Wenbo ZHAO

(86) 187-4202-4350 | vader.wenbo.zhao@gmail.com

Dalian University of Technology, No. 321 Tuqiang Road, Dalian 116600, China

Education

Dalian University of Technology (DLUT)   09/2017 – present

B.E. in Cyber Engineering

- **GPA:** 3.80/4.0 (Ranked 1 of 22 in the Internet of Things Class)
- **Scholarships:** Second-class scholarship for study (awarded in 2018, 2019, and 2020)

Skills & Hobbies

Languages: English, Chinese

Programming: Python, MicroPython, JAVA, SQL, C, C++, HTML

Software & Hardware: Atom, XCode, MySQL, Emacs, MATLAB**,** Lopy4

Others: Saxophone, Sketch (won municipal, provincial and national awards)**;** Traveling, Movies, Badminton, Jogging

Selected Research

LPWAN-based Patient Tracking & Alerting System Facing COVID-19 Pandemic   09/2020 – present

Team Member

- **Supervisor:** Prof. Lei WANG at DLUT & Prof. Jie XIONG at UMass Amherst
- **Description & Main Duties:**
  - Design a system with 5 parts – mobile devices carried by users, fixed devices (marking locations, a shifted mode of mobile devices), region servers, diagnosticians (designated medical institutions), and geo solvers (authorized geographic location query agencies)
  - Issue the pseudonym list from the geo solvers to terminal mobile devices after querying, match the pseudonym with the user to determine whether the user is risky
  - Set the SF value of LoRa signal between mobile devices and fixed devices to 7 to improve the speed; Set the SF value of LoRa signal between fixed devices and fixed devices to 12 to increase the communication distance
  - Maintain the blockchain recording trace information via Wired Internet Communication between all region servers, diagnosticians, and geo solvers
  - Realize the system by modifying existing methods or creating new ones; prepare for a paper (under review)
  - Wrote two patents under review as the first author (*A Low-power Wide Area Network-based Method for Tracking Close Contacts of Epidemic*, and *A New Low-power Tracking Device for Close Contacts of Epidemic*)
- **Innovation:**
  - Protect personal information against theft by generating pseudonyms change it periodically, and by not relying on other smart devices
  - Ensure efficiency and reliability of patient tracking by the signature and blockchain functions
  - Lower the energy consumption and achieved long-distance communication based on LPWAN and blockchain

A Data Backhaul Method for Low-power Ocean Sensing Data (Multi-hop LoRa Network)   09/2019 – present

Team Member

- **Supervisor:** Prof. Lei WANG, at DLUT
- **Description & Innovation & Main Duties:**
  - Introduce a LoRa-based low-power marine data backhaul approach, establish hierarchical and directional LoRaWAN mesh networks
  - Extend network coverage, improve data reception and effectively avoid single points of failure via a network topology that combines linear, tree-like, and MESH structures
  - Realize the functions via coding, did experiments and collected data, wrote part of the paper (under review)

High Robust Indoor Positioning System Based on AOA   09/2018 – 06/2019

Team Member

- **Supervisor:** Prof. Lei WANG, at DLUT
- **Description & Innovation & Main Duties:**

- ➢ Created ArSeRoL (new type indoor positioning system via Wi-Fi signals), which applies secondary segmentation and area segmentation of space using AoA (angle of arrival) and RSS information
- ➢ Ensured high robust of the algorithm via lower judgment requirements and additional fault node detection
- ➢ Enhanced the robust of current indoor positioning systems, improved the usability of these systems
- ➢ Realized the functions via coding, did experiments, collected data, wrote part of the paper (under review)

Selected Competitions

2019 APMCM   11/2019 – 12/2019

Team Leader

- Analyzed the pros and cons of economic development in Zhejiang province, and made appropriate suggestions based on the conclusions of the first three questions and the current economic situation and provincial policies
- Provided part of the solutions, realized part of the algorithms, finished part of the final report, <u>won the 3rd Prize</u>

2019 CUMCM   09/2019

Team Leader

- Differentiated the working process of high-pressure fuel line by time, analyzed the changes of various factors in a short period under ideal conditions, iterated several times to get the required result via Python
- Obtained several functions and the relationship between each variable by using differentiation, integral, ideal gas equation of state, dichotomous method, function fitting via MATLAB, and other methods
- Did simulations and validations via Python and MATLAB, got the best values of multiple sets of data and variables, established several models, proposed solutions for high-pressure fuel lines in complex situations
- Provided part of solutions, realized part of algorithms, finished part of the final report, <u>won the 3rd Provincial Award</u>

2019 MCM/ICM   01/2019

Team Leader

- Analyzed the characteristics of existing resources and urban distribution of Puerto Rico, in order to better solve these problems in actual (i.e. when hit by the worst hurricane on record in 2017)
- Proposed a model to create the best scheme of drone fleet via the 3D-KLP algorithm, packing algorithm, and a new AHP algorithm; Optimized ISO container deployment by k-means and gravity; Simplified flight path for drones under different needs by transforming actual problems into graphics problems
- Provided part of the solutions, realized part of the algorithms, finished part of the final report, <u>won the 'Honorable Mentions'</u> for the 2019 MCM/ICM

Selected Projects

Wenbo Movie (a Video Website with User Features)   03/2020 – 04/2020

Independent Developer

- Developed a website with user functions, database, viewing, search, favorite, comments, and filmmaker information based on python and HTML; Realized data ORM, pleasing interface, and rigorous logic via Django

Influencing Factors for Movie Recommendations and Ratings Based on Weighted K-means   09/2019 – 10/2019

Independent Developer

- Crawled movie information from douban.com while coping with the anti-crawling system by adding header and cookie
- Rated the beauty of the lead actor or actress of each movie via Baidu's Face Recognition API
- Processed data considering the types of parameters and data, improved objectivity and accuracy by normalization
- Re-classified and re-rated movies for from person to person using weighted K-means and machine learning, feedback appropriate movies to users based on interest matching, visualized some of the results

Activities

Student Union of DLUT   10/2017 – 09/2018

Officer

- Designed layout and content for the film & book sharing section and the newspaper section on the bulletin board
- Organized learning, reading, performing, advocating, and sports squads training activities