Ming Zhan
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EDUCATION

North China University of Technology Beijing, China
- Master of Engineering in Control Engineering Sept. 2021 - Present
- GPA: 89.62/100 (3.98/4.00) Rank: 2/54

Zhuhai College of Jilin University Zhuhai, China
- Bachelor of Engineering in Software Engineering Sept. 2017 - Jun. 2021
- GPA: 89.65/100 (3.70/4.00) Rank: 2/347

PUBLICATIONS

[1] **M. Zhan**, J. Fan and J. Guo, "Generative Adversarial Inverse Reinforcement Learning With Deep Deterministic Policy Gradient", **IEEE Access**, vol. 11, pp. 87732-87746, 2023, **SCI. (**Published, IF/JCR: 3.900/Q2; First Author; Doi: 10.1109/ACCESS.2023.3305453)

[2] **M. Zhan**, J. Fan and L. Jin**,** "Research on Trajectory Prediction of Vehicle Lane Change for Autonomous Driving Based on Inverse Reinforcement Learning", International Conference on Traffic Engineering and Transportation System (**ICTETS**), 2023, **CCF-C.** (Accepted; EI International Conference; First Author)

[3] R. Li, **M. Zhan**, J. Fan, "Systematic Review of DDPG Algorithm-Based Path Planning for Intelligent Vehicles", **Auto Know**, 2022, **National Journals**. (Published; In Chinese; Corresponding Author)

[4] L. Jin**,** J. Fan, F. Du and **M. Zhan**, "Research on two-stage semi-active ISD suspension based on improved fuzzy neural network PID control", **Sensors**, 23(20):8388, 2023, **SCI**. (Published; IF/JCR: 3.847/Q2; Co-Author; DOI: 10.3390/s23208388)

[5] L. Jin**,** J. Fan, F. Du and **M. Zhan**, "Research on Fuzzy Control of Two-stage ISD Suspension Based on Variable Inerter", International conference on Control and intelligent Robotics (**ICCIR**), Vol. 12940, 129401G, 2023, **CCF-C**. (Published; EI International Conference; Co-Author; Doi: 10.1117/12.3010611)

RESEARCH EXPERIENCE

Research on risky decision-making and trajectory prediction of lane changing for self-driving vehicles based on IRL
Project Leader | Postgraduate Research Project Sept. 2021 - Present
- Achieved a vehicle lane changing risk decision model based on the driving safety field, and also completed the processing of vehicle lane changing feature data based on nuScenes autonomous driving open-source dataset. The construction of a vehicle lane-changing trajectory prediction model based on inverse reinforcement learning was finally realized.
- Explored a risk decision model for lane changing of automatic driving based on the Driving Safety Field. The field theory ideology provided a risk judgment basis for vehicle lane-changing decision-making in complex traffic environments.
- Proposed state sequence sampling method based on MaxEnt IRL strategy to generate lane-changing trajectories that were closer to human driver characteristics. The trajectory prediction model used inverse reinforcement learning as the decision planning route, and the driving safety index (DSI) of the driving safety field was expected to be introduced in the reward model to further determine the risk of vehicle collision that may occur if the lane-changing decision was carried out during the prediction time period.
- Modelled the trajectory generator as a recurrent neural network encoder-decoder structure equipped with a Soft Attention mechanism to generate continuous-valued vehicle lane-changing trajectories within the predicted time period.

Method, system, apparatus, and medium for process information security interception
Project Leader | Invention Patent | Substantive Examination Stage Jul. 2022 - Present
- Proposed hook algorithm for intercepting the information of any target process, which changed the original execution process of the process and fully protected the key monitoring and interception during the execution of computer processes.
- Designed the Hook remote connection operation based on the first running environment, and obtained the modified instruction set and dynamic library data information. The algorithm executed the process information interception judgment and got the final judgment result.
- Executed a memory attribute change operation, in which the algorithm performed a process intervention operation by means of the first Hook address and the set of jump instructions. At the same time, the program recovery operation was performed based on the backup instruction and the modified instruction set.

Method, system and medium for assisted straight driving of a tracked vehicle along the centerline of a carrier plate
Project Member | Invention Patent | Substantive Examination Stage Jul. 2022 - Present
- Proposed traveling offset algorithm based on single-line LiDAR intelligence, which solved the problem of traveling offset that may occur under the traditional manual command of tracked vehicles and had high application value.
- Obtained the carrier plate based on the straight driving detection unit that acquires point cloud imaging information. The point cloud imaging information was used to confirm the boundary data of the carrier plate, and to determine the straight driving deviation of the tracked vehicle on the carrier plate.
- Calculated offset data under point cloud imaging to cue the in-vehicle driver, allowing the driver to make straight drive corrections to the tracked vehicle without the need for an out-of-vehicle conductor.

Research on bullet hole detection algorithm based on OpenCV image processing technology
Project Member | Corporate Research Program Oct. 2021 – Feb. 2022
- Proposed an improved OpenCV image processing algorithm that used a fusion of regional noise processing, edge detection, and morphological operations to accurately extract the contours of the bullet holes on the target paper, which effectively solved the constraints related to the bias of bullet hole detection.
- Experimentally demonstrated that the algorithm could overcome the recognition error caused by random noise and had good generalizability and accurate extraction ability of bullet hole features.

Research on Artificial Intelligence-based Automobile Recognition Matching Recommendation Service Platform
Project Member | National Program of Innovation and Entrepreneurship Practice for University Students May. 2020 – Dec. 2020
- Designed a high-quality diversified service platform to provide car owners with one-stop automobile-related services, focusing on users' daily lives and enabling them to take control of a series of their own needs for automobiles with the help of the Internet as well as artificial intelligence technology.

- Proposed based on the basic design of mobile applications, big data processing technology of artificial intelligence, integration of the resources of online car owners' applications, and offline physical service providers to provide better automotive services.

Research and Design of Educational Safety Escape System Based on 5G and Immersive VR Technology

Project Member | Provincial Program of Innovation and Entrepreneurship Practice for University Students May. 2020 – Dec. 2020

- Proposed an educational safety escape system based on 5G and immersive VR technology, which avoided the problems of high cost, high risk, and high limitations of traditional safety education, and utilized innovative modes and technologies to provide users with efficient and safe ways to practice escape.
- Utilized an immersive interactive experience to educate users on scenario-based escape, which had the advantage of not being limited by time and space and could be used repeatedly to reduce educational costs. The study allowed student users to be integrated into the virtual environment and conduct escape drills in order to improve users' safety awareness.

INTERNSHIP EXPERIENCE

ByteDance | *"Grace - Conversational AI Product"* Beijing, China

Department · China Content Quality and DataRocks · Mathematical Logic | Sequence · Data Science Jun. 2023 - Oct. 2023

- Analysed data for specific cohorts belonging to the Mathematical Logic department. Also delivered high-quality trainable data in daily operations based on data operation rules for the large language modelling product Grace. Provided supportable metadata for Grace training.
- Based on the rule criteria under different queues, responsible for the analysis of data and quality assessment in special queue operations. Helped to select the appropriate logical reasoning method for model training and assisted Grace in solving relevant mathematical logic problems at home and abroad.
- Completed the process of standardization and refinement of mathematical logic strategies by analysing different queue requirements under data science sequences. Helped the large language model products to better handle the logic requirements, assisting the optimization and iterative updating of data training platforms and products.
- Mastered the working principles and business logic of the Large Language Modelling product and sorted out task-specific strategies for the needs of different queues. Ensured that data tasks were delivered to meet the needs of Grace's development.

Jiangsu Shengyu Intelligent Equipment Technology Co., Ltd. Changzhou, China

R&D Engineer Jul. 2022 - May. 2023

- Completed the construction of the reward model in the safety field strength model and trajectory prediction mode. Carried out the vehicle lane change feature data extraction.
- Designed and optimized the network structure in the reward model, completed the improvement of the maximum entropy strategy mechanism, and constructed the clustering trajectory generator.
- Implemented the training iteration process of the reward model. Meanwhile, grid sampling planning of vehicle lane changing trajectories was realized based on the maximum entropy inverse reinforcement learning model.
- Planned the training and optimization process of the maximum entropy inverse reinforcement learning model and tested the safety and efficiency of the model-generated vehicle lane-changing trajectories in a simulation environment.

HONORS & COMPETITION

- China National Scholarship 2023
- Outstanding Graduate Student at the School Level (for two consecutive years) 2021-2023
- Postgraduate First-Class Scholarship 2022
- Second Class Scholarship for Graduate Admission 2021
- Second Prize of the Ninth China International Internet Innovation and Entrepreneurship Conference at NCUT 2023
- Silver Prize in the University Entrepreneurship Program Competition 2022
- National Bronze Award at the 7th China International Internet Finals 2021
- Excellence Award of China University Data Challenge, Graduate Student Group 2021
- First Prize in the Safety Knowledge Contest of North China University of Technology 2021
- Outstanding Graduates of Zhuhai College of Jilin University 2021
- First Class Scholarship from Zhuhai College of Jilin University (for three consecutive years) 2017-2020
- Outstanding Student of Zhuhai College of Jilin University (for three consecutive years) 2017-2020
- Academic and Scientific Innovation Award 2019
- Outstanding Student Leader Award 2018
- Social Practice Award 2018
- Top 30 Guangdong-Hong Kong-Macao Greater Bay Area Innovation and Entrepreneurship Competition 2020
- Excellent Award of the 6th Internet Innovation and Entrepreneurship Competition 2020
- Bronze Prize of the 5th Internet Innovation and Entrepreneurship Competition Selection Competition 2019
- First Prize of Foreign Research Cup National English Reading Competition 2018

EXTRA-CURRICULAR ACTIVITIES

- President of the graduate class at North China University of Technology Sept. 2021 - Present
- President of the undergraduate class at Zhuhai College of Jilin University Jun. 2018 - Sept. 2020
- Vice president of the Artificial Intelligence Society of the School of Computer Science Jun. 2019 - Sept. 2020
- Vice President of Outreach of the Psychological Association at Zhuhai College of Jilin University Jun. 2018 - Sept. 2019
- Secretary General of the Apartment Self-Management Committee of the Faculty of Computer Science Jun. 2018 - Sept. 2019

SKILLS

Languages: Mandarin (Native), English (Fluent, IELTS: 6.5)

Technology: Python (PyTorch), SQL, Java, Linux, LATEX, MATLAB, Microsoft Office (Word, Excel, and PowerPoint), Zotero. Excellent in programming and algorithms, including machine learning decision trees, convolutional neural networks, genetic algorithms, path planning, MDP, and maximum entropy inverse reinforcement learning.