Haotian Yuan

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Education Background & Honors

University of Science and Technology Beijing (USTB), China **09.2019 to 06.2023**

- **Major:** Automation
- **GPA:** 3.41/4.0
- **Software Skills:** MS Office, Python, MATLAB, SolidWorks, Altium Designer etc.
- **Honors:** Third Prize in the USTB Robotics Design Competition (5.2021); Second Prize in the USTB Mathematics Competition (9.2022); First Prize in the 15th USTB Intelligent Vehicle Competition (12.2021); Second Prize in ICAN National College Student Innovation and Entrepreneurship Competition (Beijing Region) (10.2021); Successful Participant in Mathematical Contest In Modeling (2021); etc.

Academic Research Projects

Research on Drowning Detection of Indoor Swimmers Based on ST-GCN and Keypoint Detection (Dissertation),
Author **12.2022 to 06.2023**

- Collected the Hong Kong University pool dataset and performed preprocessing on the acquired video data.
- Used the PaddleVideo architecture on the Baidu PaddlePaddle AI Studio platform to perform object detection and keypoint pre-inference on the dataset, resulting in a well-trained ST-GCN model and model weights. These trained models and weights were then imported into the PaddleDetection framework to achieve drowning detection for single targets in videos.
- Through model training and testing, the ST-GCN model in the PaddleVideo architecture demonstrated good performance in drowning detection for indoor swimmers. The model achieved an accuracy rate of 0.95 on the test set, with good detection results and false positive/false negative rates maintained within acceptable limits.
- While using the PaddleDetection framework within the PaddlePaddle platform for continuous drowning detection in videos, the system performed excellent tracking on single targets. The system's detection speed was optimal, meeting the requirements for tracking and drowning detection of indoor swimmers.

USTB Robotics Design Competition
Key Member **5.2021**

- Selected appropriate circuitry for the competition robot's functionality; designed the main control board's Printed Circuit Board (PCB) using Altium Designer (AD), ensuring all components were effectively integrated.
- Procured the necessary electronic components and fabricated the PCB; performed soldering and circuit debugging to ensure proper electrical functionality.
- Programmed the STM32 microcontroller to implement core robot functionalities, including path tracking and obstacle avoidance, ensuring smooth and efficient operation in dynamic environments.
- Utilized SolidWorks for the 3D design of the robot's chassis; selected suitable aluminum alloy materials, arranged for CNC cutting, and assembled the robot by integrating the electrical circuit with the motion control modules.
- Conducted testing and debugging of the robot's path following and obstacle avoidance features; made necessary adjustments to enhance system performance and ensure reliability during operation.

ROS-based Intelligent Car
Project Leader **12.2021**

- Responsible for setting up the Linux platform, adjusting SLAM (Simultaneous Localization and Mapping) algorithm parameters, and debugging the intelligent vehicle path planning algorithm.
- Researched and evaluated various path-planning algorithms from GitHub repositories; integrated selected algorithms into the autonomous vehicle system and tested their performance on different training maps; chose the optimal path-planning algorithm for the car based on empirical results.
- Tuned the parameters of the path-planning algorithm based on the car's performance in different environments; optimized for the shortest completion time while minimizing collisions with obstacles, ensuring efficient race performance.

Integrated Garbage Bin for Identification and Screening Based on SSD Algorithm
Key Member / Technical Lead **10.2021**

- Responsible for setting up the programming environment, selecting appropriate deep-learning models for object detection, and integrating the SSD (Single Shot Multibox Detector) algorithm to classify different types of waste.
- Collected high-quality image datasets of various types of waste and used LabelMe to annotate the data; classified the data into four categories and reserved a portion of the dataset for final testing.

- Trained the deep-learning models using the annotated dataset, then tested the models with a reserved set of images; achieved a classification accuracy of 95.2%, correctly identifying 952 out of 1000 waste images, demonstrating strong detection and classification performance.

Practice Experiences

Metalworking Practice Training, USTB, Beijing, China
Trainee **07.2021 to 12.2022**

- Learned and practiced programming control and production techniques for 3D printing, laser cutting, and high-precision CNC lathe.
- Understood and practiced the operational processes involved in various metalworking trades.

Steel Production Practice Training, USTB, Beijing, China
Trainee **07.2022 to 09.2022**

- Visited the Shougang Group and gained an understanding of the modern steel production process.
- Studied the application of PLC (Programmable Logic Controllers) in electrical automation control within the steel metallurgy industry, and used the S7-300 PLC to develop and build control models for simulating automatic control in steel production.
- Investigated the application of automatic control technology in safety warning and protective processes in steel production, and designed control flow diagrams.

Engineering Cognitive Practices, USTB, Beijing, China
Trainee **07.2021 to 09.2021**

- Learned about the entire steel production process and gained hands-on experience using a virtual simulation platform.
- Learned and extracted key automatic control technologies used throughout steel production.
- Investigated the current development of the steel industry and proposed recommendations for green development, digital transformation of enterprises, and data asset construction.

Publication

Haotian Yuan (Co-First Author), 2022, “Mechanism and Control of Fusion and Agglomeration in Indirectly Heated Silicothermic Reduction” accepted by The Chinese Journal of Nonferrous Metals, Issue6, (ISSN 1004-0609), Chinese Science Publishing Press, pages: 30-36. DOI: 10.3969/j.issn.1007-7545.2022.06.006