Haoxuan SHAN

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EDUCATION BACKGROUND

University of Michigan *Ann Arbor, Michigan*
BSE in Computer Science with a Minor in Mathematics *Aug 2020 - May 2022 (Expected)*
Overall GPA: 4.0/4.0, Major GPA: 4.0/4.0
Upper-Level Courses: *Computer Vision A+, Machine Learning A+*, *Intro to NLP A*
Intro to Algorithmic Robotics A+, Autonomous Robotics A, Operating System A

University of Michigan - Shanghai Jiao Tong University Joint Institute *Shanghai, China*
BE in Electrical and Computer Engineering *Sept 2018 - Aug 2022 (Expected)*
Overall GPA: 3.74/4.00, Major GPA: 3.92/4.00
Upper-Level Courses: *Embedded System (Implemented a two wheels self-balancing car), Control System & Analysis A+*

PUBLICATIONS

Dragon Rider-An Integrated Unmanned Quadruped-Hexarotor System for Flight-Impeded Area Exploration[PDF]
Author: **Haoxuan Shan**, Gang Chen, Shuyang Shi, Zhelong Wang, Maoshen Qin, Wei Dong
The IEEE 27th International Conference on Mechatronics and Machine Vision in Practice (accepted)

A Snake-Like Robot with Envelope Wheels and Obstacle-Aided Gaits [PDF]
Author: Kundong Wang, Youwei Ma, **Haoxuan Shan**, Shugen Ma
Journal: Applied Sciences (published) Doi: 10.3390/app9183749

PATENT

Patent for Utility Model: Anti Overflow Spray and Liquid Dumping Device *Sept 11, 2018*
Conferred by China National Intellectual Property Administration, Patent Number: ZL 2017 2 1855428. X

RESEARCH EXPERIENCE

Autonomous Robotic Manipulation Lab, University of Michigan *Sept 2021 - Present*
Application of Normalizing Flows in Navigation, Supervisor: Professor Dmitry Berenson
- Explored the obstacle navigation task with normalizing flows methods
- Used a neural network to deal with flows generation and accommodate variant cost function

Cooperative Intelligence of Unmanned System Lab, Shanghai Jiao Tong University *Nov 2019 - Aug 2021*
Dragon Rider Project, Supervisor: Professor Wei Dong
- Designed, modeled, and built a combined system combining Unmanned Aerial Vehicle and Quadruped Robot
- Utilized Aruco Library of OpenCV to detect QR code and calculated the position of the camera
- Developed the upper-level state control and the PID control in ROS; wrote a Python script to communicate with Arduino board; trained a YOLO3 network for UAV detection and position estimation.
- Implemented a ROS plugin for controlling joints and simulated obstacle avoidance algorithm of UAV in GAZEBO
- The research paper has been accepted by M2VIP 2021

Department of Instrument Science and Engineering, Shanghai Jiao Tong University *Apr 2019 - Oct 2019*
Simulation and Design of Snake-like Robot, Supervisor: Professor Kundong Wang
- Designed and carried out the experiment of obstacle-aided gait through the narrow corner
- Solved the powering problem and revised the supporting part for the servo
- Got A in the Participation in Research Program (PRP), SJTU and published a paper in *Applied Sciences*

PROJECT EXPERIENCE

Course Project of *Autonomous Robot*, University of Michigan *Sep 2021 - Present*

- Developed the motion controller for a mobile bot with Robot Control Library on the BeagleBone Blue board
- Realized communication between programs or boards with Lightweight Communications and Marshalling (LCM)
- Implemented the simultaneous localization and mapping (SLAM) on the bot with a radar

Course Project of *Computer Vision*, University of Michigan *Feb 2021 - May 2021*

Fast Super-Resolution via Residual Convolutional Network [PDF] [Video]

- Designed a residual convolutional network model and built a tool to improve the resolution of video clips
- Surpassed the bicubic baseline model on the DIV2K dataset and got **A+** for the course grade

2020 Mathematical Contest in Modeling *Feb 2020*

Fish Migration: Multi-factor Spatiotemporal Fish Migration and Profit Analysis Model [PDF]

- Built GMVC (1,1) Temperature model and fitted the weekly mean temperature from 1990 to 2019
- Built a Multi-factor Spatiotemporal Fish Migration and Profit Analysis Model (MSFM-PA) given the temperature prediction and used the model to predict the migration of fish and provide suggestions for small fishery companies
- Simulated the prediction with MATLAB and finished a paper which won **the Finalist Prize (1%)**

Course Project of *Intro to Engineering*, UM-SJTU JI *May 2019 - Aug 2019*

A Mars Exploring Robotic Dog [PDF] [Photo]

- Designed a mobile bot with a damping system and paper bars as the supporting structure
- Designed a remote-control system to control four crafted tiny cars with tracking function

Massachusetts Institute of Technology, Computer Science and Electrical Engineering Winter Program *Jan 2019*

- Lecturer: Jason S. Ku, held by Chinese Culture Connection (non-official program)
- Ranked 2/7 in the tracking car match, the 1/7 for the final grade and finished two website games
- Participated in the one-day volunteer service at BOSTON FOOD LANJRY

EXTRACURRICULAR EXPERIENCE

***Teaching Assistant, VG101: Intro to Computer and Programming*, SJTU** *Sept 2019 - Aug 2020*

- Arranged lab, delivered recitation classes, held office hours, and graded homework and exam paper

***Consultant,* UM-SJTU JI Student Science, Technology and Innovation Association** *Oct 2018 - Dec 2019*

- Worked as the lecturer in Arduino Workshop, SOLIDWORKS Workshop, and Heuristic Search Workshop
- Served as the judge in Mechanical Innovation Robotics Competition for Freshmen

AWARDS & HONORS

University Honors, UM (twice) *Apr 2021 & Dec 2020*
Dean's List, UM (twice) *Apr 2021 & Dec 2020*
Undergraduate Excellent Scholarship Class C Academic Scholarship, UMJI *Sept 2020 - Dec 2020*
Undergraduate excellent scholarship Class B Academic Scholarship, UMJI *Sept 2019 - Dec 2019*
Rong Chang Innovation Scholarship Nomination, SJTU (30 winners each year in SJTU, 0.3%) *Sept - Nov 2020*
Mathematical Contest In Modeling, America, *Finalist Prize,* (1%) *Feb 2020*
"Lan Qiao Cup" Programming Competition, China *Mar 24, 2019 & May 25, 2019*
Second Prize (National Level, 0. 7%), First Prize (Shanghai Area, Ranking: 10%)

SKILLS

- **Language:** English (Fluent), Mandarin (Native)
- **Programming:** C/C++, Python, MATLAB, SQL
- **Software:** SOLIDWORKS, GAZEBO, Mathematica, Vivado, MPLAB, Origin
- **Platform:** ROS, Arduino, Beaglebone Blue, Raspberry Pi