

Haojie Shi

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EDUCATION

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- Harbin Institute of Technology, School of Honor
Bachelor of Engineering for Automation Sep.2016-Jun.2020(Expected)
GPA: 95.99/100(major) **Ranking: 1/156** in Automation
 - University of California, Berkeley
Academic Exchange Program&Summer Research Jan.2019-Jul.2019
GPA: 4.0/4.0
 - Harvard University
Undergraduate Research Intern at DAS Lab Sep.2019-May.2020(Expected)
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RESEARCH&COMPETITION EXPERIENCE

Lossy Image Compression with Recurrent Network Sep.2019-May.2020(Expected)

Advised by Prof. **Stratos Idreos**, DAS Lab, Harvard University

- Expect to apply **LSTM** or **GRU** for lossy image compression.
 - Expect to explore a **recurrent predictor** of objects in image patches for video analysis.
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2D Object Detection from a Bird's Eye View for Autonomous Driving Feb.2019-Jul.2019

Advised by Prof. **Masayoshi Tomizuka**, Mechanical Systems Control Lab, University of California, Berkeley

- Trained a neural network for 2d object detection based on **Mask RCNN**.
 - Applied **optical flow** to better track the vehicles from a bird's eye view.
 - Combined **background subtraction** with Mask RCNN, concatenating **foreground mask** as 4th channel for pedestrian detection, and the result AP achieves **87.6%**, gaining **17.2%** compared with Mask RCNN only.
 - Applied **RTS smoother** for object tracking and use **KLT** method to self-merge broken track.
 - Developed a GUI in matlab for manual check.
 - Our website: <http://www.interaction-dataset.com>
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Multi-modal sensor fusion for 3D object detection using neural networks Mar.2019-May.2019

Advised by Prof. **Avideh Zakhori**, Video and Image Processing Lab, University of California, Berkeley

- Added image features on **Frustum PointNets** to get better performance.
 - Fused image features and point cloud from Lidar.
 - Concatenated geometry features like normal and covariance features in point cloud.
 - Found a dimensionality based scale selection to compute normal adaptively.
 - 3D AP gains **3%** for cyclist and pedestrian detection in KITTI val set.
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Vibration Control under Visual Servo in Three Axis Mechanical Anti Vibration Platform Sep.2018-Jan.2019

Advised by Prof. **Weichao SUN**, Prof. **Huijun GAO**, Research Institute of Intelligent Control and Systems, HIT

- Designed the mechanical structure of Three Axis Mechanical Anti Vibration Platform and use 3D printing technology to make it.
 - Used Inertial Measurement Unit as measuring element and apply the theory of PID control for its Vibration Control.
 - Expected to use depth camera for Simultaneous Localization and Mapping.
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Intelligent Robot System for Quoridor Oct.2017-Jun.2018

Advised by Prof. **Ju HUO**, HIT Smart Car Innovational Club, HIT

- Used K60 microcontroller as core controller, Core i7 microcomputer as PC, DC motors to drive four Mecanum Wheels as the mobile platform, two color camera lens as measuring element.
- **Image processing:** Used library functions in Opencv to undistort source image, developed code for inversing perspective transformation, Canny edge detector, image segmentation.
- Identified numbers in image by ANN, then calculated the robot's position and direction by image analysis.
- Came up with a new algorithm of **digital correction** to improve the successful ratio of digital recognition.
- Built the robot **visual servo control system** with speed, position and self-angle closed loop control.
- Made the robot play Quoridor against other robots and win **the fourth place** in the 13th National University' NXP 'Cup of Smart Car Competition.

Mechanical Arm Handling System

Jun.2017--Aug.2017

Electric developer in HIT Competitive Robot Team

- Used STM32 microcontroller as core controller, DC and servo motors as actuation element, photoelectric encoder as measuring element.
- Used the STM32F103 microcontroller to achieve the LED lights display, output PWM waves, realize serial port communication by UART and CAN bus communication technology.
- Applied PID control theory to maintain the DC motor's rotational speed closed loop control.

INTERNSHIP AND PRACTICE

Electronic Process Practice at HIT

Oct.2018

- Designed Printed circuit boards containing switching circuit, oscillating circuit and power amplifier circuit for alertor with Altium Designer.
- Received systematic training in soldering and manufacture of PCB.
- Soldered and debugged an speaker and a radio.

Metalworking Practice at HIT

Apr.2018-May.2018

- Received basic training in CNC machining technology, automatic production line.
- Designed a humanoid robot that can start or end moving by voice control.

SCHOLARSHIP AND HONORS

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| • Luomai Keji Scholarship (1/164) | Oct.2018 |
| • First prize in the 13th National University' NXP 'Cup of Smart Car Competition | Aug.2018 |
| • First prize in Heilongjiang Province in The 9th Chinese Mathematics Competitions | Oct.2017 |
| • Chinese National First Class Scholarship (Top 3% in 164) | Oct.2017 |
| • First-class scholarship of HIT (Top 5% in 164) | twice Oct.2016, Apr.2017 |

LEADSHIP& VOLUNTEER EXPERIENCE

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| • Present one research poster in BAIR\BDD Spring retreat | Mar.2019 |
| • Vice Chairman of the Student Union in School of Astronautics | Sep.2018-Present |
| • Vice Director of Campus Live Department, the Student Union in School of Astronautics | Sep.2017-Jun.2018 |
| • Volunteered in aid education in Nankang Village, Hebei Province, China | Jul.2017-Aug.2017 |
| • Secretary of Campus Live Department, the Student Union in School of Astronautics | Sep.2016-Jun.2017 |

SKILLS

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- Programming Languages: C, C++(Opencv), Python(Tensorflow), MATLAB
 - Applications: Microsoft Office Suite, Photoshop, Adobe After Effects, Multisim, Altium Designer, Solidworks