HAIRUO SUN

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EDUCATION

Boston University, Boston, MA — Aug 2018 – Jan 2021
Bachelor of Science, Computer Engineering, CUM LAUDE
Cumulative GPA: 3.55 (Dean's List)

SELECTED COURSEWORK

Computer Engineering: Computer Programming, Embedded Microprocessor Systems Design, Applied Algorithms and Data Structures, Computer Organization, Smart & Connected Systems (IoT), Robot Learning and Vision for Navigation (Machine Learning Applications in Autonomous Navigation), Networking the Physical World, Engineering Design
Business: The Business of Technology Innovation, Strategy for Technology-Based Firms, International Entrepreneurship, Entrepreneurship: Solving Problems in a Dynamic World, Nuts & Bolts of New Ventures, Make To-Gather Interaction Design (Design Thinking).

SKILLS

Business: Sales/Marketing Strategic Planning, Team-building and Management, Fund-raising (Kickstarter, Incubator Pitch).
Programming/Computer Framework & tools: Python, C/C++/Embedded C, C#, Java, JavaScript, HTML, npm, Flask, AJAX, socket.io, Node.js, npm, MongoDB, JSON, jQuery, Git, Linux, Zephyr OS, Google Cloud Functions, ROS, PyTorch, Machine Learning, MATLAB.
Software: SolidWorks, Creo Parametric, Unity 3D, PSpice, Eclipse, Anaconda Navigator.
Communications Protocols: Modbus, Modbus over Ethernet, HART.
Hardware: Arduino/Raspberry Pi/Nordic nrf9160/ESP32, Robot Designing and Building, Electronics Soldering and Assembling, Laser cutting, Oscilloscope and Meters, Cadence, CNC machine, Spectrometer.
Language: Native Fluency Chinese, Fluent English.

WORK EXPERIENCE

H2OK Innovations; Somerville, MA
Software Test and Process Engineer(New Role) — Aug 2023 - Present

- Writing, testing and planning to deploy backward compatible code for edge sensors and gateways with each software feature addition.
- Designing and developing software unit tests and integration tests, write test cases for h2ok IoT products.
- Implementing team-wide Github practices and documentation structure for IoT, ML and full-stack projects.
- Providing software technical support, over-the-air upgrade and maintenance for deployed products.

IoT Software Engineer — Nov 2021 – July 2023

- Designed and Programmed 2 generations of IoT sensor-gateway products that collect spectral, health and location data from our customers' liquid products and process it on the AWS IoT Core.
- Programmed 2 Communications protocols: HART and ModbusEthernet for industrial sensors/PLCs.
- Conducted a series of testing (sensor and integration testing) and managed products deployment.
- Help review applications and recruit new engineers.

INTERNSHIP EXPERIENCE

Jump Into the Light; New York City, NY — Jul – Aug 2017
VR Intern

- Created small maze games in Unity3D using various game design methods and C#.
- Trained customers to use VR headsets and VR machines.

PROJECTS

IoT Projects:
Massachusetts Institute of Technology (MIT); Cambridge, MA
Smart Cooking Machine - IoT Project on MIT Out Of Frame Platform — Mar 2021 - Aug 2022
(https://www.outofframe.mit.edu/stories-of-food-and-tech**)**

- Designed and prototyped a smart cooking machine that cooks Chinese food with minimal human input.
- Programmed: 1) a touch screen that allows users to control the cooking machine to add ingredients or stir the pot. 2) a simple iPhone app that displays the cooking machine status and various recipes.

Boston University; Boston, MA
IoT – Smart & Connected System Sept – Dec 2020
- Designed and prototyped 6 cyber-physical IoT systems utilizing smart phones, microcontrollers, webcam/ sensors, IP gateways, mobile cloud computing, WPANs and wireless COMM protocols.

Mars Rover Robotic Arm Sept 2019 – May 2020
- Designed, assembled and programmed a robotic arm to maneuver (retrieval & delivery) objects through a remote PS4 game controller live-streamed the onto a PC wirelessly through a web-cam.

Weather Satellite – Secure Networking System Feb – May 2020
- Implemented a system that mimics real world micro-satellites' secure weather data communication.
- Collaborated with teammates to obtain weather data using OpenWeather API's cloud database, ensure transmission security using user authentication & prevent data leakage using data encryption.

Embedded Weather Monitoring and Alarm System Feb – May 2018
- Designed, assembled and programmed an embedded weather system using Atmel AVR microcontrollers, sensors, keypad, LCD screen and embedded C, mixed C and assembly language programming.

Business Projects:
Strategic Analysis and Recommendation for WeVR Film Company Feb – May 2020
- Proposed Strategic recommendations for WeVR to effectively improve its sales and marketing, target the right audience, deal with new competitors and form partnerships with industry leaders.

Business Simulation – Operate a Tech-Based Firm Feb – May 2020
- Conducted a simulation of operating a tech-based firm over a 10-year period.
- Obtained $1707.2M cumulative profit by making decisions on R&D funding allocation, sales strategies based on the past year's performance and the market need

Toyota's Acquisition of Momenta (Autonomous Driving Company) Proposal Feb – May 2020
- Delivered a proposal on Toyota's acquisition of Momenta with a detailed analysis of the acquisition structure and business, industry & economic implications and competitive response.

Real Time IoT Oil Drilling Monitoring System – Elevator Pitch with VCs Feb – Mar 2020
- Conducted research on an existing startup's patented IoT technology, interviewed its founder and delivered a 5-min mock elevator pitch to a panel of VC judges looking to raise $1.5M series A funding.

Welsh Water Company Negotiation Project Apr 2020
- Conducted a mock negotiation with different unions' student leaders as Welsh Water's representative to ensure company's profitability while providing benefits for workers and avoiding workers' strike.

Massachusetts Institute of Technology (MIT); Cambridge, MA
User-Centered Design: Extreme Users and Product Rapid Ideation Jan 2020
- Designed and prototyped a smart door-bell(IoT) product ideation process using hands-on tools to help designers better understand user experience and help users understand the product development process.

Sustainability Projects / Research
Boston University; Boston, MA
Role of Harvard Museum of Natural History (HMNH) in Sustainability Education Feb – May 2019
- Researched the HMNH's educational role in raising awareness on global warming issue and habitat protection and how it can encourage local citizens to take action in various communities.

Massachusetts Institute of Technology (MIT); Cambridge, MA

Creating a Real-World Energy Future Team Project Jan 2021

- Designed strategic plans for 5 different stakeholders to persuade policy makers to create and pass Carbon taxation and data transparency policies on consumer products.

Building a Movement: Planning a Sustainability Campaign Jan 2020

- Designed a global warming campaign plan for the City of Cambridge to help raise citizens' awareness in reducing residential Carbon footprint and engage local authorities to support sustainability policies.

RESEARCH EXPERIENCE

Boston University; Boston, MA

Autonomous Navigation Using Unicycle Method (BU Robotics Lab) Sept 2020 – July 2023

- Programmed a moving object to traverse autonomously between 2 points with known location using visual homing 2D unicycle method in ROS.
- Programmed a 3D vehicle to traverse through an AR gate (with fiducial on all gateposts for gate localization) in a Gazebo simulation.

Autonomous Navigation Using Machine Learning Method Sept – Dec 2020

- Programmed a simulated Mars rover to traverse autonomously through a mock Mars simulation in Unity3D using a trained imitation learning agent with quality camera data.

Massachusetts Institute of Technology (MIT); Cambridge, MA

MIT Immersion Lab Sept 2023 - Present

(Link: TBD)

- Get Trained on various XR headsets(Varjo, HoloLens, Meta Quest Pro) and conduct small demo projects to understand the pros and cons, and potential application/capabilities of each headset.

LEADERSHIP EXPERIENCE

Boston University; Boston, MA

BU Mars Rover Team – Team Building & Management Sept 2019 – Jan 2021

- Assembled BU Mars Rover Team of over 100 ENG/SCI students & 8 sub-teams, successfully designed a rover prototype and secured $1000 dollar funding at BU Build Lab (an incubator).
- Hosted over 250 hours of team meetings / hackathon and managed a team drive and GitHub repository for team documentations, peer programming and website design.

Massachusetts Institute of Technology (MIT); Cambridge, MA

MIT Media Lab XR Portal Reef Project Mar 2022

(https://github.com/hrsun0118/mit_reality_hack_2022)

- Collaborated in a team of 4 and designed an AR application in Holo-Lens 2 and EEG Head-band using visual, auditory, and hand tracking to create an interactive environment for users to experience how human touches trigger coral reef destruction.
- Goal: Helps evoke audience's empathetic emotions towards damaged coral reef and motivate them to take actions for environmental protection.

Sloan: Future of Work -Training and Retraining of Skills Jan – Feb 2018

- Co-led a team and proposed a digital training platform to "Help Low-Skillsets Low-Income Workers Deal with Job Loss due to Machine Automation by 2050" and won the 1st place, $2000 prize in presentation.

MIT Media Lab VR Hackathon AlgoAR Education Platform (https://devpost.com/software/algoar**)** Oct 2017

- Assembled a team of 2 3D-model designers and 3 developers.
- Designed and prototyped an AR interface that let users to interact with 3D virtual models by manipulating Vuforia cards through an AR web-cam in Unity and learn sorting algorithms and other CS/ENG concepts.

MIT Reality Hack VR Hackathon Lego Land Education Platform Oct 2021
(https://github.com/hrsun0118/Lego-Land-Project-MIT-Reality-Hack-2021)

- Assembled a team of 2 3D-model designers and 2 developers.
- Designed and prototyped a VR world in Unity on the VRChat platform that allows students from STEM, architecture, art and interior design background to work on creative interdisciplinary projects together.

VOLUNTEER & EXTRACURRICULAR ACTIVITIES

Boston University Mars Rover Club, President / COMM System Team Lead Sept 2019 – Jan 2021
Stony Brook University Sailing Club, Member Sept 2015 – Dec 2016
Australian International Student Volunteer Organization, Conservation Volunteer May – Jun 2016