# Introduction of Research Experience

Applicant: Shuwei Pei

University of Science and Technology Beijing

peishuwei9@live.com

Please feel free call me Travid





## I. Personal Background <u>1. Education</u>

#### **University of Science and Technology Beijing**

M.E. in Mechanical Engineering

#### **University of Science and Technology Beijing**

B.E. in Vehicle Engineering

#### National Taipei University of Technology

Exchange Student in Vehicle Engineering

## 2. Awards

The Second Price Scholarship, University of Science and Technology Beijing, 2023&2022 The Second Price Scholarship, Roberto Rocca Scholarship, 2023 National Second Prize, China Industrial Internet Contest, 2021 Outstanding Graduates, University of Science and Technology Beijing, 2021 Merit Student, University of Science and Technology Beijing, 2018

3. Skills

**Programming:** MATLAB, LaTeX, Python, Pytorch, C/C++, Simpy **Software:** SolidWorks, CAD, Carsim, Simulink **Languages:** IELTS 7.5

#### GPA: 3.62/4.0—Beijing, CHN

September 2021 - June 2024 (expected)

#### GPA: 3.68/4.0—Beijing, CHN

September 2017 - June 2021

GPA: 3.82/4.0—Taipei, CHN

September 2019 - January 2020



**Shuwei Pei / Travid** Looking for a PhD position for fall 2024.

**Research Interest** Reinforcement Learning Automated Driving Intelligent Transportation Control and Plan

# II. Research Experience Publications

Shuwei. Pei and Jue. Yang, "Multi-objective Velocity Trajectory Optimization Method for Autonomous Mining Vehicles," *Int J Automot Technol*, vol. 24, no. 6, pp. 1627-1641, 12 2023, doi: 10.1007/s12239-023-0131-5.



The costs for the transportation?

Energy consumption

#### Contribution

- ✓ Less time and runs more smoothly with fewer velocity fluctuations.
- $\checkmark$  Reduce the battery capacity loss.
- $\checkmark$  It is more suitable mining transportation.

#### **Objective function**



#### Method

- *<u>Time, and energy consumption</u>* target.
- Dynamic Programming.
- Route is divided into sub-sections.

# *II. Research Experience*2. <u>Publications</u>

**Shuwei. Pei** and Jue. Yang, "An Integrated Dispatching Framework with Trajectory Optimization for Improving Autonomous Mining Transportation," *IEEE Transactions on Intelligent Vehicles*, 2023 **Submitted.** 



#### *II. Research Experience* Centralized training 2. Publications HIDDEN LAYERS INPUT OUTPUT Shuwei. Pei and Jue. Yang, "An Integrated Dispatching. Experience learning Action Framework with Trajectory Optimization for Improving Autonomous Mining Transportation," IEEE Transactions on Intelligent Vehicles, 2023 Submitted. **Decentralized** execution Agent 0 Agent ... Agent N State State State Action Action Action Reward Reward Reward tn tn Multi-agent reinforcement learning. Rewar<sup>1</sup> Rewar 1 Rewar<sup>1</sup> Each truck --- individual agent. Truck 0 Truck Truck N 3. Deep Q learning network. Velocity trajectory optimization Environment/Simpy Observation state-action-reward. Route information State flow Self update actions and rewards. 5. Shovel ( Dump 0 Action flow Velocity flow Dynamic programming Dump 1 Velocity Optimal velocity trajectory

# *II. Research Experience*<u>3. Cooperation Project</u>

The Electric Autonomous Mining Truck Without Cabin

- 1. Battery exchange transfer system, autonomous driving.
- 2. Analyzed and diagnosed the breakdown.
- 3. Dispatched vehicles in a closed area using intelligent system



### 4. Student Research Project

Theoretical Research on Autonomous Vehicles Based on ROS2

- 1. Designed autonomous driving system for location, perception and planning.
- 2. RRT search algorithm and MPC were used.
- 3. Tested vehicles in the gazebo simulation environment.



## III. Working Experience Internship



#### **China National Heavy Duty Truck Group Co., Ltd.**

Intern in Light Truck July 2022-September 2022 Modified the truck chassis for achieving refrigerator car standards and functions.

VDA

**German Association of the Automotive Industry** Intern in China Office

September 2020 - December 2020

Office administrative work and translation about the automotive industry.



Midea Group Co., Ltd.

Foshan, CHN

**Beijing**, CHN

Jinan, CHN

June 2020 - August 2020

Improved logistics and transport efficiency for manufacturing in plants.

## IV. PhD Research Interest

**Research Interest** Be open to the related area

Deep Reinforcement Learning, Intelligent Transportation System, Automated Driving, Control and Optimization

Self Statement

- Highly motivated and self-directed individual.
- Strong sense of responsibility and cooperation.
- Innovative and active.
- Proficiency in English.
- CSC scholarship is applicable.

Detailed information on my personal website. <u>Personal information | Shuwei Pei / Travid (travidp.github.io)</u>

# Thanks for your attention!

Applicant: Shuwei Pei

University of Science and Technology Beijing peishuwei9@live.com

Please feel free to reach out any questions