Tian Qin

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Education

China University of Mining & Technology, Beijing (CUMT 211) Sep. 2023 - Present

Master: Control Science and Engineering | **GPA:3.4/4.0**

Supervisor: Prof. Kehu-Yang, Lab of Intelligent Energy System and Autonomous Mining

Coursework: Advanced Signal Processing (93), Linear System Theory(96), Adaptive Control (94)

Sichuan University, Chengdu (SCU 985) Sep. 2015 - Jun. 2019

Bachelor: Electronic and Information Engineering | **GPA:2.93/4.0**

Coursework: C Language Programming (91), Computer Communications and Networking(86), Experiments of Communication Principles (88), Analog Electronics Technology, Signals and Systems

Publication

In Press

- **Qin Tian**, Zhu Desheng, Wang Chunhui, et al. *Dual-Loop Fuzzy-PID Acceleration Tracking Controller for Autonomous Mining Trucks under Variable Payload Conditions*[J].Coal Engineering.

  Proposed a dual-loop fuzzy PID control architecture with parameter self-adaptive compensation to achieve robust acceleration/velocity tracking. Compared with MPC control, the peak-to-peak values of speed and acceleration errors were reduced by *8.77 %* and *13.30 %*.

Conference

- **Qin T,** Qiu L, Chen J, et al. Double-Layer Following Controller for Autonomous Vehicles.2024 36th Chinese Control and Decision Conference (CCDC). IEEE, 2024: 908-913.

  Designed a controller based on Linux/ROS, combining DWA and fuzzy adaptive PID to optimize the acceleration of driving comfort without affecting safety. Compared with the PID-Stanley algorithm, the root mean square error of the lateral acceleration is reduced by *19.5 %*.

- Chunhui Wang, Desheng Zhu, **Tian Qin**, et al. Lateral Trajectory Tracking of Autonomous Mining Trucks Using MPC with Adaptive Load Compensation. IEEE Chinese Control and Conference(CCC), 2025.

  Based on the dynamic model of the mining truck, design the MPC controller and the longitudinal controller which adapt to large variable loads and complex scenarios in mines. Compared with the LQR algorithm, the average lateral error was reduced by *33.33 %* under load conditions.

- Peize Yang, Desheng Zhu, **Tian Qin,** et al. Adaptive Heading Tracking Algorithm Based On Vehicle Dynamics Model. IEEE Chinese Control and Conference(CCC), 2025.

  Improved the pure tracking algorithm to adapt to the safety constraints of the strip mine and enhance the lateral control performance. Compared with the traditional pure tracking algorithm, the lateral error of this algorithm is reduced by *47 %*.

Research Experience

Key Technologies and Application Demonstration of Autonomous Transportation and Loading/Unloading System for Large Open-pit Mine Robots

National Key Research and Development Program of China Nov. 2022 - Oct. 2025

- According to the unloading area scenarios of mining trucks, designed and tested the MPC controller through the *ROS C++* programming language and *Python*. The lateral parking errors and longitudinal errors at the loading points were controlled within *0.4* m and *0.15* m respectively.

Competition

China Intelligent Connected Vehicle Challenge

Contribution Award(Top 5 %) Oct. 2023 - Nov. 2023

- Developed an adaptive cruise controller to achieve trajectory optimization of DWA and Fuzzy-PID hybrid control to maintain safe following distance on the Virtual Test-driven (VTD) simulation platform, minimizing the transverse and longitudinal accelerations to ensure comfort.

Autopilot Challenge of the Vehicle-Road-Cloud Integration

Innovation Award(Top 5 %) Mar. 2024 - Jun. 2024

- Integrated the Linear quadratic regulator (LQR) controller system into the autonomous vehicle platform, and demonstrated technical actions such as parking and obstacle avoidance in the racing competition to complete the verification. The competition was completed with a result of *7* out of *118*.

National Post-Graduate Mathematical Contest in Modeling

Participation Award(Top 20 %) Oct. 2024 - Nov. 2024

- Constructed the multi-physics field coupling model based on the characteristics of magnetic components, leveraging the interactive linear regression method to improve the original Steinmetz Equation, which increased the accuracy of the model by *5 %*.

Additional Information

- **Programming and others:**
  - C++, Python, Matlab, Trucksim, Carsim, Vtd
- **Language Proficiency**
  - English (IELTS 6.5 - Reading 8), Mandarin(native)