Dohyung Park

Contact Information

Electrical & Computer Engineering
The University of Texas at Austin
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Research Interests

My research interests are primarily in large-scale optimization for machine learning problems. I am also interested in online or distributed algorithms in this area.

Education

The University of Texas at Austin 2011 - 2016
Ph.D., Electrical & Computer Engineering
- Advisors : Prof. Constantine Caramanis and Prof. Sujay Sanghavi
- Current GPA : 4.0/4.0

Korea Advanced Institute of Science and Technology
M.S., Electrical Engineering
B.S., Electrical Engineering (Magna Cum Laude)
- Minor in Computer Science

Research Experience

Facebook, Inc.
Semantic embeddings of topics in the word vector space
- Designed an algorithm based on Word2Vec which embeds topics into the word vector space
- Implemented a pipeline which constructs training text corpora using Python, Java, and Hive/SQL, and developed the algorithm and its unit tester in C/C++.

The University of Texas at Austin
Collaborative ranking from pairwise preferences
- Proposed algorithms for ranking multiple items for each of multiple users from given pairwise preferences.
- Implemented parallel algorithms on a multi-core machine.

Learning unions of subspaces (a.k.a. Subspace clustering)
- Developed algorithms to recover unions of subspaces from unlabeled points.
- Derived statistical guarantee for exact clustering with conditions weaker than state-of-the-art results.
- Showed competitive practical performance on motion segmentation with much lower computational cost.

Samsung Advanced Institute of Technology
Mobile indoor localization systems
- Designed algorithms to estimate indoor locations with limited infrastructure.
- Developed a testbed to demonstrate the localization algorithms.

Honors & Awards

Bronze medal, Korean Olympiad in Informatics
Bronze medal, Korean Science Olympiad
KAIST Governmental Fellowship

Publications

[1] **Dohyung Park**, Anastasios Kyrillidis, Constantine Caramanis, and Sujay Sanghavi, "Finding Low-rank Solutions to Matrix Problems, Efficiently and Provably," ArXiv preprint (1606.03168)

[2] **Dohyung Park**, Anastasios Kyrillidis, Srinadh Bhojanapalli, Constantine Caramanis, and Sujay Sanghavi, "Provable Non-convex Projected Gradient Descent for A Class of Constrained Matrix Optimization Problems," submitted to NIPS, (ArXiv preprint 1606.01316)

[3] Xinyang Yi, **Dohyung Park**, Yudong Chen, and Constantine Caramanis, "Fast Algorithms for Robust PCA via Gradient Descent," submitted to NIPS (ArXiv preprint 1605.07784)

[4] **Dohyung Park**, Joe Neeman, Jin Zhang, Sujay Sanghavi, and Inderjit S. Dhillon, "Preference Completion: Large-scale Collaborative Ranking from Pairwise Comparison," in *Proc. International Conference on Machine Learning(ICML)*, 2015.

[5] **Dohyung Park**, Constantine Caramanis, and Sujay Sanghavi, "Greedy subspace clustering," in *Proc. Neural Information Processing Systems(NIPS)*, 2014.

[6] Won-Yong Shin, **Dohyung Park**, and Bang Chul Jung, "Can one achieve multiuser diversity in uplink multi-cell networks?," *IEEE Transactions on Communications*, Vol. 60, No. 12, pp. 3535-3540, Dec. 2012.

[7] Bang Chul Jung, **Dohyung Park**, and Won-Yong Shin, "Opportunistic interference mitigation achieves optimal degrees-of-freedom in wireless multi-cell uplink networks," *IEEE Transactions on Communications*, Vol. 60, No. 7, pp. 1935-1944, July 2012.

[8] **Dohyung Park**, Joonsung Kang, and Eung Sun Kim, "Ad hoc indoor peer-to-peer tracking using relative location estimation," in *Proc. International Conference on Indoor Positioning and Indoor Navigation(IPIN)*, ETH Zurich, Switzerland, Sept. 2010.

[9] Bang Chul Jung, **Dohyung Park**, and Won-Yong Shin, "A study on the optimal degrees-of-freedom of cellular networks: opportunistic interference mitigation," in *Proc. Asilomar Conference on Signals, Systems and Computers*, Nov. 2010.

[10] Namyoon Lee, **Dohyung Park**, and Young-Doo Kim, "Degrees of freedom on the K-user MIMO interference channel with constant channel coefficients for downlink communications," in *Proc. IEEE Global Communications Conference(GLOBECOM)*, 2009.

[11] **Dohyung Park** and Sae-Young Chung, "Performance-complexity tradeoffs of rateless codes," in *Proc. IEEE International Symposium on Information Theory(ISIT)*, Toronto, Canada, July 2008.

Courses

Math/OR/Stat - Real Analysis, Theory of Probability, Functional Analysis, Numerical Linear Algebra, Linear Programming, Convex Optimization, Statistical Modelling

EECS - Probability and Stochastic Processes, Advanced Probability, Randomized Algorithms, Machine Learning, Large-scale Learning, Sparsity/Structure/Algorithms,

Scalable Machine Learning, Information Theory, Coding Theory, Communication Systems.

Patents

[1] Eung Sun Kim, **Dohyung Park**, Yong Kim, "Method of calculating accuracy of measuring location, and method and apparatus for measuring location of terminal using accuracy of measuring location," US2013/0080048A1, Mar. 2013.

[2] Joon Seong Kang, Eung Sun Kim, and **Dohyung Park**, "Method and apparatus for estimating angle of arrival," US2011/0199263A1, Aug. 2011

[3] **Dohyung Park**, Eung Sun Kim, and Joon Seong Kang, "Apparatus and method for estimating relative location," US2011/0270519A1, Nov. 2011.

Skills

- Programming Languages: C/C++, Java, Python, R, MATLAB, SQL/Hive.
- Operating Systems: Windows, Mac OS, Unix/Linux