Boyuan Sun

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EDUCATION

Northwestern University, Evanston, IL — *(Expected) Sep 2020 – June 2022*
M.S. in Biomedical Engineering — GPA: 3.7/4.0
Relevant Courses: Computer Vision, Machine Learning, Bioelectronics, Additive Manufacturing

Columbia University, New York, NY — *Sep 2018 – Dec 2019*
M.S. in Electrical Engineering — GPA: 3.3/4.0
Relevant Courses: Algorithms, Microservices, GPU programming, Database, Distributed Network, Stream Processing, IoT

Michigan State University, East Lansing, MI — *Sep 2014 – May 2018*
B.S. in Electrical and Electronics Engineering — GPA: 3.9/4.0
Relevant Courses: C Language, Communication Network, Network Security, Signal Processing, Biomedical Imaging

PROFESSIONAL SKILLS

- Technical Skills: Python, C, CUDA C, MATLAB, SQL, HTML, CSS, TensorFlow, Keras, Spark, Kafka
- Web Development: Flask, AWS, Docker
- Hardware Design: SOLIDWORKS, Ansys HFSS

RESEARCH EXPERIENCE

Northwestern Rivnay Lab | Graduate Researcher, Evanston, IL — *June 2021- Present*
- Worked as a full-time graduate researcher and designed and built a micro-continuous liquid interface production based stereolithography 3D printing system that produces fine (< 200 μm) features using hydrogels.
- Established a computer vision algorithm using OpenCV that locates the tagged bioelectronic probes.
- Trained a predictive model to track the cell activity and implemented the model in the printing system.
- Built a prototype with microcontrollers and implemented the RESTful services with Flask.

FOCUS: The 'Fast Object-oriented C++ Ultrasound Simulator' | Research Assistant, East Lansing, MI — *May 2018- Oct 2018*
- Developed a rapid grid computation algorithm for nearfield ultrasound simulation with CUDA.
- Implemented transient calculations that provides high accuracy with low sample rates.
- Researched on nonlinear ultrasound simulations using the discontinuous Galerkin method.

SOAR: Autonomy Research Group | Research Assistant, East Lansing, MI — *Aug 2016- May 2018*
- Developed several machine learning and deep learning models for traffic sign recognition and driving strategies using TensorFlow.
- Established framework and communication protocols among vehicle infrastructures and sensors: radar, LiDAR, and cameras.
- Designed lane detection algorithm with Kalman filter and Hough transform in MATLAB.
- Completed general road tasks on lane detection and street sign recognition during the competition in Yuma, AZ.

PROJECT EXPERIENCE

Where2Meet – A Microservices Web Application — *Aug 2019- Dec 2019*
- Built a web service for group meetups that recommends locations and shows attendee's locations.
- Setup APIs using API Gateway with lambda functions and defined AWS SNS and SES topic for user email registration and verification.
- Deployed the frontend in an AWS S3 bucket and applied AWS Elastic Beanstalk to host applications.

Realtime Twitter Analysis with Spark Structured Streaming — *Feb 2019- May 2019*
- Built Spark structured streaming with Kafka.
- developed data warehouse using Google's BigQuery and firebase database.
- Implemented the visualization of real-time twitter treading and heatmap applications using JavaScript.

Machine Learning — *Sep 2018- Dec 2018*
- Trained a high-performance Contextualized Word Vectors Model using a bidirectional LSTM encoder for solving complex characteristics of word use.
- Designed and trained the conditional Deep Convolutional Generative Adversarial Networks with classifier for human face images completion and classification with.
- Refined a deep Q-learning algorithm for image restoration by Double Q-learning, Prioritized Replay and Dueling Q-learning.

Publications & Awards

[1] R. Keate, C. P. Collins, J. Tropp, B. Sun, J. Rivnay, C. Sun "Engineering conductive hydrogel architecture via polyelectrolyte-functionalization of sub-100-micron features". *Adv. Healthc. Mater.* (In review)

[2] B. Sun, E. H. Jones, C. Sun "Computer-vision-assisted micro-continuous liquid interface production 3D printing", 2022 (In progress)

Awards: Nikola Tesla Electrical Engineering Scholarship (2018-2019), Dean's Honors List (2014-2018)