoded features are passed through a Graph Neural Network and a multilayer perceptron for embedding generation and learning.
- Established a knowledge base that could learn best practices from existing designs, and provide designers with feasible suggestions.

- CSUN Laboratory for Sustainable and Additive Manufacturing** **Los Angeles, CA, United States**
Research Internship - The Smart Connected Worker Project *June 2020 - Present*
Advisor: Prof. Bingbing Li, Prof. Guann-Pyng Li

- Developed a YOLO-based object detection model for automated machine state monitoring and behavior supervision of 3D printers. The model achieved an average test accuracy of 94.8%.
- Constructed a CRAFT-based finger and text recognition model for human-machine interaction control of 3D printers. The model achieved an average test accuracy of 89.87% for finger position detection and 90.0% for text recognition.
- Proposed and designed an automated system with an interactive GUI for real-time workplace monitoring and information analysis.

- Center for Vision, Cognition, Learning, and Autonomy (VCLA)** **Los Angeles, CA, United States**
Research Internship *June 2020 - Oct. 2020*
Advisor: Prof. Songchun Zhu, Dr. Feng Shi

- Performed literature review, analyzed and debugged baseline models.

- Conducted statistical experiments on numerous baseline models to evaluate the performance of the proposed Heterogeneous Graph Transformer.

Publications

- **Shijie Bian**, Tiancheng Lin, Chen Li, Yongwei Fu, Mengrui Jiang, Tongzi Wu, Xiyi Hang, Bingbing Li*, “*Real-time Object Detection for Smart Connected Worker in 3D printing*”, Proceedings of the 2021 International Conference on Computational Science (ICCS-2021, **Rank A Conference**), Krakow, Poland, June 16-18, 2021. URL: https://doi.org/10.1007/978-3-030-77970-2_42. **Publication with an oral presentation of the full paper at the conference.**
- **Shijie Bian**, Chen Li, Yongwei Fu, Yutian Ren, Tongzi Wu, Guann-Pyng Li, Bingbing Li*. “*Machine learning-based real-time monitoring system for smart connected worker to improve energy efficiency*”. Journal of Manufacturing Systems (JCR Quartile Ranking: **Q1**, 2020 Impact Factor: **8.633**), 2021, Volume 61, Pages 66-76. URL: <https://doi.org/10.1016/j.jmsy.2021.08.009>.


Awards

- **Oral presentation at the 2021 International Conference on Computational Science (ICCS).**
- Mathematical Contest in Modeling (MCM) 2021: **Honorable Mention (Top 24%).**

Programming Projects


The Smart Connected Worker (SCW) Project **June 2020 - June 2021**

Machine Learning, Computer Vision, Intelligent Manufacturing, IoT, HCI

- A machine learning-assisted automated system for real-time workplace monitoring.
-  <https://github.com/BrandonBian/SCW-V1.0>


Real-time Human-Machine Interaction Monitoring Project **June 2020 - May 2021**

Machine Learning, Computer Vision, Object Detection, Text Recognition, HCI

- A CRAFT-based finger detection and text recognition model for the real-time human-machine interaction control of a 3D printer.
-  <https://github.com/BrandonBian/SCW-finger-text-detection>

Real-time 3D Printer State Monitoring Project **June 2020 - March 2021**

Machine Learning, Computer Vision, Object Detection, Automated System

- A YOLO-based object detection model and a filtering algorithm for the real-time machine state identification of a 3D printer.
-  <https://github.com/BrandonBian/SCW-object-detection>