

# Rongze CAI

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## EDUCATION BACKGROUND

**Guangdong University of Technology (GDUT)**

**Guangzhou, China**

*Master of Engineering in Industrial Engineering*

*09/2019 - 06/2022*

- **GPA:** 3.6/4.0 **Average Score:** 86.25%
- **Research Direction:** Theory and Application of Intelligent Manufacturing System Optimization
- **Core Modules:** Production Management (93), Modelling and Simulation Analysis (93), Discrete Event System Simulation (90), Database Principle and Application (88), Operations Research (88), Intelligent Manufacturing Technology and Application (87)
- **Dissertation:** Optimization of AGV System Guide-path Network Layout Considering Congestion Factors

**Sun Yat-Sen University (SYSU)**

**Guangzhou, China**

*Bachelor of Science in Computer Science and Technology (online education)*

*09/2016 - 01/2019*

- **GPA:** 3.4/4.0 **Average Score:** 83.4%
- **Core Modules:** Software Engineering (94), Principles of Data Communication (90), Database System (86), Operating System (86), Assembly Language Programming (83)

**Guangdong Polytechnic of Industry and Commerce (GDPIC)**

**Guangzhou, China**

*Three-year Diploma in Mould Design and Manufacture (offline)*

*09/2009 - 06/2012*

- **GPA:** 3.2/4.0 **Average Score:** 80.3%

## RESEARCH PROJECTS

**Master's Dissertation: Optimisation of AGV System Guide-path Network Layout Considering Congestion Factors**

*12/2020 - 06/2022*

*Independent Researcher*

- **Aims:** to reduce the probability of AGV running congestion in the workshop in the planning stage, bring down the difficulty and complexity of the subsequent AGV scheduling stage, as well as enhance the efficiency of logistics transportation
- **Key responsibilities:** proposed to design an AGV guidance path network with a flexible structure first based on the current situation of the machining workshop layout of a customised equipment intelligent manufacturing enterprise
- **Methods:** K-arc Strong Connectivity Guide Path Network Layout (KGNL) design, Multi-objective Math Model, Adaptive Large Neighbourhood Search Algorithms (ALNS), Simulation Experiments
- **Results:** The effectiveness of the ALNS was verified by testing five benchmark cases and the enterprise case of this paper; the outcomes show that the ALNS is superior to the existing variable neighbourhood algorithm (VNS) in terms of solution quality and solution time
- Attained a score of 83.8 in the oral defence of the graduation thesis

**Stochastic Flexible Layout Optimisation of Intelligent Workshop with Unidirectional Multiple Closed Loop AGVs**

*10/2019 - 01/2022*

*Research Member*

- **Key responsibilities:** studied the latest theories of workshop layout planning, based on which I optimised the underlying guide-path network topology design of the automated guided vehicle (AGV) to achieve a more flexible workshop
- **Project Leader:** Prof. Ning MAO
- **Funded by the National Natural Science Foundation of China, No. 51775120**

**Research and Development of an Intelligent Workshop AGV Dispatching System**

*11/2020 - 08/2021*

*Research Member*

- **Key responsibilities:** lucubrated the AGV charging strategy of the machining workshop, constructed the simulation model of the workshop using the software Plant Simulation, and conducted simulation experiments to verify the model by designing different charging strategies
- **Result:** increased the AGV transport efficiency by 30% and reduced the electricity cost by 5%
- **Project Leader:** Assoc. Prof. Zhantao LI & General Manager Mr Jintang KUANG
- School-enterprise cooperation project

## Development of Robot Intelligent Factory Layout Designing System

12/2019 - 09/2020

*Research Member*

- **Key responsibilities:** researched the network topology design of AGV guide-path and addressed the AGV congestion problems
- **Result:** A set of workshop layout planning and design systems were created based on the production characteristics of the enterprise in a bid to endow the enterprise with the rapid layout ability
- **Project Leader:** Prof. Ning MAO
- School-enterprise cooperation project

## FULL-TIME WORK EXPERIENCE

### CALB Group.,Ltd.

Shenzhen, China

*Sr. Simulation Engineer*

07/2022 - Present

- Responsible for design and development of factory production simulation management system project, which integrated project management, simulation model customization, and algorithm optimization functions.
- **Achievement:** improved the efficiency of simulation modelling by 40%, about \$55~63k cost save per year, ROI(0.65)

### Roca Bathrooms (China) Co., Ltd.

Foshan, China

*Sr. Industrial Engineer*

09/2016 - 02/2018

- Presided over the large-scale workshop layout optimisation project of the three processes of 'glaze spraying, kiln firing, and packaging'; used the Plant Simulation tool to establish a simulation model for optimisation. Streamlined the production cycle of the process by 34% and saved the total production cost of about \$100k a year.
- Remoulded the spray glaze production line by transforming it from the assembly line to the unit type. Cut down the product cycle to 60% and elevated the production efficiency of operators by 30%.

### Avery Dennison (Guangzhou) Converted Products Ltd.

Guangzhou, China

*Asst. Industrial Engineer*

06/2012 - 09/2016

- Led the layout optimisation project of the digital printing workshop and built the workshop simulation model based on the Plant Simulation platform. The project saved about 20% of the total workshop area and about \$27k a year in workshop production costs.
- Assisted in developing the planning system for the daily production line operation. The project managed to decrease the on-site material inventory by 60%, material supply time by 40%, and labour costs by 50%

## AWARDS & HONOURS

- University-level Third-class Scholarship, GDUT 2020
- University-level Second-class Scholarship, GDUT 2019

## RELATED SKILLS

- **Programming:** Java, Python, C#, SQL
- **Simulation Software:** Flexsim, Plant Simulation
- **Proficient contents:** Heuristic Algorithm, Deep Reinforcement Learning, Operation Research Theory, Graph Theory
- **Communication:** Mandarin, Cantonese, English