Fatemeh Vahedian

Curriculum Vitae

Postdoctoral Research Fellow
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Research Interests

Applied Machine Learning, Heterogeneous Network Mining, Dynamic Networks, Network Alignment, and Recommender Systems .

Current position

2020-Present **Postdoctoral Research Fellow**, *Department of Computer Science and Engineering, University of Michigan, Ann Arbor, MI. USA*,
Research Areas: Applied Machine Learning, Deep Learning explanation, Dynamic Networks, Network Representation Learning and Alignment.

Education

2018-2019 **Postdoctoral Research Scholar**, *Department of Computer Science and Engineering, University of Notre Dame, Notre Dame, IN. USA*,
supervisor: Dr. Tijana Milenkovic.

2012-2018 **Ph.D. in Computer Science**, *DePaul University*, Chicago, IL. USA,
Thesis: A Multi-Relational Recommender System Framework for Heterogeneous Information Networks.

2007–2010 **M.S. in Information Technology**, *Iran University of Science and Technology*, Tehran, Iran.

2003–2007 **B.S. in Computer Science**, *AmirKabir University of Technology (Polytechnic)*, Tehran, Iran.

Research Experiments

NAReS: Redefining Network Alignment as Recommender System, *Conducting research, University of Notre Dame.*
- The goal of this project is to redefine network alignment problem as a recommendation prediction model in a heterogeneous network. This method unlike traditional network alignment, utilizes supervised learning to find node mapping in two given networks.
- We construct a heterogeneous network (from two given PPI networks) with two node types and three edge types. Then predict the node mapping using multi-relational learning.

Heterogeneous Network Approach to Predict Individuals' Mental Health, *Conducting research and mentoring a Ph.D. Student, University of Notre Dame.*
- The goal of this project is to predict individuals' mental health (depression or anxiety) based on their social interaction, personalities and physical health.
- In order to integrate users' social networks with their personal characteristics and make more accurate mental health predictions, we constructed a heterogeneous information network from the attribute-rich NetHealth data containing smartphone, wearable sensor, and survey data. Furthermore, we use network-based prediction models to predict individuals' mental status.

WHyLDR:Weighted Hybrid for Low Dimensional Recommender System, *Research Assistant, DePaul University*.

○ The goal of this work is to integrate multi-dimensional data gained from a complex heterogeneous network following several extended paths in a weighted hybrid model to generate personalize recommendation. We generate several recommendation components using collaborative filtering methods after following multi-steps paths of the network, and then combine all those components in a weighted hybrid model.

○ A new metric based on Normalized information gain of each path is introduced to control extended path generation and predict the contribution of recommender component in weighted hybrid model.

Extended Multi-relational Matrix Factorization for Heterogeneous Network, *Research Assistant, DePaul University*.

○ The goal of this work is to extend the existing multi-relational matrix factorization methods and adapt them for heterogeneous information network.

○ The metric based on Normalized information gain of each path of network is introduced to predict the informativeness of each path to avoid over-fitting and improve the time efficiency of the recommendation method.

Weighted Random walk Sampling for Weighted Heterogeneous Network, *Research Assistant, DePaul University*.

○ The main goal of this work is to incorporate explicit user feedback in the meta-path generation and emphasize on heavily rated edge of the network to capture the user preferences more accurately.

○ We implemented a weighted sampling on a biased random walk method to generate user profiles following meta-paths which results more accurate and efficient recommendation models.

Publications

Under Preparation

Fatemeh Vahedian and Tijana Milenkovic. "NAReS: Redefining Network Alignment as Recommender System". To be submitted to Journal of Bioinformatics.

Shikang Liu, **Fatemeh Vahedian**, David Hachen, Omar Lizardo, Christian Poellabauer, Aaron Striegel, and Tijana Milenkovic. "Heterogeneous Network Approach to Predict Individuals' Mental Health". Submitted to ACM Transactions on Knowledge Discovery from Data (TKDD).

Book Chapter

[1] **Fatemeh Vahedian** and Robin Burke. "Recommender Systems based on Social Networks", Encyclopedia of Social Network Analysis and Mining (ESNAM). Second edition. Alhajj, Reda; Rokne, Jon (Eds.). Springer, 2017.

Journal Paper

[2] **Fatemeh Vahedian**, Robin Burke and Bamshad Mobasher. "Multi-relational Recommendation in Heterogeneous Networks", ACM Transactions on the Web (TWEB), Volume 11 Issue 3, July 2017, Article No. 15.

Conference Papers

[3] **Fatemeh Vahedian**, Robin Burke and Bamshad Mobasher. "Weighted Random Walk Sampling for Multi-Relational Recommendation", UMAP 2017 Proceedings of the 25th Conference on User Modeling, Adaptation and Personalization, Pages 230-237.

[4] **Fatemeh Vahedian**, Robin Burke, and Bamshad Mobasher. "Meta-Path Selection for Extended Multi-Relational Matrix Factorization", In The Twenty-Ninth International Flairs Conference (2016). 566-571.

[5] **Fatemeh Vahedian**, Robin Burke and Bamshad Mobasher. "Weighted Random Walks for Meta-Path Expansion in Heterogeneous Networks", Poster Proceeding of 10th ACM Conference on Recommender Systems (RecSys 2016).

[6] **Fatemeh Vahedian**, Robin Burke, and Bamshad Mobasher. "Network-Based Extension of Multi-Relational Factorization Models", Poster Proceeding of 9th ACM Conference on Recommender Systems (RecSys 2015).

[7] Robin Burke and **Fatemeh Vahedian**, "Abstract: Recommendation using Extended Paths in Complex Networks". Proceeding of 3rd IJCAI Workshop on Heterogeneous Information Network Analysis (HINA 2015).

[8] Robin Burke, **Fatemeh Vahedian** and Bamshad Mobasher. "Hybrid Recommendation in Heterogeneous Networks", Proceedings of the 22nd Conference on User Modeling, Adaptation and Personalization (ACM UMAP 2014). 49-60.

[9] **Fatemeh Vahedian**. "Weighted Hybrid Recommendation for Heterogeneous Networks", Proceedings of 8th ACM Conference on Recommender Systems (ACM RecSys 2014). 429-432.

[10] Robin Burke and **Fatemeh Vahedian**. "Social Web Recommendation using Meta-paths", Proceedings of the 5th Workshop on Recommender Systems and the Social Web (RSWeb 2013) co-located with the 7th ACM Conference on Recommender Systems (RecSys 2013).

[11] **Fatemeh Vahedian** and Robin Burke. "Predicting Component Utilities for Linear-Weighted Hybrid Recommendation", Proceedings of the 6th Workshop on Recommender Systems and the Social Web (RSWeb 2014) co-located with the 8th ACM Conference on Recommender Systems (RecSys 2014).

[12] **Fatemeh Vahedian**. "Recommender System Framework for Heterogeneous Networks", ACM SIGAI Career Network and Conference (CNC 2016).

Programming Skills

Languages	**Java, Python, C++, C#.**
Databases	**MS SQL Server, MySQL.**
Statistical	**R, SPSS, SAS.**
Platforms	**Linux, Mac OS, Windows.**
Graph Mining	**Gephi, UCINET, GraphChi, NetworkX.**
Recommender Engine	**MyMediaLite, LibRec.**

Teaching

Winter 2018	**Data Analysis and Statistics**, *Adjunct Faculty*, DePaul University.
Fall 2017	**Data Analysis and Statistics**, *Adjunct Faculty*, DePaul University.
Spring 2017	**Java Programming Workshop**, *Instructor*, DePaul University.
Winter 2017	**Java Programming Tutorial**, *Instructor*, DePaul University.

Teaching Assistant

2014	**CSC 423: Data Analysis and Regression**, *DePaul University*.
2013-2014	**CSC 424: Advanced Data Analysis**, *DePaul University*.
2013	**CSC 578: Neural Networks and Machine Learning**, *DePaul University*.
2013	**IT 130: Introductory Computing for the Web**, *DePaul University*.
2013	**IT 223: Data Analysis**, *DePaul University*.

Invited Talk

Fall 2018	**Network Science Course**, *University of Notre Dame.*
Winter 2017	**CDM Research Colloquium**, *DePaul University.*

Mentoring and Contribution to Diversity

Guided two Ph.D. students in their research projects, writing papers and presenting their work at University of Notre Dame.

Organized Women In Technology workshop (over 100 particpants) at DePaul University with the goal of encouraging undergraduate female students pursue higher degree in STEM and help them to find a technology job in industry.

Worked with both graduate and undergraduate students to implement a recommendation model for Chicago City of Learning at DePaul University.

Volunteered to review and evaluate three posters by undergraduate students at DePual University Annual Undergraduate Research Showcase.

Volunteered and mentored third-through fifth-grade kids and their parents at Family Science Nights at Chicago Public Library.

Professional Activities

Organizer	Women In Technology Workshop, DePaul University 2017
Chair	School Of Computing Research Symposium (SOCRS)-2017
Reviewer	User Modeling and User-Adapted Interaction: The Journal of Personalization Research (UMUAI)
	Journal of the Association for Information Science and Technology (JASIST)
	Journal of Knowledge and Information Systems
	Journal of IEEE's Transactions on Knowledge and Data Engineering
	World Wide Web Journal -Internet and Web Information Systems
	Journal of Information System and Tourism
	ACM Conference on Recommender Systems (RecSys)- 2016
	ACM SIGIR Conference on Human Information Interaction and Retrieval (CHIIR)- 2017
Program Committee Member	
	ACM Conference on Recommender Systems- RecSys-2018, 2019
	AI track- Grace Hopper Celebration of Women-2018
	ACM Symposium on Applied Computing (SAC)- 2017
	Florida Artificial Intelligence Research Society Conference (FLAIRS)- 2017
	Workshop on Intelligent Recommender Systems by Knowledge Transfer and Learning (RecSysKTL) held in conjunction with the ACM Conference on Recommender Systems- 2017, 2018
	Workshop on Web Personalization, Recommender Systems, and Social Media joint with Web Intelligence Conference- 2017
	School Of Computing Research Symposium (SOCRS)- 2015
	DePaul University Annual Undergraduate Research Showcase- 2016

Honors and Awards

2014-2018	Research Assistant on WHyLDR Project (NSF Grant)
2012-2014	Graduate Scholarship
2012-2017	Summer Ph.D. Research Grant
2016	ACM SIGAI CNC Conference Travel Support
2012,2017	CRA-women Conference Student Travel Support
2014	NSF Ph.D. Student Travel Support for ACM RecSys Conference

References

○ **Dr. Tijana Milenkovic** (Supervisor)
Associate Professor of Computer Science, Department of Computer Science and Engineering, University of Notre Dame
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Phone: 574-631-8975

○ **Dr. Bamshad Mobasher**
Professor of Computer Science, College of Computing and Digital Media, DePaul University
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○ **Dr. Jonathan Gemmell**
Assistant Professor of Computer Science, College of Computing and Digital Media, DePaul University
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○ **Dr. Robin Burke** (PhD Advisor)
Professor of Computer Science, Department of Information and Computer Science, University of Colorado, Boulder
robin.burke(at)colorado.edu

○ **Dr. Ernesto Diaz-Aviles**
Adjunct Assistant Professor at University College Dublin, Co-Founder, CEO and Chief Scientist at Libre AI
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