Curriculum Vitae

Personal Information

Name: Xinwei Liu (刘心唯) Birth Date: 1994.4.22

Unit: China Telecom Research Institute | AI R&D Center

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Education

Beijing University of Posts and Telecommunications (BUPT), Beijing *2016.09-2019.06*

Master in Information and Communication Engineering

- Cumulative GPA: 84.7/100
- National Scholarship（2019）
- Excellent Academic Scholarship (first two years)

Xidian University, Xi'an *2012.09-2016.06*

Major in Communication Engineering

- Cumulative GPA: 86.5/100
- The student recommended for admission
- Excellent Academic Scholarship (all four years)

Select Work Projects

China Telecom Research Institute | AI R&D Center

AI-empowered Base station energy-saving platform *2019.10-present*

To help China achieve the "dual carbon" goal, our platform has provided intelligent control services for millions of 4/5G base stations and hundreds of data centers over more than 240 cities.

1) Energy-saving control on 4/5G base station via Reinforcement Learning

- The parameters related to power-saving are optimized under RL algorithms.
- The function has been deployed in 25 provinces across the country. With users' experience satisfied, the energy-saving effect is boosted by nearly 50%. 285 million kWh has been saved.
- One patent was submitted.

2) Missing data imputation with Generative Adversarial Networks

- *WGAN* was applied to learn the distribution of the data of the access network, to fill the missing parts of the collected data from base stations.
- Compared with the expert-designed method, this achieved better results on downstream tasks.

3) Large-scale hyperparameter optimization for time-series model

- The hyperparameters of millions of predictive models are optimized by evolutionary algorithms.
- After the hyperparameter search, the prediction error is reduced by 15~30%.

4) Time series forecast for 4G base stations

- Predictive models are trained to support the analysis and alarm functions of the platform.
- In terms of scale, one model per base station, and millions of models are trained distributedly.
- In terms of accuracy, we achieve comparable results to that of Huawei.

Intelligent anti-fraud system "TianYiLanDun" *2020.10-present*

"TianYiLanDun" is an AI-empowered system for fraud and harassing calls interception

- The interception strategies of the system were optimized via evolutionary algorithms.
- It has been verified in Guangdong Province that with the interception volume satisfied, the false interception rate can be reduced by an average of 10%.

Select Research Projects

BUPT | Laboratory of Wireless Signal Processing and Network

Research on Context-based Caching Schemes for Mobile Edge Computing (MEC)

Supported by the National Science Foundation of China (NSFC) *2018.06-2019.02*

- A new modeling method was proposed to characterize and analyze the impacts of users' social networks on individual behaviors.
- A caching scheme based on individual characteristics and social networks was proposed, and a contextual multi-armed bandit algorithm was used to solve the proposed optimization problem.
- Published a conference paper and gave a presentation about it in the 2019 IEEE International Conference on Pervasive Computing and Communications Workshops, in Kyoto, Japan.

Research on Theory and Technologies of Mobility-Aware MEC Caching Schemes

Supported by the National Science Foundation of China (NSFC) *2016.09-2018.06*

- A novel mobility-aware MEC caching scheme was proposed to solve the problem that most related works ignored users' mobility.
- Based on stochastic geometry theory and the proposed mobility model, the explicit expression of throughput was derived.
- Two light-weight heuristic algorithms were provided to numerically obtain optimal solutions.
- Published a journal article on IEEE ACCESS (IF=3.736).

Selected Publications

Papers (of which Xinwei Liu is the first author)

- Mobility-Aware Coded Probabilistic Caching Scheme for MEC-Enabled Small Cell Networks, *IEEE Access*, vol.5, pp. 17824 – 17833, 2017.
- Context-aware caching with social behavior in MEC-enabled wireless cellular networks. In *Proc. IEEE PerCom Workshops*, pp. 1004-1008, 2019.

Patents (of which Xinwei Liu is the first author)

- 《基站节能系统的参数优化方法和装置》(202011224030.2)

Skills

- English: CET-4 (585), CET-6 (505), IELTS (Overall 6.5)
- Computer languages: Python, C/C++
- Deep learning framework: Tensorflow
- Big Data framework: Spark

Proposed research directions in Ph.D.

- meta-Reinforcement Learning (RL), offline RL, and meta offline RL.