Ruihao **Zeng**

Intelligent Transportation System · Spatio-temporal Prediction · Deep Learning

TransportLab, Sydney, Australia

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Education

The University of Sydney — *Sydney, Australia*

School of Civil Engineering — *2022 – now*

- M.Phil. Student
- Thesis title: Automated and connected vehicle technologies for traffic congestion management

Fujian Normal University — *Fuzhou, China*

International College of Chinese Studies — *2018 – 2022*

- Bachelor of Engineering in Digital Media Technology
- Overall GPA: 85.1/100, Overall Rank: 1/59
- Major Courses: C Language Programming, Object-oriented Programming, Introduction to Digital Media Technology, Date Structure, Database Application, Network and Communication Programming, Operating Systems, Windows Program Design, Computer Graphics, Game Design and Implementation, Drawing Graphics Engine, 2D Animation, 3D animation, Game Design and Script, Software Engineering, Game Planning and Project Management, 3D animation Script and Shooting Design, 3D Engine Basic Programming, Next Generation Model Design, Web Design and Development, Mobile Software Development, Advanced Game Engine Programming, Advanced Action and Special Effects, etc.

Research Programs

Automated and Connected Vehicle Technologies for Traffic Congestion Management — *TransportLab, Sydney, Australia*

Supervisor: *Dr.* Mohsen Ramezani and *Prof.* David Levinson — *Oct. 2022 – now*

- Implementing 3D point clouds in parking lots detection
- Developing 3D objects tracking algorithm

Research on Location Service-Oriented Trajectory Prediction in Traffic Network — *DFITBD, Fuzhou, China*

Supervisor: *Assoc Prof.* Xing Wang — *Oct. 2020 – 2022*

- Implemented machine learning algorithm (CNNs, RNNs, DBNs) as well as data mining algorithm to establish testing framework, detect outliers in urban traffic and solve problems of vehicle trajectory prediction
- Applied strong programming competency in Python, MATLAB, and SPSS as well as efficient data processing skills to test and evaluate more than 7 million traffic data of Fujian province
- Results were under major revision by *Applied Intelligence* and invention patent is scheduled to be published

Research on GANs-based Line Art Colorization — *MIT, Online, USA*

Supervisor: *Assoc Prof.* Mark Vogelsberger — *Jul. – Sept. 2021*

- Learned and practiced various machine learning algorithms and frameworks
- Extracted the lines of anime images using methods such as XDoG, VGG net, etc.
- Improved the existing coloring method by modifying the structure of GANs, using different representations of images and U-Net structure
- Results were submitted to *AIAHPC 2022*

Application of Data Mining in Urban Traffic — *ICTCAS, Beijing, China*

Supervisor: *Assoc Prof.* Xingwu Liu — *Jul. – Aug. 2020*

- Managed and developed a team to establish project scope, terms of reference, timeline, and budget considerations
- Manipulated Python lib and deep learning framework (Keras, PyTorch, Tensorflow) to track and analyze more than 300,000 taxi GPS traffic data
- Spearheaded in-depth analysis of data to identify and forecast urban traffic congestion sections using algorithm analysis (clustering, dimensionality reduction)

Publications

Peer review publications

6 An Analysis: Different Methods about Line Art Colorization — *accepted*

*Jinhui Gao & **Ruihao Zeng** & Yuan Liang* & Xinyu Diao** — *AIAHPC*

5 STTF: An Efficient Transformer Model for Traffic Congestion Prediction — *2023*

*Xing Wang & **Ruihao Zeng***, Fumin Zou, Lyuchao Liao and Faliang Huang* — *IJCIS*

4 A Highly Efficient Framework for Outlier Detection in Urban Traffic Flow — *2021*

*Xing Wang & **Ruihao Zeng***, Fumin Zou, Faliang Huang and Biao Jin* — *IET Intell. Transp. Syst.*

3 Research on Musical Changemakers based on Music Influence — *2021*
***Ruihao Zeng**, Ao Lei and Guangyi He** — *CTMCD*

2 An analysis and forecasts of online product sales based on BP Neural Network and Pearson Coefficient — *2020*
Chenghao Wang, Jingsi Chen and **Ruihao Zeng*** — *ICAICA*

1 Hybrid Malware Detection System Based on Big Data — *2020*
Ruihao Zeng* — *China New Communications*

Invention patents

2 A Highly Efficient Method for Outlier Detection in Urban Traffic — *2022*
*Xing Wang, **Ruihao Zeng**, Ao Lei and Xinxin Li* — *CNIPA*

1 An LSTM neural network trajectory prediction method and process incorporating DTW — *2022*
*Xing Wang, Yingsong Luo, Xinxin Li, **Ruihao Zeng** and Ao Lei* — *CNIPA*

Academic & Community Services

2022 **IET Intelligent Transport Systems** — *Peer reviewer*
(Intended) 5th International Conference of Information Science and System (ICISS) — *Student volunteer*
2021 **CMC-Computers, Materials & Continua** — *Peer reviewer*
IEEE Access — *Peer reviewer*

Internship Experiences

Xiamen YesSoft Technology Co., Ltd — *Xiamen, China*
Internet of Things (IOT) Product Development — *Jul. 2019 - Aug. 2019*

- Responsible for sending and receiving the module programming of the hospital monitoring device
- Collaborated with team members to optimize the capacity of receiving and sending modules
- Utilized C++ language for Arduino programming

Honors & Awards

2021 **Second Prize**, National Student Mathematical Modeling Competition Fujian Region, *China Society of Industrial and Applied Mathematics* — *China*
2021 **Brown Medal**, HuBMAP competition — *Kaggle*
2021 **First Prize**, "Challenge Cup" University Student Extracurricular Academic Science and Technology Competition, *Communist Youth League Committee of Fujian Normal University* — *China*
2021 **National College Students' Innovation and Entrepreneurship Training Program (Innovated Training Project)**, *Ministry of Education of the People's Republic of China* — *China*
2021 **Honorable Mention**, Interdisciplinary Contest in Modeling, *Consortium of Mathematics and Its Applications* — *USA*
2020 **First Prize**, 10th Cross-Strait Information Service Innovation Competition and the 14th Computer Software Design Competition, *Fujian Provincial Department of Science and Technology, Fujian Provincial Department of Education, etc* — *China*
2020 **Second Prize**, National Finals of the 8th National College Student Digital Media Technology Works and Creativity Competition, *Chinese Association of Artificial Intelligence* — *China*
2020 **First Prize**, 10th MathorCup College Mathematical Modeling Challenge Undergraduate Group, *Chinese Society of Optimization, Overall Planning and Economic Mathematics* — *China*
2020 **Third Prize**, "Huashu Cup" National College Students Mathematical Contest in Modeling, *Chinese Society for Futures Studies* — *China*
2019 **National College Students' Innovation and Entrepreneurship Training Program (Entrepreneurship Training Project)**, *Ministry of Education of the People's Republic of China* — *China*

Skills & Interests

Programming	Python, C++, C#, C, Matlab, HTML5, JavaScript, CSS, SQL, TEX
Operating Systems	Linux, MacOS, ROS, WindowsOS
Statistical Computing	SPSS, STATA
Foreign Language	fluent in English (TOEFL: 108), entry Level of Japanese
Graphic	Lightroom, Photoshop, 3DsMax, Maya
Video	DaVinci Resolve, After Effects, Premiere