

# Xi Liu

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## Objective

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**Full-Time Machine Learning Engineer, Software Engineer, Data Scientist.**

## Highlights

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- One-year hands-on experiences in designing and implementing recommender systems and predictive modeling on large-scale heterogeneous enterprise dataset (e.g., profiles, text, images etc.) with AWS and EC2. Developed models separately achieved 8.5% and 6.5% performance improvement. Proposed techniques were highlighted by news media VentureBeat.
- Five-year research experiences of machine learning with special focus on bandit learning, deep reinforcement learning, and semi-supervised representation learning as well as their applications in predictive modeling, recommender and advertising systems.
- Published papers in top-tier machine learning and data mining conferences such as ICML, WWW, ICDM, KAIS. Won Best Paper Candidate Award in ICDM 2018.
- Programming skills of Python (TensorFlow, Keras, PyTorch), Spark, R, SQL, Matlab.

## Education

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**Texas A&M University, College Station, USA**

*P. R. Kumar, Nick Duffield*

**PH.D. IN COMPUTER ENGINEERING, GPA 3.93/4.00**

*Aug. 2013 - Dec 2019*

- Thesis: Bandit Learning - Regret, Complexity, and Reneging.
- Enabled bandit learning to handle reneging - quite common in the downstream applications of bandits learning algorithms, such as customer churn in recommender systems, patient death in the drug test, member unsubscription in membership business, portfolio selection etc. Paper accepted by top-tier machine learning conference ICML.
- Proposed BMLE - a new family of the bandit learning algorithms that has a provable order-optimal regret bound, performs better than many state-of-the-art baselines, and has a much lower computation complexity. The baselines outperformed by include UCB, Thompson Sampling, Information-Directed Sampling, Bayes-UCB, Knowledge-Gradient, MOSS, etc. The family of reward distributions handled by BMLE includes all exponential family and distribution with bounded support. Paper available at <https://arxiv.org/abs/1907.01287>

**Harbin Institute of Technology, Harbin, China**

*Lin Ma*

**BACHELOR DEGREE IN ELECTRONICS AND INFORMATION ENGINEERING, GPA 3.90/4.00**

*Aug. 2009 - Jul. 2013*

- Thesis: Information Gain based Feature Selection.

## Internship

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**Samsung Research America, Mountain View, CA**

*Yong Ge, Rui Chen*

**WORKED ON RECOMMENDER SYSTEMS AND CHURN PREDICTION**

*May. 2017 - May 2018*

- Researched, proposed, and implemented a novel multi-task deep reinforcement learning solution for multi-type feedback recommender systems. On the Samsung Game Launcher dataset containing millions of users, thousands of items, and billions of records, it achieved 8.5% performance improvement than many state-of-the-art methods such as Logistic Regression, Factorization Machine, Wide&Deep, Gradient Boosting Decision Tree, Regularized Multi-Task Learning, RNN, GRU, LSTM, CNN, Word2Vec.
- Researched, proposed, and implemented a novel deep semi-supervised representation learning solution for churn prediction. On Samsung Game Launcher dataset containing thousands of items, thousands of users, and millions of records, it achieved 6.5% performance improvement than many state-of-the-art methods such as SVM, Decision Tree, and Random Forests.
- Deployed developed solutions on Samsung Game Launcher and validated the recommendation performance by AUC, Precision@K, F1, Mean Average Precision, and NDCG@K.
- Published a paper in ICDM 2018 (acceptance rate 11.08%), won the Best Paper Candidate Award, published another paper in Journal of Knowledge and Information System (KAIS, acceptance rate 18.7%), and was highlighted by technology news media VentureBeat: <https://venturebeat.com/2019/01/21/researchers-use-samsung-data-and-ai-to-predict-mobile-game-churn/>.

**Fujitsu Network Communications, Richardson, TX**

*Calvin Wan, Yanbing Li*

**WORKED ON MACHINE LEARNING SOLUTIONS**

*May. 2016 - Aug. 2016*

- Developed and implemented a data-driven solution to estimate the network port delay.
- Developed and implemented neural network learning methods to identify network ports responsible for packet loss or delay.
- Analyzed machine learning algorithms include: Linear Regression, Logistic Regression, SVM, KNN, K-Means, MLE, MAP, Naive Bayes, Decision Tree.
- Filed two patents for proposed solutions. Patent Publication No. 20180062963 and No. 20180062958.

## Patents

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- US 20180062958, Xi Liu, Max Simmons, Calvin Wan, Jacky Kuo, Vamseedhar Reddyvariraja. "Neural Network Learning Methods to Identify Network Ports Responsible For Packet Loss or Delay".
- US 20180062963, Xi Liu, Max Simmons, Calvin Wan, Jacky Kuo, Vamseedhar Reddyvariraja. "Data-Driven Estimation of Network Port Delay".

## Recent Publications

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- [Xi Liu](#), Ping-Chun Hsieh, Anirban Bhattacharya, P. R. Kumar. “Bandit Learning Through Biased Maximum Likelihood Estimation”. Preprint arXiv:1907.01287
- [Xi Liu](#), Li Li, Ping-Chun Hsieh, Muhe Xie, Yong Ge, Rui Chen. “Handle Multiple Long-term Recommendation Tasks by Distilled Reinforcement Learning Model”. Preprint
- Ping-Chun Hsieh\*, [Xi Liu](#)\* (\*:equal contribution), Anirban Bhattacharya, P. R. Kumar. “Stay With Me: Lifetime Maximization Through Heteroscedastic Linear Bandits With Reneging”. Accepted by 2019 International Conference on Machine Learning (ICML, acceptance rate 22.6%)
- [Xi Liu](#), Muhe Xie, Xidao Wen, Rui Chen, Yong Ge, Nick Duffield, and Na Wang. “A Semi-Supervised and Inductive Embedding Model for Churn Prediction of Large-Scale Mobile Games”. Accepted by 2018 IEEE International Conference on Data Mining (ICDM Research Track, Long Paper, acceptance rate 11.08%, Best Paper Candidate Award)
- [Xi Liu](#), Muhe Xie, Xidao Wen, Rui Chen, Yong Ge, Nick Duffield, and Na Wang. “Micro- and Macro-Level Churn Analysis of Large-Scale Mobile Games”. Accepted by Springer Journal of Knowledge and Information System (KAIS, acceptance rate 18.7%)
- [Xi Liu](#), Ping-Chun Hsieh, Nick Duffield, Rui Chen, Muhe Xie, and Xidao Wen. “Streaming Network Embedding through Local Actions”. Accepted by 2019 International Conference on World Wide Web Workshop: Deep Learning for Graphs and Structured Data Embedding
- Xidao Wen, Yu-Ru Lin, [Xi Liu](#), Peter Brusilovsky and Jordan Barría Pineda. “Iterative Discriminant Tensor Factorization for Behavior Comparison in Massive Open Online Courses”. Accepted by 2019 International Conference on World Wide Web (WWW, acceptance rate 18%)
- Arman Hasanzadeh, [Xi Liu](#), Nick Duffield. “Piecewise Stationary Modeling of Random Processes Over Graphs With an Application to Traffic Prediction”. Preprint, arXiv:1711.06954
- Xianshan Qu, Li Li, [Xi Liu](#), “A Dynamic Neural Network Model for Click-Through Rate Prediction in Real-Time Bidding”. Preprint
- Xidao Wen, Yu-Ru Lin, Yongsu Ahn, Konstantinos Pelechrinis, [Xi Liu](#), and Nan Cao. “FacIt: Factorizing Tensors into Interpretable, Scrutinizable, and Fine-tunable Patterns”. Accepted by 2019 IEEE Visual Analytics Science and Technology (VAST, acceptance rate 22%)

## Services

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- Reviewer: ICDM 2018, WWW 2018, CIKM 2017/2018/2019, PKDD 2018, IEEE BigData 2018/2019, IEEE Transactions on Games, IEEE Transactions on Automatic Control, IEEE Transactions on Control Systems Technology.