Abbas Hosseini, Asst. Professor Sharif University
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Biographic Summary

Abbas Hosseini is an assistant professor at Sharif University and director of the Sharif MLSys Lab. His research addresses the design of algorithms, and systems for scalable machine learning and data science. Abbas holds a PhD in Machine Learning from Sharif University where he created a collection of models and algorithms for scalable personalized recommendation. Building on his Thesis work, Abbas co-founded Tapsell Inc.

RESEARCH INTERESTS

- Machine Learning Systems: Distributed Model Training, Prediction Serving, ML Systems Evaluation and Monitoring, Federated Learning Systems
- Reinforcement Learning: Contextual Multi-armed Bandit, (Deep) Reinforcement Learning
- Probabilistic Machine Learning: Deep Bayesian Neural Networks, Bayesian Nonparametric Models, Probabilistic Graphical Models, Variational Bayesian Inference, Monte Carlo Techniques
- Recommendation and Personalization: Time-Sensitive Recommendation, User Representation Learning, Privacy preserving recommender systems

EDUCATION

Ph.D., Artificial Intelligence, January 2019
Computer Engineering Department at Sharif University of Technology
Title: *Continuous-Time Modeling of Marked Events*
Thesis Advisor: Prof. Hamid R. Rabiee

M.S., Artificial Intelligence, August 2014
Computer Engineering Department at Sharif University of Technology
Title: *Online Stream Classification using Bayesian Non-Parametric Models*
Thesis Advisor: Prof. Hamid R. Rabiee

B.S. with Honors, Software Engineering, August 2012
Computer Engineering Department at Sharif University of Technology

HONORS AND AWARDS

- **Ranked 1st** in Iranian Nationwide University Entrance Exam for Ph.D. Students, 2014
- **Ranked 1st** in Cumulative GPA (19.55/20) among M.Sc. students of the artificial intelligence group, class of 2014 students, Department of Computer Engineering.
- **Gold Medal** in National Computer Olympiad for University Students, Summer 2012, Tehran
- Awarded Fellowship of National Elite Foundation of Iran for, 2012-2016
- **Ranked 1st** in Cumulative GPA (19.81/20) among about 120 B.Sc.students of the department, class of 2012 students, Department of Computer Engineering.
- Awarded Fellowship of Exceptional Talents of Sharif University of Technology for MSc. Program, 2012
- Awarded as **Outstanding Student** by university president, 2012
- Awarded **summer internship grant** from Swiss Federal Institute of Technology, Lausanne(EPFL), Summer 2011, Lausanne
- **Silver Medal** in Iranian National Olympiad in Informatics, 2007

PUBLICATION

- **ChOracle: A Unified Statistical Framework for Churn Prediction**,
(A. Khodadadi, A. Hosseini, E. Pajouheshgar, F. Mansouri, H. R. Rabiee), *IEEE Transactions on Knowledge and Data Engineering (***TKDE***) 2020.* pdf.jpg
- **Recurrent Poisson Factorization for Temporal Recommendation**,
(A. Hosseini, A. Khodadadi, K. Alizadeh, A. Arabzadeh, M. Farajtabar, H. Zha, H. R. Rabiee), *IEEE Transactions on Knowledge and Data Engineering (***TKDE***) 2018.* pdf.jpg
- **Continuous-Time User Modeling In the Presence of Badges: A Probabilistic Approach**,
(A. Khodadadi, A. Hosseini, E. Tavakoli, H. R. Rabiee), *ACM Transactions on Knowledge Discovery from Data (***TKDD***) 2018.* pdf.jpg

◇ **Recurrent Poisson Factorization for Temporal Recommendation**,
(A. Hosseini, K. Alizadeh, A. Khodadadi, A. Arabzadeh, M. Farajtabar, H. Zha, H. R. Rabiee), *23rd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining. ACM, Halifax, Nova Scotia Canada,* **SIGKDD** *2017.* pdf.jpg

◇ **HNP3: A Hierarchical Nonparametric Point Process for Modeling Content Diffusion Over Social Media**,
(A. Hosseini, A. Khodadadi, A. Arabzadeh, H. R. Rabiee,), *IEEE International Conference on Data Mining Barcelona, Spain, (***ICDM***) 2016.* pdf.jpg

◇ **Classifying A Stream Of Infinite Concepts: A Bayesian Nonparametric Approach**,
(A. Hosseini, H. R. Rabiee, H. Hafez A. Soltani,), *7th European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (***ECML-PKDD** *Nancy, France, 2014.* pdf.jpg

◇ **A unified statistical framework for crowd labeling**,
(J. Muhammadi, H. R. Rabiee, A. Hosseini), *Journal of Knowledge and Information Systems (***KAIS***)*(IF: 2.639), vol. 41, no. 1, October 2014. pdf.jpg

◇ **Spatial-Aware Dictionary Learning for Hyperspectral Image Classification**,
(A. Soltani, H. R. Rabiee, A. Hosseini), *IEEE Transactions on Geoscience and Remote Sensing* (IF: 3.467), vol. 53, no.1, pp. 527-541, 2015. pdf.jpg

◇ **Locality Preserving Discriminative Dictionary Learning**,
(S. Haghiri, H. R. Rabiee, A. Soltani, A. Hosseini, M. Shadloo), IEEE International Conference in Image Processing (**ICIP**) 2014. pdf.jpg

Research Experience

◇ **Machine Learning Systems Lab** Fall 2020-Present
I founded Machine Learning Systems Lab in Fall 2020. Currently our team has 6 B.Sc. students and 3 M.Sc. students. Our main focus is on designing scalable predictive models for different applications such as online recommendation, search and personalization and developing end-to-end machine learning systems which are able to continuously learn such models and are able to provide service in real world scale. Currently we have the following active projects:

- **Deep Bayesian Contextual Multi-armed Bandit for Online Recommendation**, In this work, we try to solve the exploration-exploitation tradeoff in online recommendation using contextual multi-armed bandit approach. In order to model the complexity and uncertainty of online recommendation problem, we proposed a model based on Bayesian deep neural networks.
- **Scalable user representation learning and Look-alike modeling**, In this work, we try to learn an efficient representation for users based on their activity histories to be used in online recommendation and look-alike modeling. Since there are hundreds of millions of users in real world online systems, the method for look-alike modeling should be simple and highly scalable.
- **Modeling Delayed Feedback for Continuous Training in Online Advertising**, Online advertising systems need to train continuously due to its inherent concept drift. However, in many ad systems, positive feedbacks are only observed after a possibly long and random delay. In this project, we aim to propose a method to continuously train the ad recommender system with the available biased dataset.

◇ **Data Science and Machine Learning Lab**, 2012-2019
I did my B.Sc. project and M.Sc, and Ph.D. theses in DML. I did the following projects in that period.

- **Continuous-time Modeling of Marked Events**, In this work, we proposed a unified statistical framework for joint modeling of mark and time of events which is able to learn the latent underlying patterns of events to predict the time and mark of future events. We demonstrated the efficiency of this framework by applying it to different applications such as time-sensitive recommendation, content diffusion over social networks and churn prediction.
- **Using Time Dependent Non-parametric models for Stream Classification**, In this work, we proposed a new model for stream classification using time dependent nonparametric models. This model can handle concept drift in stream classification problem properly. more details can be found in here.

- **HyperSpectral Image Classification Using Dictionary Learning**, In this work, we proposed a structured dictionary-based model for hyperspectral data that incorporates both spectral and contextual characteristics of a spectral sample, with the goal of hyperspectral image classification. more details can be found in here.

◇ **LAPMAL lab at EPFL**, Summer 2011
During this internship, I worked on speeding up MRI using compressed sensing (CS). In order to do so, I sped up two variational inference methods in order to accelerate the process of sampling matrix design.

Teaching Experience

◇ **Machine Learning** (Fall 2020, Spring 2021)
I developed machine learning course for B.Sc. students and taught it for two semesters in Sharif University of Technology. This class covers topics ranging from data cleaning and visualization to machine learning and foundations of deep learning with a focus on real-world data and problems. For more information visit https://mlclass.ir/

◇ **Engineering Probability and Statistics** (Fall 2014, Fall 2015, Spring 2016, Fall 2016, Fall 2019), In this course I taught fundamental concepts in probability and statistics to B.Sc. students mainly from a Bayesian perspective. I taught this course for 5 semesters in Sharif University of Technology.

Industrial Experience

◇ **Tapsell**,
Summer 2014- Fall 2021
Co-founder
I co-founded Tapsell in 2014 to commercialize my research. It is currently grown to more than 200 employees and is the leading online advertising system in Iran with more than 40 million online users.

Talks and Presentations

◇ **Stream Classification, A Bayesian Nonparametric Approach** in *Max Planck Institute for Intelligent Systems, Tubingen.*, Winter 2014.

◇ **Graphical Models and Bayesian Inference** in *Digital Media Lab. Sharif University of Technology*, Summer 2012.

◇ **Bayesian Modeling in Machine Learning** in *Digital Media Lab. Sharif University of Technology*, Spring 2012.

Skills

◇ Programming Languages: Java, Python, C, C++, Matlab.

◇ Databases: MongoDB, Oracle, Postgres, Elasticsearch

◇ IDEs and Version Control Tools: Intellij IDEA, PyCharm, Eclipse, Git, SVN

◇ Virtualization and Containerization: VMWare, Docker, etc

◇ Continuous Delivery Toolset: Gitlab, Artifactory, Jenkins, Docker Registry