PENGLI ZHAO

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RESEARCH INTERESTS

Air Traffic Management, Intelligent Transportation Systems, Transportation System Modeling and Simulation, Trajectory Based Operation,

EDUCATION

University of South Florida, Tampa, FL *August 2020 - Present*

Ph.D. student in Civil Engineering, Civil and Environmental Engineering Department

Advisor: Dr. Yu Zhang

Research Focus: environmental impact analysis on the UAM(Urabn Air Mobility).

Nanjing University of Aeronautics and Astronautics, Nanjing *September 2017 - April 2020*

M.S. in Transportation Planning and Management, College of Civil Aviation

Advisor: Prof. Junfeng Zhang

Research Focus: sequencing and scheduling of arrival flights.

Nanjing University of Aeronautics and Astronautics, Nanjing *September 2013 - June 2017*

B.S. in Air Traffic Management, College of Civil Aviation

RESEARCH PROJECT EXPERIENCE

AMAN Performance Evaluation December 2017 - November 2019

Collaboration with Central South Air Traffic Management Bureau, CAAC

This project aims to analyze historical radar data to evaluate the potential benefits after using AMAN in Changsha Terminal. I cooperate with a partner, my work focuses on radar data processing and AMAN structure research. His work focuses on indicator selection and evaluation.

- Design and development of a tool for radar data processing and visualization.
  - Studied radar-encoding documentation.
  - Development of automatic decoding tool and trajectory visualization tool for analysis.
- Design of test scenarios for AMAN functions verification.
- Research based on KPI and arrival flight tightness.
  - Analyzed and clarified the KPIs and modeling for multi-objective optimization under CDO.
  - Research about the relationship between arrival tightness and computation time.

DST for AMAN under CDO December 2017 - July 2019

Collaboration with Boeing (China) Research and Technology and COMAC

This project was aiming to develop a Decision Support Tool (DST) for ANAN under Continue Descent Operation (CDO). It could receive real-time data from Air Traffic Simulator and make real-time sequencing and scheduling. My work focuses on function development and experiment verification.

- Integration of trajectory prediction method for multi-type aircrafts.
  - 4D trajectory prediction for step-down and CDO based on BADA3 model.
  - Development of online trajectory prediction function.
- Design and development of sequencing algorithms and functions.
  - Algorithms development for sequencing with different objectives. FCFS and GA can be alternatives according to the volume of arrival flights.
  - Support sequencing under different modes of operation and special cases.
- Design and development of trajectory generation strategies.
  - Trajectory allocated suggestion based on Scheduled Time of Arrival (STA).
  - Trajectory generation strategies (route, height and speed scheduling).
  - Function realization of continually trajectory monitoring and deviation detecting.
- Design and development of AMAN
  - Missed-approach scheduling function and holding suggestion function.
  - Interface developed for timeline and aircraft display.
  - Programming with UDP sockets for AMAN and simulator connection.
  - Proficient with function development on Qt platform using C++.

FELLOWSHIPS & AWARDS

Foundation of Graduate Innovation Center in NUAA **2018**
Third-class Scholarship for Graduate Freshmen **2017**

RESEARCH EXPERIENCE

Criteria Selection and Multi-Objective Optimization for ALP
July 2018 - July 2019

- Criteria selection, reduction and model development of Multi-Objective Optimization.
- Algorithm design to solve the problem.
- Demonstration about the relationship between arrival flight tightness and computation time.

Multi-Objective Optimization Under CDO
March 2019 - July 2019

- Modeling based on the KPIs of terminal operation under CDO context.
- Experimented use public data and real case.

Composite Dispatching Rule-Based Method for Multi-Objective ALP
January 2018 - September 2018

- Adopted two stages method for sequencing and scheduling
- First,using Composite Dispatching Rule (CDR) to decide the sequence.Then,using CPLEX to calculate to scheduled time of arrival.

Sequencing of Arrival and Departure Flights on Parallel Runways
March 2017 - June 2017

- Algorithm based on Tabu search is implemented on single and parallel runways with arrival and departure flights.

PUBLICATIONS

Pengli Zhao, Joseph Post, Zhiqiang Wu, and Yu Zhang. "Environmental Impact Analysis of On-Demand Urban Air Mobility: A Case Study of The Tampa Bay Area" In TRB 2022(**Poster Presentation**)

Junfeng Zhang, **Pengli Zhao**, Yu Zhang, Ximei Dai, and Dong Sui. "Criteria selection and multi-objective optimization of aircraft landing problem." *Journal of Air Transport Management* 82 (2020): 101734.

Junfeng Zhang, **Pengli Zhao**, Dong Sui and Ximei Dai. "A new meta-heuristic approach for aircraft landing problem" *Transactions of Nanjing University of Aeronautics and Astronautics*, 37(2):197-208, 2020

Pengli Zhao, Junfeng Zhang, Songwei Liu, Dong Sui, and Rong Hu. "Scheduling landing aircraft with multiple objectives under continuous descent operation" In TRB 2020(**Poster Presentation**)

Pengli Zhao, Junfeng Zhang, and Lubao You. "A composite dispatching rule-based method for multi-objective aircraft landing problem." In CICTP 2019, pp. 4902-4913. 2019.

Junfeng Zhang, Zhixiang Zheng, **Pengli Zhao**, and Rong Hu. "Multi-objective integrated arrival departure aircraft sequencing under the influence of sequential flights." In 2018 Integrated Communications, Navigation, Surveillance Conference (ICNS), pp. 3B3-1. IEEE, 2018.

SKILLS

Programming Language	C++, MATLAB, Python, SQL
Tools	Qt, Git, LaTeX
Operating System	Windows, Linux

LANGUAGE

Chinese & **English**
TOEFL 93 (R28 \ L23 \ S20 \ W22)
GRE V145 \Q164 \AW3.0

COURSE TAKEN

Flight Procedure Design, Air Navigation Study, Human Factors, etc.
Mathematical Optimization Modeling, Operations Research, etc.

PERSONAL TRAITS

Highly Motivated and eager to learn new things

Strong determination and enforcement

A stable personality and a high sense of responsibility