

# JIANAN ZHOU

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## EDUCATION

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### Nanyang Technological University, Singapore

Jan 2020 - Jun 2021

Master of Science

Major in Artificial Intelligence

GPA: 4.94/5 (First Class Honours)

Awarded Certificate of Excellence for outstanding academic performance

### Northeastern University, China

Sep 2015 - Jun 2019

Bachelor of Engineering

Major in Software Engineering

GPA: 3.57/5 (85.7/100) Rank: 39<sup>th</sup>/256

Awarded three times University Scholarship

3<sup>rd</sup> Prize in Collegiate Programming Contest (C/C++)

## PUBLICATIONS

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Learning Large Neighborhood Search for Vehicle Routing in Airport Ground Handling

Jianan Zhou, Yaoxin Wu, Zhiguang Cao, Wen Song, and Jie Zhang

Submitted to *IEEE Transactions on Systems, Man and Cybernetics: Systems*, 2021

## WORK EXPERIENCE

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### Research Intern

Nov 2020 - Mar 2021

Singtel Cognitive and Artificial Intelligence Lab for Enterprises, SCALE@NTU

Singapore

- Researched large neighborhood search and vehicle routing problems, supervised by Prof. Jie Zhang.
- Used graph convolutional network and forward training algorithm to learn a destroy operator, which guides large neighborhood search framework to achieve a better candidate solution in vehicle routing problems.
- The learned framework is able to outperform conventional LNS heuristics with respect to the solution quality and computational cost.

### R&D Intern

Aug 2019 - Nov 2019

News Break

Beijing, China

- In charge of developing the spider system, analyzing the bad cases of web page and improving the parser policy. The spider system provides news services for the news reading APP (News Break) in the North American region.
- Developed docker containers for the spider system to achieve automatic deployment.

### Java Web Intern

Jun 2018 - Aug 2018

Neusoft Corporation

Shenyang, China

- Co-developed a commercial education system, which utilized SSM and React frameworks to decouple development of system, along with JQuery-Ajax to implement interactions between front and back-end system.
- Used Tomcat, Nginx and Redis to deploy the system on servers with data cache, load balancing, and the separation of static and dynamic resources.

## SKILLS

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**Programming:** C/C++, Java, Python, HTML, SQL

**Frameworks:** Pytorch, Tensorflow, Scikit-learn, Pandas, MMEediting, SSM, PyQt5

**Research Interests:** Machine Learning and Optimization, Reinforcement Learning

## PROJECTS

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### Intelligent Planning and Scheduling System

Feb 2020 - Oct 2020

*Master Project*

*Nanyang Technological University*

- Formulated the operation scheduling in airport ground handling as a mixed integer linear programming model.
- Designed and developed a large neighborhood search framework with several heuristic destroy operators, to solve large-scale airport ground handling problems, which contain millions of variables and complex constraints.
- With the heuristic destroy operators, the framework is able to solve real-world instances (hundreds of flights) from CHANGI Airport within practice time, and outperform state-of-the-art solvers (CPLEX and OR-Tools).

### AI-Related Project

Feb 2020 - Oct 2020

*Course Project*

*Nanyang Technological University*

- **Image Captioning:** Used Transformer to generate grammatical correctly and expressional accurately captions for images.
- **Atari-Breakout:** Developed different DRL algorithms, such as DQN and A3C, to play Breakout game, and achieve super-human performance.
- **CelebA Facial Attribute Recognition:** Identified the attribute label depicted in a facial photograph with ResNet, improved the generalization and dealt with class imbalance problem by data augmentation and domain adaptation.
- **DIV2K Single Image Super-Resolution:** Increased the resolution of the images using MSRRNet and EDSR in MMEediting.
- **Tileworld-MAS:** Built an intelligent multi-agent system for Tileworld environment by re-designing the planning, memory and communication modules.
- **Mechanisms of Action Prediction:** Dealt with structured data (gene expression data and cell viability data) with machine learning techniques, including feature engineering, normalization, data transformation, dimensionality reduction, feature selection, label smoothing, cross validation and ensemble learning, to determine MOA of a drug, and ranked top 15% in Kaggle leaderboard.

### Mineral Grade Information Management System

February 2019 - June 2019

*Final Year Project*

*Northeastern University*

- Researched rock identification and grade intelligent detection based on portable spectrometer, supervised by Prof. Tao Ren.
- Designed and implemented a system using PyQt5 and machine learning techniques, including data decomposition and classification, which are used to handle spectral data with the features of high dimensions and high correlation between adjacent bands, to achieve automatic identification of rock grade, data visualization and management.

### CS-Related Project

2016 - 2018

*Course Project*

*Northeastern University*

- **Eight-Puzzle:** Developed solutions to Eight Puzzle Problem in C++, which used heuristic algorithm as A\*, Manhattan distance as  $h(n)$  and Cantor expansion as hash value.
- **Game Development in Linux:** Developed a multi-player online game with C in Linux, which used thread callback functions and Socket to implement asynchronous non-blocking I/O and communications between servers and clients.
- **JSP and Servlet:** Co-developed company internal OA & portal system based on JSP and Servlet, and used design pattern to facilitate reuse of the code.