

Shijie Bian | Curriculum Vitae

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Research Interest: Machine Learning, Computer Vision, Knowledge Engineering, Data Mining
Skills: Python, Tensorflow, R, C, C++, PyTorch, JavaScript, Keras, Scikit-learn, NetworkX, etc.

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:**

- **Mathematics:** Linear Algebra, Discrete Mathematics, Optimization, Graph Theory, Real Analysis, Complex Analysis, Mathematical Modeling, Data Theory, Applied Numerical Methods, etc.
- **Computer Science:** Machine Learning, Artificial Intelligence, Computer Algorithms and Complexity, Software Construction, Operating System Principles, Computer Organization, 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.

Publications

- **Machine Learning-based Real-time Monitoring System for Smart Connected Worker to Improve Energy Efficiency**
 - **Shijie Bian**, Chen Li, Yongwei Fu, Yutian Ren, Tongzi Wu, Guann-Pyng Li, Bingbing Li*
 - **Journal of Manufacturing Systems** (JCR Ranking: **Q1**, Impact Factor: **8.633**), 2021
 - DOI: <https://doi.org/10.1016/j.jmsy.2021.08.009>
- **Real-time Object Detection for Smart Connected Worker in 3D Printing**
 - **Shijie Bian**, Tiancheng Lin, Chen Li, Yongwei Fu, Mengrui Jiang, Tongzi Wu, Xiyi Hang, Bingbing Li*
 - **International Conference on Computational Science (ICCS, Rank A Conference)**, 2021
 - DOI: https://doi.org/10.1007/978-3-030-77970-2_42

Research Experience

○ **NASA Jet Propulsion Laboratory (JPL) and Autodesk Inc.**

Project: AI-assisted Knowledge Graph Design

May 2021 - Present

Advisor: Dr. Thomas Lu, Prof. Bingbing Li, Senior Engineer Daniele Grandi

- Built a pipeline to extract and encode CAD models' features and transform them into graphical representations using NetworkX.
- Proposed a novel TechNet-based method to capture valuable information from disordered user-customized semantic names through seeking correlations between keywords and entities.
- Developed a machine learning model that passes graphical connectivity information along with encoded features 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.

○ **UC Irvine (UCI) and California State University Northridge (CSUN)**

Project: *The Smart Connected Worker*

June 2020 - Present

Advisor: Prof. Guann-Pyng Li, Prof. Bingbing Li

- Exploited the memory-backtracking functionality of RNNs to build an LSTM-based module that automatically disaggregates power signatures of devices in real-time.
- Developed a fault-detection module for automated machine state monitoring by implementing a YOLO-based object detection model with a machine-state filtering algorithm.
- Constructed a CRAFT-based finger and text recognition model for human-machine interaction control. The proposed novel color identification algorithm boosted the real-time performance of the human-machine interaction monitoring module.
- Proposed and designed a ready-to-deploy automated system with an interactive GUI for real-time workplace monitoring and information analysis.

○ **UC Los Angeles (UCLA) - Center for Vision, Cognition, Learning, and Autonomy**

Project: *An Optimizing Compiler for Deep Learning*

June 2020 - Oct. 2020

Advisor: Dr. Feng Shi

- Investigated, analyzed and debugged numerous baseline models.
- Conducted statistical experiments on baseline models and grasped their principles, features, and application scopes.
- Designed a suitable experiment that verified the performance of the proposed Heterogeneous Graph Transformer model.

Awards


- **Oral presentation** at the 2021 International Conference on Computational Science (ICCS).
- Mathematical Contest in Modeling (MCM) 2021: **Honorable Mention (Top 24%)**.
- High School Mathematical Contest in Modeling (HiMCM) 2016: **Meritorious (Top 11%)**.

Programming Projects

The Smart Connected Worker (SCW) Project

June 2020 - June 2021


Keywords: 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


Keywords: 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.
-  <https://github.com/BrandonBian/SCW-finger-text-detection>

Real-time 3D Printer State Monitoring Project

June 2020 - March 2021

Keywords: 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>