






Jiazhou Wang

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Experience

Machine Learning Engineer at Meta

Aug 2022 – now

Ads ML Automation

Research Scientist at JD.com American Technologies Corporation

Apr 2019 – Jul 2022

Federated learning platform (open sourced): Tech lead, major algorithm and computation protocol/infrastructure contributor

- **Technical Contribution**

- Design the basic computation infrastructure of federated learning platform (connection, python-java mixed client design, distributed computation infra etc.)
- Design and implement Vertical Federated Random Forest(VFRF) and Vertical Federated Deep Neural Network (VFDNN) Algorithm
- Design and implement Secure Multi-party Computation (SMPC) protocols under centralized topology / decentralized topology
- Design and optimize secure inference protocol for deep learning layers, including convolution, matrix-vector multiplication, max pooling, ReLU and arccos layer
- Optimize two Homomorphic Encryption (HE) protocols to reduce computation cost in training process: Paillier cryptosystem and Randomized Iterative Affine Ciphertext (RIAC)

- **Key Result**

- ✓ VFRF model beats the SOTA model (SecureBoost) on business classification task, also achieves **5x** speed up for training process and **10x** data capacity
- ✓ Support multiple deep learning models (SphereFace, BERT etc.) in privacy preserving context
- ✓ ~**1B** weekly API calls in digital marketing scenario, boost GMV by **+50%** and content relevance by **+30%**
- ✓ Help risk control with ~**1M** weekly API calls, result in **-17%** bad debt rate
- ✓ Empower telephone debt collection with **+10%** call through rate and **+5.5%** successful collection per capita
- ✓ Embed into JD smart city OS, serve dozens of government/bank daily business

Real-time recommendation system: Main algorithm and system contributor

- **Technical Contribution**

- Design and implement the multi-source recall pipeline to increase recommendation diversity
- Build two-tower deep learning model in pre-ranking module to improve the ranking performance
- Build xDeepFM and Multi-gate Mixture-of-Experts(MMOE) model to improve both click through rate(CTR) and reading time
- Design and implement Hellinger Upper Confidence Bound (Hellinger-UCB) Bandit Algorithm to improve the CTR of cold-start content

- **Key Result**

- ✓ Increasing **+300%** CTR and **100%** reading time than the default result from business team
- ✓ Increasing the CTR of cold-start content by **+400%** than default sort-by-time strategy
- ✓ Reduce inference time of single ranking result list from **500+ms** to **250ms**
- ✓ Support multiple business groups, including news feed, searching, product recommendation etc.

Quantitative Researcher at Alphacrest Capital Management

Jun 2015 – Jan 2018

Systematic trading signal research: Major predictive strategy contributor

- **Technical Contribution**

- Build Triangular Input Balanced(TIB) predictive filter for daily/intraday prediction of US stock market
- Design and implement a random forest algorithm to predict return of stocks with RavenPack event data
- Design and implement a novel Hellinger-UCB reinforcement learning algorithm to reduce transaction costs in execution

- **Key Result**

- ✓ TIB filter achieves **10+** times better than other state space model with unbiased estimation like Kalman filter on return prediction.
- ✓ The random forest model achieves **52%** success rate, comparing to 50.3% success rate (**600%+** PnL) of linear regression model.
- ✓ Turn **3** strategies from losing money to profitable by reducing the transaction costs.

Fast portfolio optimization: Owner

- **Technical Contribution**

- Design and implement fast algorithm for mean-variance portfolio optimization with transaction cost models
- Use multi-core parallel computing to optimize the running performance of portfolio selection module
- Accelerate portfolio selection code in python by combining routine functions written in C.

- **Key Result**

- ✓ The portfolio optimization algorithm achieves **100** times faster than general interior point method for single instrument multiple periods, **10+** times faster for two or more instruments with multiple periods.
- ✓ The algorithm has $O(n \log n)$ time complexity on single instrument with any transaction cost model between linear and quadratic

Award

Year of 2021 top performer award, JD.com American Technologies Corporation, 2022

Year of 2020 top performer award, JD.com American Technologies Corporation, 2021

The Outstanding Dissertation Award, Stonybrook University

Skills

Production code experience: Python(>30K lines), PySpark(~5K), SQL/HIVE(~1K), Java(~1K), C/C++(~1K)