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, Software Construction, Operating System Principles, Computer Organization, Computer Networks, 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 real-time 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%)**.

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 of a 3D printer.
- 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