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