Sida DAI

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Educational Background

Huazhong University of Science and Technology *Sept.'19-Jun.'22*

Master of Control Science and Engineering GPA: 90.44/100
Advisor: Prof. Yu, Minghui
Core courses: Analysis of Time series, Optimization Theory and Algorithms, Theory of Matrices, Mathematical Statistics, New Energy Techniques, Machine Learning and Data mining.
Awards:

- Merit Postgraduate Dec.'20
- First-class Scholarship for Postgraduates Nov.'19, Nov.'21
- Third Prize of Zhixing Scholarship Dec.'20

Northeastern University *Sept.'15-Jun.'19*

Bachelor of Automation GPA: 3.88/5
Core courses: Automatic Control Theory, Modern Control Theory, Circuit Principle, Computer Software Foundation.
Awards:

- Second-class Scholarship for Graduates Jun.'15, Jun.'16, Jun.'17
- Merit Student Dec.'16, Dec.'17

Research Experiences

CSSC 702 Research Institute Project: Ship intelligent economical navigation optimization based on monitoring data Nov.'20-Apr.'22
Huazhong University of Science and Technology, Wuhan

- In order to save the total fuel consumption of the ship during the voyage, the key of the ship's intelligent and economical navigation optimization technology is the ship speed optimization.
- We propose an online ship speed optimization method based on data-driven, which iteratively calculates the speed of each voyage of the ship and continuously monitors the ship's fuel consumption.
- The speed optimization model solves the optimal average speed of each segment by constructing a space-time network diagram.
- Build a fuel consumption rate prediction model based on BiLSTM and use the temporal attention mechanism to improve the prediction effect.
- The process of online optimization of the ship includes: offline speed optimization before the ship departs, monitoring the deviation of the fuel consumption rate from the expected fuel consumption before departure through the fuel consumption rate prediction model during the sailing process, and recalculating the optimal speed for the remaining voyage when the deviation is too large.
- The prediction process includes the following steps: data visualization analysis: make a line graph on the input feature vector that affects the fuel consumption rate prediction, analyze the trend of the data, normalization, converting the time series into supervised learning data, construction of the prediction model, model training: use huber loss function and ADAM optimizer, and conducting comparative experiment.

Solar Storm Warning Nov.'19-.Mar'21
Huazhong University of Science and Technology, Wuhan

- Use the active magnetic parameter data in the solar region and the corresponding flare event labels to establish a solar flare forecast model based on GRU to accurately warn of solar flare events.

- In the case of uneven number of positive and negative label samples in the two-class problem, we adopt the undersampling method.
- Due to the large number of samples, a learning curve is drawn during the experimental design to prevent underfitting and overfitting.
- Train the prediction model through cross entropy loss function and output 1 or 0 to predict whether a solar storm will occur.

Airport deicing pad scheduling Feb.'19-Jun.'19
Huazhong University of Science and Technology, Wuhan

- The airport deicing pad scheduling model aims to minimize the total number of flight delay.
- Use the improved genetic algorithm to solve the model by using two segments of codes to correspond to the deicing pad allocation results and the deicing queuing sequence of aircraft on the deicing pad respectively when designing genetic code.
- Compared with the greedy algorithm, the improved genetic algorithm is proved to have more advantages in reducing the aircraft delay rate.

Human face to Disney animation face Feb.'19-Jun.'19
Bilibili, Shanghai

- Use crawler tools to crawl the front of real people from search engines for men and women.
- Collect disney animation face data: use ffmpeg to cut the video, and then write a program to traverse the video clips, export frame pictures.
- Data annotation: use labelme to label the animation face data at five points.
- Use opencv writing tool to correct the face and expand and intercept the animation face picture.
- Use UGATIT to set the model parameters for training.

Articles

Minghui Yu and **Sida Dai***. "Online ship speed optimization based on BiLSTM Encoder-Decoder," *Journal of the Franklin Institute* Accepted

Sida Dai and Minghui Yu*. "Multi-Horizon Ship Speed Prediction with Temporal Attention Mechanism and GRU Encoder-Decoder," *2022 Asia Conference on Algorithms, Computing and Machine Learning(IEEE Conference)* Accepted