

Shutong Zhong

Tel: +86 18992610022, Email: zhong806038347@163.com

Homepage: <https://iverson0630.github.io/>

EDUCATION

School of Electrical and Information Engineering, Tianjin University

- Master in **Electrical and Information Engineering** 2022.09-present
- GPA: **3.74/4**
- Bachelor in **Automation** 2018.09-2022.07
- GPA: **3.65/4**
- GRE: **321** TOEFL: **95**
- **Computer skills:** Python, C++, Linux, Qt

PUBLICATIONS & PATENTS

- **Shutong Zhong**, Zeng Ming. AWED: Asymmetric Wavelet Encoder-Decoder Framework for Simultaneous Gas Distribution Mapping and Gas Source Localization. IEEE Transactions on Instrumentation and Measurement (2024), accept (**JCR Q1**).
- Ming Zeng, Chang Meng, Bin Han, Yuanhao Li, Hanshen Yu, Huijia Fu and **Shutong Zhong**. Gait Characteristics and Adaptation Strategies of Ants with Missing Legs. Journal of Bionic Engineering (2024) (**JCR Q3**).
- Ming Zeng, **Shutong Zhong**, and Leijiao Ge. Few-shot Industrial Meter Detection Based on Sim-to-Real Domain Adaptation and Category Augmentation. IEEE Transactions on Instrumentation and Measurement (2023), vol. 73, pp. 1-10 (**JCR Q1**).
- Ming Zeng, Yuanhao Li, Chang Meng, **Shutong Zhong**, Zhijing Wang, and Feng Zhao. Motion Capture and Gait Analysis of Ants with Leg Injuries. In 2023 42nd Chinese Control Conference (CCC), pp. 4449-4454. IEEE, 2023.
- Ming Zeng, Siying Li, **Shutong Zhong**, Feng Zhao, Xianghui Wang. Image Class Incremental Learning Algorithm Integrating Uncertainty Estimation and Incremental Stage Discrimination [P]. Tianjin: CN117079024A, 2023-11-17.
- Ming Zeng, **Shutong Zhong**, Bin Han, Hanshen Yu, Zhi Xu, Liang Mao. Few-shot Object Detection Method for Power Meters Based on Domain-Adaptation [P]. Tianjin: CN116310596A, 2023-06-23.
- Ming Zeng, **Shutong Zhong**, Xiangyan Meng, Yuanhao Li, Chang Meng. Personalized Voice-Triggered Emergency Assistance System [P]. Tianjin: CN115985308A, 2023-04-18.

RESEARCH

Power Inspection Robot Based on Intelligent State Perception 2023.05-2024.06

- Designed and realized a crawler-type robot capable of traversing various complex terrains (e.g., grass, steps, gravel, sand).
- Adopted a dual-spectrum head to collect visible light and infrared images, adopted a gas sensor to collect sulfur hexafluoride and combustible gas concentration in real-time, and utilized AD hoc network technology and 4G communication technology to establish communication with field operation terminal and remote client.
- Mounted a lightweight six-axis robot arm on the chassis to perform inspection tasks such as rotating knobs and toggling switches, creating an intelligent inspection robot that integrated perception and operation.
- Used Qt to develop remote client software for visualizing the acquired images and data, robot status, and facilitated real-time monitoring of the operating status of various equipment in the substation.

Shutong Zhong

Tel: +86 18992610022, Email: zhong806038347@163.com

Homepage: <https://iverson0630.github.io/>

Gait analysis of injured ants and its application in motion control of multi-legged robots

2023.02-present

- An apparatus for capturing the injury-induced behavior of ants was designed, utilizing key-point detection technology to annotate the movement postures of ants in real-time. Through signal analysis, the locomotive patterns characterizing the injured state of insects were summarized.
- Leveraging the locomotive patterns of the injured state as prior information, a deep reinforcement learning algorithm was employed to investigate the gait recovery capabilities of a hexapod robot following different leg-amputation injuries.
- A physical prototype of the hexapod robot was developed, equipped with a Bluetooth module for wireless communication with a PC-based upper computer, enabling real-time tracking of the desired joint angle trajectories.

Fully Separated Intelligent Garbage Classification Guidance System

2021.09-2023.08

- Collected a large number of high-quality real garbage images, conducted data organization and cleaning, and constructed a large-scale garbage image dataset named GarbageNet with 100,000 images.
- Utilized Swin-Transformer to train on GarbageNet, achieved a final classification accuracy of 95% on the test set for 34 major categories and a classification accuracy of 99% in the four categories of recyclable, hazardous, kitchen waste, and other waste, and deployed the model on the edge computing device Jetson Nano.
- Realized the communication and work of the fully separated intelligent trash can based on the built ROS environment: the upper computer applied Jetson Nano, and the lower computer used STM32 microcontroller and was equipped with infrared, ultrasonic, and other sensors.
- Relied on Jetson Nano to identify the images collected by the camera in real-time using the deployed classification algorithm, and sent the identification results to the corresponding STM32 to control the trash can.

Intelligent Auxiliary Sensing System for Aircraft Tractors

2021.06-2021.08

Intern, China-Singapore International Joint Research Institute

Advisor: Danwei Wang, NTU

- Completed using yolov5 under the DeepStream framework to detect vehicles and workers in an airport environment.
- Completed the writing of MATLAB and Python code for multi-step trajectory prediction based on particle filtering, which is used to predict the trajectory of vehicles and aircraft to eliminate the risk of collision.
- Utilized C and C++ to write DeepStream plugins in the Linux environment to complete the packaging of background data, and applied socket communication to send it to the front end to complete data interaction.

AWARDS

- | | |
|---|-----------------|
| • First Prize for Postgraduate Academic Scholarship, Tianjin University | 2022.10/2023.10 |
| • Excellent Student, Tianjin University | 2019/2020/2021 |
| • University Excellent Undergraduate Graduation Project at Tianjin University | 2022.06 |
| • Second Prize in the 15th Tianjin University Challenge Cup Competition | 2022.05 |