

Hao-Jun Michael Shi

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Education

Northwestern University

PhD in Industrial Engineering and Management Sciences

Advisor: Prof. Jorge Nocedal

Evanston, IL

2016–2021

Kellogg School of Management at Northwestern University

Management for Scientists and Engineers Certificate

Evanston, IL

2020

Northwestern University

MS in Industrial Engineering and Management Sciences

Evanston, IL

2016–2017

University of California, Los Angeles

BS in Applied Mathematics

College and Departmental Honors

Los Angeles, CA

2012–2016

Research Interests

- computational optimization
- stochastic optimization
- noisy optimization
- derivative-free optimization
- machine learning
- deep learning

Awards

- 2019 International Conference on Machine Learning Top 5% Reviewer
- 2017, 2018 IEMS Departmental Service Award
- 2016, 2017 NSF Graduate Research Fellowship: Honorable Mention
- 2016 Walter P. Murphy Fellowship

Industry Experience

Facebook

Research Intern

Advisor: Dheevatsa Mudigere

Menlo Park, CA

2019

- Cleaned and incorporated Criteo Ad Kaggle dataset into DLRM.
- Investigated training properties and compression algorithms for deep learning-based recommendation systems.

Journal Publications

1. H.-J.M. Shi, Y. Xie, M.Q. Xuan, and J. Nocedal. "Adaptive Finite-Differencing Methods for High-Accuracy Noisy Derivative-Free Optimization". In preparation.
2. H.-J.M. Shi, M.Q. Xuan, F. Oztoprak, and J. Nocedal. "On the Numerical Performance of Derivative-Free Optimization Methods Based on Finite-Difference Approximations". In preparation.
3. H.-J.M. Shi, Y. Xie, R. Byrd, and J. Nocedal. "A Noise-Tolerant Quasi-Newton Algorithm for Unconstrained Optimization". Submitted. [ArXiv].

4. J. Luo, K. Shapiro, H.-J.M. Shi, Q. Yang, and K. Zhu. "Practical Algorithms for Learning Near-Isometric Linear Embeddings". SIAM Undergraduate Research Online, vol. 9, 2016. [SIURO].

Conference Proceedings

1. H.-J.M. Shi, D. Mudigere, M. Naumov, and J. Yang. "Compositional Embeddings Using Complementary Partitions for Memory-Efficient Recommendation Systems". KDD, Virtual Conference, August 2020. [KDD].
2. R. Bollapragada, D. Mudigere, J. Nocedal, H.-J.M. Shi, and P.T.P. Tang. "A Progressive Batching L-BFGS Method for Machine Learning". International Conference on Machine Learning (ICML), Stockholm, Sweden, July 2018. [ICML]
3. H.-J.M. Shi, M. Case, X. Gu, S. Tu, and D. Needell. "Methods for Quantized Compressed Sensing". Proc. Information Theory and Applications (ITA), La Jolla, CA, Jan. 2016. [ITA].

Technical Reports

1. M. Naumov, D. Mudigere, H.-J.M. Shi, J. Huang, N. Sundaraman, J. Park, X. Wang, U. Gupta, C.-J. Wu, A.G. Azzolini, D. Dzhulgakov, A. Mallevich, I. Cherniavskii, Y. Lu, R. Krishnamoorthi, A. Yu, V. Kondratenko, S. Pereira, X. Chen, W. Chen, V. Rao, B. Jia, L. Xiong, M. Smelyanskiy. "Deep Learning Recommendation Model for Personalization and Recommendation Systems". Preprint. [ArXiv].
2. H.-J.M. Shi, S. Tu, Y. Xu, and W. Yin. "A Primer on Coordinate Descent Algorithms". Preprint. [ArXiv].
3. X. Gu, S. Tu, H.-J.M. Shi, M. Case, D. Needell, and Y. Plan. "Optimizing Quantization for Lasso Recovery". IEEE Signal Processing Letters, vol. 25, issue 1, Jan. 2018. [IEEE].
4. C. Abrahamson, H.-J.M. Shi, and B. Yang. "Ground Motion Prediction Equations for Arias Intensity Consistent with the NGA-West2 Ground Motion Models". Pacific Earthquake Engineering Research (PEER) Report, July 2016. [PEER].

Presentations

1. "A Noise-Tolerant Quasi-Newton Method for Unconstrained Optimization". INFORMS 2020, Remote, Nov. 2020.
2. "Compositional Embeddings Using Complementary Partitions for Memory-Efficient Recommendation Systems". ACM SIGKDD, Remote, Aug. 2020.
3. "Compositional Embeddings Using Complementary Partitions for Memory-Efficient Recommendation Systems". PerSoNAI tutorial, ISCA 2020, Remote, May 2020.
4. "Towards Understanding Embeddings and Optimization in Deep Neural Recommendation Systems". INFORMS 2019, Seattle, Washington, Oct. 2019.
5. "Recent Advancements in Stochastic Quasi-Newton Methods". Facebook, Menlo Park, California, Feb. 2019.
6. "A Progressive Batching L-BFGS Method for Machine Learning". Chicago Area SIAM Student Conference 2018, Chicago, Illinois, Apr. 2018.
7. "A Progressive Batching L-BFGS Method for Machine Learning". Midwest Machine Learning Symposium 2018, Chicago, Illinois, June 2018.
8. "Learning Near-Isometric Linear Embeddings". Joint Mathematics Meetings 2015, San Antonio, Texas, Jan. 2015.

Teaching Experience

Northwestern University

- IEMS 351: Optimization Methods in Data Science, Instructor (Spring 2020)

- IEMS 455: Machine Learning, Teaching Assistant (Spring 2018)
- IEMS 1st Year Boot Camp: Analysis, Instructor (Summer 2017)

Advising

B.S. and M.S. Students Advised

- Manish Kumar, MS in Analytics, Northwestern University, Winter 2020.
Current Position: Data Scientist at Microsoft.

Professional Activities

- Referee for:
 - *SIAM Journal on Optimization*
 - *International Conference on Machine Learning*
 - *Neural Information Processing Systems*
 - *International Conference on Learning Representations*
- Student Member of SIAM and INFORMS.
- Northwestern INFORMS Student Chapter Board: Webmaster (2017-18).

References

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Ping Tak Peter Tang

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Andreas Waechter

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