92 West Dazhi Street,
Nan Gang District, Harbin
Heilongjiang, China, 150000

Liqun Zhao

+008618846032597
lqzhaohit@gmail.com

Education

Harbin Institute of Technology (HIT)   **Harbin, Heilongjiang, China**
Bachelor of Engineering in Automation (A five-year study due to my request for a one-year deferral) *08/2016 – 07/2021 (Expected)*
GPA: 95.03/100; **Ranking:** 2/182
Honors:
- National Scholarship (Top 2% among the School of Astronautics), Twice, granted by the Ministry of Education of P. R.C.
- CSC Scholarship (for my academic exchange in Australia), granted by China Scholarship Council
- First Class of People's Scholarship, (Top 3%), Three times, granted by HIT
- Second and Third Class of People's Scholarship, (Top 10% and Top 20% respectively), granted by HIT

The University of Adelaide   **Adelaide, South Australia, Australia**
Exchange Student   *02/2019 – 06/2019*
GPA: 89/100 (High Distinction, equivalent to 4.0/4.0)
Honor:
- Endeavor Cheung Kong Scholarship, granted by the Australian Government and Cheung Kong

Publications

- Zou, S., Lv, Y., Zhao, L., Ma, G., and Yan, H. (2019). A novel shape detection method for continuum soft manipulator based on cable encoders. In 2019 *Chinese Co*ntrol Conference (CCC) (pp. 4709–4714). IEEE. https://doi.org/10.23919/ChiCC.2019.8865407 [indexed by IEEE Xplore and EI Compendex]
- C. Wang, M. Tong, L. Zhao, X. Yu, S. Zhuang and H. Gao, "DanioSense: Automated High-Throughput Quantification of Zebrafish Larvae Group Movement," in *IEEE Transactions on Automation Science and Engineering*, doi: 10.1109/TASE.2021.3050408.
- Collaborated to apply for the patents for these projects

Research Experiences

Institute of Intelligent Control and Systems, HIT   **Harbin, Heilongjiang, China**
Research Assistant   Supervisor: Prof. Huijun Gao (Group Leader),   Mentor: Prof. Weiyang Lin   08/2019 – Present
Project: *Study on Quantitative Microinjection Technology and Automatic Tracking of Zebrafish,*
The Sub-Project of the Key Program Supported by the National Natural Science Foundation of China
- Developed a new quantitative microinjection technology which can be integrated with existing medical injection pump with the advantage of applicability, and adopted fuzzy PID control to construct the closed-loop control system for the pump
- Co-developed an automatic tracking system for zebrafish larvae group by firstly applying Gaussian Mixture Model (GMM), Convolutional Neural Network (CNN), and other methods to enable the tracker to localize every zebrafish even in occlusion cases, then adopting Adaptive Kalman Filter to optimally estimate locomotive parameters and conducting data association to generate each zebrafish's trajectory

The Research Center of Deep Space Detection, HIT   **Harbin, Heilongjiang, China**
Research Assistant   Supervisor: Prof. Guangfu Ma (Group Leader),   Mentor: Dr. Yueyong Lv   04/2018 – 08/2019
Project: *A Novel Shape Detection Method for Continuum Soft Manipulator Based on Cable Encoder*
- Proposed a novel method to detect the shape of soft continuum manipulator in real-time and established a distributed sensor network to measure the lengths based on cable encoders and then transmit the information to the computer
- Developed a 3D model of the single-section and extended it to multi-section, achieving the conversion from the geometric parameters to the pose of the manipulator, and then demonstrated the effectiveness by simulating the developed shape detection method for the soft manipulator in real-time with MATLAB
- Conducted research on trajectory planning by using improved B-spline curves

Summer Internship

Mechanical Systems Control Lab (MSC), University of California, Berkeley   **Berkeley, California, USA**
Research Assistant   Supervisor: Prof. Masayoshi Tomizuka (Group Leader),   Mentor: Dr. Wei Zhan   07/2020 – 09/2020
Project: *Study on Trajectory Planning for Autonomous Driving by Using A* Algorithm and Quadratic Programming,*
The Project Supported by Autonomous Driving Group within Mechanical Engineering Dept. at UC Berkeley
- Collaborated to develop a new method to present the current road situation to assist the decision-making process for autonomous driving, and co-developed a new way by integrating A* algorithm to plan the trajectory under uncertainties
- Co-developed the quadratic programming to modify the output produced by the A* algorithm to better the performance of the autonomous vehicles under environmental restrictions, including the movements of other vehicles and pedestrians

- Realized the methods mentioned above by coding in C++, designed and simulated possible environments for autonomous driving, and tested the validity of these methods and programs

Course Projects

Automatic Control Practice, HIT   **Harbin, Heilongjiang, China**
Circuit Design for Motor Control System with the Analysis of Its Performance   *11/2018–12/2018*
- Designed a specific motor control circuit with adjustable-speed drives (forward and reverse rotation), user-friendly operations, and a low cost (approximately 50 cents), and then completed the soldering
- Inspected the motor control circuit and corrected the errors occurring during the design and soldering
- Analyzed the relationship between input/output quantities by regulating the input signal (both its frequency and duty ratio) and measuring the corresponding output (rotational speed), then calculated the parameters of the controlled motor based on the data collected

Digital Microelectronics, the University of Adelaide   **Adelaide, South Australia, Australia**
AM2901 Logical Unit Design   *05/2019 – 06/2019*
- Designed the schematic with an efficient and manageable architecture, partitioned the circuit into appropriate modules, and minimized the logic
- Designed the corresponding layout that adopted good routing strategy, sensible floorplan, and good regularity to reduce the complexity, and the layout passed DRC, LVS, and simulations with a minimized size
- Tested both schematic design and the generated extraction circuit by setting specific inputs via voltage sources and the vector file generated by Python, then optimized the design to minimize the time delay; achieved a time delay of 0.7–0.8 ns on average, less than 0.8% compared to the period of the input

Awards

Golden Prize   **Daejeon, South Korea**
Golden Prize (first out of about 30 teams) of the 14th ICISTS-KAIST, granted by ICISTS   *08/2018*

Outstanding Volunteer   **Harbin, Heilongjiang, China**
Outstanding Volunteer of Model United Nations, International Week, and British Parliamentary
Debate at HIT, four times, granted by the Office of Global Affairs, HIT   *10/2018, 12/2017, 09/2017, & 04/2017*

Deputy Minister   **Harbin, Heilongjiang, China**
Deputy Minister of the HIT International Communication Association,
granted by the Office of Global Affairs, HIT   *07/2018*

Honorable Mention   **Harbin, Heilongjiang, China**
Honorable Mention in the 2018 MCM/ICM Contest, granted by COMAP   *05/2018*

Skills & Qualifications

Computer Skills
- **Computer Languages:** C (3+ years), Python (2 years), C++ (six months), Java (four months)
- **Mathematical Analysis:** MATLAB (2+ years; including simulation and control system design), Mathematica (1 month; for solving specific mathematical problems)
- **Mechanical Modeling:** AutoCAD, SolidWorks, Autodesk Inventor (six months; for modeling the mechanical structures)
- **Programming and Data Science Platforms:** Jupiter Notebook and Anaconda (2 years; for CNN and image processing)
- **Circuit Design and Simulations:** Multisim, Altium Designer, Cadence (2+ years; for digital and analog circuit design; particularly interested in digital microelectronics design)
- **Others:** LabVIEW (for control system design and simulations), ROS (for trajectory planning)

Methods & Algorithms
- Common concepts and algorithms taught in undergraduate courses (e.g., trees, graphs, Dijkstra algorithm)
- Fundamental knowledge of machine learning (e.g., CNN)
- Some fundamental knowledge of image processing and filtering (e.g., Adaptive Kalman Filter, Difference of Gaussian [DOG], Scale-Invariant Feature Transform [SIFT])
- Methods and algorithms for other purposes (e.g., fuzzy control, A* algorithms)

Languages
- **Chinese (Mandarin):** Native Speaker
- **English:** TOEFL 110 (Reading 29, Listening 29, Speaking 25, and Writing 27), GRE 331(V161 + Q170)
- **Japanese:** JLPT N1 (highest level in the Japanese-Language Proficiency Test)
- **German:** Reading at nearly B2 standard, others at nearly A2 standard
- **Korean:** Nearly TOPIK4 standard