YANG DENG

#Research Interests: AI evaluation and deployment, Data Generation, Smart Building.
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PROFESSIONAL EXPERIENCE

Research Associate, The Hong Kong Polytechnic University, Hong Kong — Jun 2020 - Sep 2020
Data-driven Chiller Operation Platform development

Senior Machine Learning Engineer, DawnLight (Co-Founder: Feifei Li), Shanghai — Apr 2020 - Jun 2020
Clinical decision support system development

Machine Learning Engineer, Big Data Department, DADA Group Ltd, Shanghai — Sep 2019 - Apr 2020
AI-based projects related to logistics

Machine Learning Engineer, Wireless Network Department, Huawei, Shanghai — Jun 2017 - Jun 2019
AI-based algorithms in 4G wireless scenarios

Development Intern, Envision Energy, Shanghai — Mar 2017 - Jun 2017
Develop the back-end services for wind turbines.

Development Intern, Emotibot Technologies Ltd, Shanghai — May 2016 - Sep 2016
Development of the Knowledge Graph of Corpus of texts

EDUCATION

The Hong Kong Polytechnic University (PolyU), Hong Kong, — Sep 2020 - Sep 2024
Ph.D. in Computer Science, Advisor: Dr. Dan Wang
Thesis: Towards AI Deployment of the Machine Learning-based Forecasting Model in Smart Buildings

TongJi University, Shanghai, China, — Sep 2014 - Jun 2017
M.Eng. in Software Engineering, Advisor: Dr. Chenxi Zhang

Nanjing University of Aeronautics and Astronautics (NUAA), China, — Sep 2010 - Jun 2014
B.S. in Software Engineering

SELECTED PROJECTS

(1) BaiTest: A Platform for AI Evaluation in Smart Buildings — May 2023 - Oct 2025
(Hong Kong ITF project: ITS/056/22MX, 4.025 $M)

- Overview: The idea of this project is based on my e-Energy'22 paper. BaiTest focuses on building a large-scale machine-learning model evaluation platform for the smart building community, and the goal is to promote the widespread adoption of AI techniques in buildings.
- Responsibilities: 1) During the project application phase, I was responsible for proposal writing (including preliminary experiments) and presentation slides. 2) During the development phase from Sep 2023, I am leading a team of four teammates (weekly meeting note), they are one year-1 PhD student and two research assistants.
- Current progress (by Oct 2024): i) Published two demo papers, two poster papers, and two full papers. Won three awards from PolyU and SigEnergy. ii) A video recorded at Jun 2024.
- Short-term plans (before the end of 2024): i) integrating BaiTest into the existing building HVAC (Heating, ventilation, and air conditioning) monitoring system of Hong Kong EMSD, and ii) providing control rules recommendations for Huace International Building in Hengqin, Zhuhai.

(2) Engineering Parameter Calibration for 4G LTE Base Station — May 2018 - Jun 2019
(As the engineer in Huawei Shanghai Institute; Total funding for this project: 100M RMB)

- Overview: lead the sub-project of Antenna azimuth prediction, i) designed an computer vision-based prediction solution based on Convolutional Neural Network (CNN) for modeling the actual azimuth of the antenna. ii) developed a gray-box algorithm combining the NN model and expert experience. iii) achieved an MAE of 12 degrees, significantly outperforms industry standards (average error of 16 degrees). iv) responsible for the patent.

· Award: Winning the Huawei Ingenuity Award, 2018

(3) Logo&Mask Recognition of Delivery Man for COVID-19 Jan 2020 - Apr 2020
(As the engineer in DADA Group Ltd)

· Overview: Lead the development of this feature related to the company's image. i) designed CNN-based classification neural networks and the analysis of model interpretability. ii) Quickly launched in a week to respond to COVID-19.

· Outcome: 1) For mask recognition, the recognition rate for positive samples approached 99%, and for negative samples, it reached 69%. 2) For logo recognition, the precision of negative samples increased from 10% with the existing algorithm to 48%, resulting in a 67% reduction in manual review workload. Here is part of the code: code1, code2.

AWARDS

Research and University

· Best Presentation Award at the 2nd PolyU Research Student Conference (PRSC 2024)
· Best Poster Runner Up - ACM e-Energy 2024
· National 2nd Prize, National Postgraduate Mathematics Contest in Modeling, China, 2016
· The 3rd prize (twice), Nanjing University of Aeronautics and Astronautics Science and Technology Competition, (2012, 2013).
· The 2nd Prize Scholarship, Nanjing University of Aeronautics and Astronautics, 2013
· The 3rd Prize Scholarship (twice), Nanjing University of Aeronautics and Astronautics, 2012, 2014.

In Industry Period

· HUAWEI Ingenuity Award (for the contribution of the project of Engineering Parameter Calibration), Mar 2019
· Ranked 14 / 1646, "Future Challenge – Helping Balloons Navigate the Weather", Alibaba Tianchi Big Data Competition, 2018
· Ranked 6 / 204, "Network Signal coverage simulation" the 7th "Shannon cup" Huawei Wireless Algorithm Competition, 2019

PUBLICATIONS

1. (**ACM BuildSys 2024**) Yufei Zhang, Yang Deng, Rui Liang, and Dan Wang. "A Data-driven Framework for Occupant-centric Demand Flexibility Potential Evaluation at Scale",
2. (**ACM BuildSys 2024, Demo**) Yang Deng, Donghua Xie, Rui Liang, and Dan Wang. "BuildProg: Program Generation for Testing ML-based Building Load Forecasting models via LLM and Prompt Engineering",
3. (**ACM BuildSys 2024, Poster**) Yang Deng, Yaohui Liu, Rui Liang, Samson Tai, and Dan Wang. "Towards ML-based Model Predictive Control for HVAC Control in Multi-Context Buildings at Scale via Ensemble Learning",
4. (**ACM BuildSys 2024** accepted) Yang Deng, Rui Liang, Jiaqi Fan, and Dan Wang. "AugPlug: An Automated Data Augmentation Model to Enhance Online Building Load Forecasting",
5. (**ACM e-Energy 2024 Demo, *PRSC 2024 Best Presentation Award***) Yang Deng, Donghua Xie, Jingyun Zeng, Rui Liang, Yufei Zhang, Jiaqi Fan, Samson Tai, and Dan Wang. "Towards deploying ML-based Load Forecasting Models for Building HVAC System: an AI Evaluation Platform", In Proceedings of the 15th ACM International Conference on Future and Sustainable Energy Systems, pp. 488-489. 2024.
6. (**ACM e-Energy 2024, *Best poster award Runner-up***) Rui Liang, Yang Deng, Dan Wang. "Probabilistic Building Load Forecasting via Conditional Diffusion Model", In Proceedings of the 15th ACM International Conference on Future and Sustainable Energy Systems, pp. 490-491. 2024.

7. (**ACM BuildSys 2023**) Yang Deng, Rui Liang, Dan Wang, Ao Li, and Fu Xiao. "Decomposition-based Data Augmentation for Time-series Building Load Data", In Proceedings of the 10th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation, pp. 51-60. 2023.
8. (**Applied Energy 2023**) Li Ao, Chong Zhang, Fu Xiao, Cheng Fan, Yang Deng, and Dan Wang. "Large-scale comparison and demonstration of continual learning for adaptive data-driven building energy prediction", Applied Energy 347 (2023): 121481.
9. (**ACM BuildSys 2023, Poster**) Yang Deng, Rui Liang, Jiaqi Fan, Ao Li, and Dan Wang. "Towards a Benchmark for ML-based Building Load Forecasting Model Selection for a Target Building", In Proceedings of the 10th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation, pp. 318-319. 2023.
10. (**ACM e-Energy 2022**) Yang Deng, Jiaqi Fan, Hao Jiang, Fang He, Dan Wang, Ao Li, and Fu Xiao. "Behavior testing of load forecasting models using BuildChecks", In Proceedings of the Thirteenth ACM International Conference on Future Energy Systems, pp. 76-80. 2022.
11. (**ACM e-Energy 2021**) He Fang, Yang Deng, Yanhui Xu, Cheng Xu, Dezhi Hong, and Dan Wang. "Energon: A Data Acquisition System for Portable Building Analytics", In Proceedings of the Twelfth ACM International Conference on Future Energy Systems, pp. 15-26. 2021.
12. (**IEEE MDM 2019**) Xiaolei Di, Yu Xiao, Chao Zhu, Yang Deng, Qinpei Zhao, and Weixiong Rao. "Traffic congestion prediction by spatiotemporal propagation patterns", In 2019 20th IEEE international conference on mobile data management (MDM), pp. 298-303. IEEE, 2019.
13. (**Journal of Computer Applications 2017**) Yang Deng, Chenxi Zhang, and Jiangfeng Li. "Video shot recommendation model based on emotion analysis using time-sync comments", Journal of Computer Applications 37, no. 4 (2017): 1065.
14. (Submitted to **IEEE Transactions on Knowledge and Data Engineering**) Xiaoyang Zhang, Yang Deng, Shuntao Zhu, and Dan Wang. "A Node-aware GNN-based Carbon Intensity Forecasting Model for Cross-Border Power Grids",

MENTORING AND TEACHING EXPERIENCE

Guide capstone project of the final-year undergraduates in COMP department of PolyU

- Hao Jiang (class of 2018), "A Case Study on Building Cooling Load Forecasting Model Evaluation", Score: A-
- Jiaqi Fan (class of 2018, currently a PhD student in our group), "A measurement study for building cooling load forecasting model evaluation", Score: A-
- Rui Liang (class of 2019, currently a PhD student in our group), "Boosting Load Forecasting Model Evaluation through Data Generation", Score: A
- Yang Shen (class of 2020), "A measurement of the interpretability of the load forecasting models", Score: A-

My fellow research assistants (BaiTest team)

- Donghua Xie, Sep 2023 - Oct 2025, recruited by BaiTest project (ITS/056/22MX). He is responsible for i) GUI and front-end development, and ii) the pre-train foundation model implementation in the building energy field.
- Jingyun Zeng, Sep 2023 - Sep 2024, recruited by BaiTest project (ITS/056/22MX). He is responsible for ML modeling and back-end development.

Teaching assistant in PolyU

- COMP3121 (Fall 2020, Fall 2021) Social and Collaborative Computing: Responsible for the tutorials
- COMP1411 (Spring 2021, Spring 2022, Spring 2023) Introduction to Computer Systems: Responsible for the homework and Grading the final exam
- COMP1002 (Fall 2023) Computational Thinking and Problem Solving: Responsible for the homework and Grading the final exam

Teaching assistant in Tongji University

· (Spring 2015) C++ Programming Language: Responsible for guiding the undergraduate student for the program coding

PROFESSIONAL SERVICE

Reviewer

Energy Informatics Review (EIR, The ACM SIGEnergy newsletter) 2023
IEEE Transactions on Mobile Computing (TMC) 2023
IEEE ICA3PP 2024
Global AI Challenge, host by Hong Kong Government (EMSD), 2022