Zhuo ZHI

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EDUCATION

Harbin Institute of Technology (HIT), China *2019.09-2021.07 (expected)*

Master of Engineering in Instrument Science and Technology,
Institute of Automatic Test and Control, GPA: 88/100, Rank: 15/110
Core courses: Digital Signal Processing, Digital Image Processing, Advanced Sensing Technique

Shandong University (SDU), China *2015.09-2019.07*

Bachelor of Engineering in Automation
School of Electromechanical and Information Engineering, GPA: 84.96/100, Rank: 15/120
Core courses: Analogue Electronic Technique, Digital Electronic Technique, Automatic Control Theory, Signal and System, Modern Control Theory, Computer Control System
Direct admission to master degree with exemption of national entrance examination for postgraduate

PUBLICATIONS

- [1] L. Liu, **Z. Zhi**, H. Zhang, Q. Guo, Y. Peng, D. Liu. "Related Entropy Theories Application in Condition Monitoring of Rotating Machineries", published in Entropy 2019, 21(11), 1061.
- [2] **Z. Zhi**, L. Liu. "Enhancing the reliability of the quadrotor by formulating the control system model", accepted by ICSMD 2020.

PROJECT & RESEARCH EXPERIENCE

Projects & Research participated in postgraduate period

Advised by Prof. Datong Liu & Prof. Liansheng Liu, Institute of Automatic Test and Control, HIT

Modeling and verification of the quadrotor flight control system *2019.07-2019.11*

- Proposed a method for formulating a simulation model by Simulink to improve the reliability of low-cost quadrotor UAV control system.
- Simulated the Mahony attitude fusion algorithm and the attitude control algorithm in the model.
- Finally, designed a physical controller with STM32F103 MCU and different sensors. The experimental data proved the usability of the model and the reliability of the flight control system.
- Submitted a paper as the first author to publication (as shown in **Publication [2]**).

Research on Condition Acquisition and Estimation of Industrial Robot *2020.06-present*

Funded by National Internet development project (ZGZZ20190004) $352 Thousand

- Expect to use some data-driven methods to provide condition estimation of RV reducer and harmonic reducer and develop a monitoring system.
- Expect to build a test bench for reducer and apply some optimization algorithms to optimize the layout of monitoring sensors.
- Expect to increase the confidence level of anomaly detection and fault warning to 90%.
- This project is also the graduate design and expect to publish a paper as the first author.

The Review of Related Entropy Theories Application in Condition Monitoring of Rotating Machineries

Funded by National Natural Science Foundation of China (61803121) $70 Thousand *2019.07-2019.09*

- Reviewed the related entropy theories which have been applied for condition monitoring of rotating machinery and conducted some case studies to prove the validity of the theory.
- Published a paper as the second author in Entropy (as shown in **Publication [1]**).

Tetris game based on FPGA development board *2019.07*

- Project designed in 2019 International Summer School organized by HIT.
- Developed the Tetris game based on FPGA and some Peripherals, including VGA, keyboard etc.
- Awarded as the outstanding team work of the school.

Projects & Research participated in undergraduate period

Advised by Prof. Chengjin Zhang, School of Electromechanical and Information Engineering, SDU

Smart car system based on visual and electromagnetic navigation *2017.12-2018.06*

- Designed two cars with electromagnetic sensors, cameras, speed encoders, ultrasonic sensors, laser sensors, gyro accelerometers to finish the closed circuit.
- Came up with an image processing method and applied it into Cotex-M3 MCU with OV7725 CMOS camera to achieve the fast extraction of the track center line. Improved the navigation algorithm based on electromagnetic wire guidance and integrated it with the visual algorithm. Achieved the accuracy rate of track recognition >98%.
- Improved the PID algorithm and applied it into the control of drive motor and steering servo to make the car run stably at the high speed >3.3m/s. As well built the Ackerman corner model to achieve precise control of the steering servo.
- Won First Prize of National College Student Smart Car Competition.

Multi-control small garbage cleaning ship *2016.03-2016.09*

Funded by Shandong University Undergraduate Research Training Program $1200

- Designed an autopilot with MCU Mega2560 and some sensors, including the gyroscope, accelerometer, magnetometer and GPS to realize the automatic driving of the ship.
- Designed the obstacle avoidance module with ultrasonic wave which achieved the recognition rate>95%.
- Won Second Prize of National Mechanical Innovation Design Competition and Second Prize of National College Students Entrepreneurship Competition.

Development of Copepod Zooplankton Artificial Culture System *2017.12-2018.06*

Funded by Weihai Science and Technology Research Project $2000

- Attended as the undergraduate research assistant project.
- Designed a desktop terminal for real-time monitoring of copepod zooplankton artificial cultivation.
- Used PH sensor, water oxygen content sensor, mechanical arm motion sensor to build the sensor net, used NRF for wireless communication and built the terminal with LCD, keyboard, etc.
- Awarded Shandong University Outstanding Undergraduate Research Assistant

Development on Ball and Plate Control System *2017.09*

- Used OV7725 camera to get the location of the ball.
- Proposed a cascade PID algorithm (including angular velocity loop, angular acceleration loop, ball speed loop and the angle loop) to control two servos to move the position of the ball on the plate.
- Won First Prize of National College Students Electronic Design Competition

Design of Small Biped Robot *2017.10*

- Designed an anti-human gait algorithm for small biped robot.
- Built a model and complete the track with MCU K60 and six Servos.
- Won Special Prize of China Engineering Robot Competition.

AWARDS

2018.06	Shandong University Outstanding Undergraduate Research Assistant (Top 5%, 2/40)
2018.07	First Prize of National College Student Smart Car Competition (Top 0.5%, 10/2000)
2017.10	Special Prize of China Engineering Robot Competition (Top 1.5%, 3/200)
2017.09	First Prize of National College Students Electronic Design Competition (Top 10%)
2018.10	Second Prize of National Mechanical Innovation Design Competition (Top 20%)
2018.12	Second Prize of National College Students Entrepreneurship Competition (Top 20%)

SKILLS

- **Programming language:** C, Matlab, Verilog
- **Professional software:** Matlab, Vivado, Altium Designer, Multisim, Keil, IAR, Quartus, Mysql
- **Well trained in** FPGA and ARM development, digital circuit and analog circuit design, digital signal processing and digital image processing, as well as control theory and algorithm