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Curriculum Vitae

Research interests

Primary: Machine learning methods for personalized learning in education

Secondary: Convex optimization; Bayesian data analysis; Reinforcement learning; Social network analysis; Deep learning

Education

May 2016: Ph.D. in Electrical and Computer Engineering, Rice University, Houston, TX, USA.
Doctoral dissertation: “Machine Learning Techniques for Personalized Learning,” thesis advisor: Prof. Richard G. Baraniuk.

May 2014: M.S. in Electrical and Computer Engineering, Rice University, Houston, TX, USA.
Master’s thesis: “Sparse Factor Analysis for Learning and Content Analytics,” thesis advisor: Prof. Richard G. Baraniuk.

Nov. 2010: B.S. in Physics and Mathematics with minor in Information Technology (first class honors), Hong Kong University of Science and Technology, Hong Kong.

Previous academic positions

Feb. 2017–Dec. 2018: Postdoctoral Research Associate in the Department of Electrical Engineering, Princeton University, Princeton, NJ, USA. Advisors: Prof. Mung Chiang and Prof. H. Vincent Poor.

June 2016–Feb. 2017: Postdoctoral Research Associate in the Department of Electrical and Computer Engineering and OpenStax, Rice University, Houston, TX, USA. Advisor: Prof. Richard G. Baraniuk.

Professional activities

- Workshops organized:
 - IEEE International Conference on Data Mining (ICDM), Singapore, Nov. 2018, on “Data Mining for eLearning Personalization” (with Prof. R. G. Baraniuk, Dr. C. Brinton, and E. Glassberg Sands)
 - ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), Halifax, Canada, Aug. 2017, on “Advancing Education with Data” (with Prof. R. G. Baraniuk, Prof. M. Chiang, Dr. C. Brinton, Dr. S. Rao, R. Sumbaly, and J. Ngiam)

- Neural Information Processing Systems (NIPS), Barcelona, Spain, Dec. 2016, on “Machine Learning for Education” (with Prof. R. G. Baraniuk, Prof. C. Studer, Dr. P. Grimaldi, and J. Ngiam)
- International Conference on Machine Learning (ICML), Lille, France, July 2015, on “Machine Learning for Education” (with Prof. R. G. Baraniuk, Prof. E. Brunskill, Dr. J. Huang, Prof. M. van der Schaar, Prof. M. C. Mozer, and Prof. C. Studer)
- Neural Information Processing Systems (NIPS), Montreal, Canada, Dec. 2014, on “Human Propelled Machine Learning” (with Prof. R. G. Baraniuk, Prof. C. Studer, and Prof. M. C. Mozer)
- Technical program committees:
 - International Conference on Machine Learning (ICML), New York, NY, USA, June 2016, on “Machine Learning for Digital Education and Assessment Systems”
 - IEEE International Conference on Data Mining (ICDM), Atlantic City, NJ, USA, Nov. 2015, on “Data Mining for Educational Assessment and Feedback”
 - ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), New York, NY, USA, Aug. 2014, on “Data Mining for Educational Assessment and Feedback”
- Journal and conference program committee/reviewing:
 - Journal of Machine Learning Research (JMLR)
 - Machine Learning
 - Data Mining and Knowledge Discovery (DAMI)
 - IEEE Transactions on Signal Processing (TSP)
 - IEEE Transactions on Learning Technologies (TLT)
 - IEEE Journal of Selected Topics on Signal Processing (JSTSP)
 - Statistics and Computing
 - Journal of Educational Data Mining (JEDM)
 - International Conference on Educational Data Mining (EDM)
 - Neural Information Processing Systems (NIPS)
 - International Conference on Machine Learning (ICML)
 - International Conference on Learning Representations (ICLR)
 - AAAI Conference on Artificial Intelligence (AAAI)
 - IEEE Signal Processing Letters
 - IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)
 - European Conference on Signal Processing (EUSIPCO)
 - Conference on Information Sciences and Systems (CISS)

Publications

1. Journal and conference publications

1. T. Yang, R. Baker, C. Studer, M. Chiang, and A. S. Lan, “Active Learning for Student Affect Detection,” submitted, Oct. 2018
2. T. Yang, J. Rosca, A. S. Lan, M. Chiang, and P. J. Ramadge, “EAT-DAT: Energy-based Adversarial Training and Domain Adaptation for Anomaly Detection,” submitted, Oct. 2018

3. Z. Ren, X. Ning, A. S. Lan, and H. Rangwala, "Grade Prediction Based on Cumulative Knowledge and Co-taken Courses," submitted, Oct. 2018
4. P. Naghizadeh, M. Gorlatova, A. S. Lan, and M. Chiang, "Hurts to Be Too Early: Benefits and Drawbacks of Communication in Multi-Agent Learning," IEEE International Conference on Computer Communications (INFOCOM), Apr. 2019, to appear
5. T. Yang, C. Brinton, P. Mittal, M. Chiang, and A. S. Lan, "Learning Informative and Private Representations via Generative Adversarial Networks," IEEE International Conference on Big Data, Dec. 2018, to appear
6. C. Brinton, S. Buccapatnam, L. Zheng, D. Cao, A. S. Lan, F. Wong, S. Ha, M. Chiang, and H. V. Poor, "On the Efficiency of Online Social Learning Networks," IEEE Transactions on Networking (TON), Vol. 26, Issue 5, Oct. 2018
7. A. S. Lan, J. Spencer, Z. Chen, C. Brinton, and M. Chiang, "Personalized Thread Recommendation for MOOC Discussion Forums," European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD), Sep. 2018
8. A. Aghazadeh, M. Golbabaee, A. S. Lan, and R. G. Baraniuk, "Insense: Incoherent Sensor Selection for Sparse Signals," Signal Processing, Vol. 150, pp. 57–65, Sep. 2018
9. A. S. Lan, M. Chiang, and C. Studer, "An Estimation and Analysis Framework for the Rasch Model," International Conference on Machine Learning (ICML), pp. 2889–2897, July 2018
10. R. Ghods, A. S. Lan, T. Goldstein, and C. Studer, "Linear Spectral Estimators and an Application to Phase Retrieval," International Conference on Machine Learning (ICML), pp. 1729–1738, July 2018
11. A. Winchell, M. C. Mozer, A. S. Lan, P. Grimaldi, and H. Pashler, "Textbook Annotations as an Early Predictor of Student Learning," International Conference on Educational Data Mining (EDM), pp. 431–437, July 2018
12. W. Chen, A. S. Lan, D. Cao, C. Brinton, and M. Chiang, "Behavioral Analysis at Scale: Learning Course Prerequisite Structures from Learner Clickstreams," International Conference on Educational Data Mining (EDM), pp. 66–75, July 2018
13. D. Cao, A. S. Lan, W. Chen, C. Brinton, and M. Chiang, "Learner Behavioral Feature Refinement and Augmentation using GANs," International Conference on Artificial Intelligence in Education (AIED), pp. 41–46, June 2018
14. Z. Wang, A. S. Lan, W. Nie, P. Grimaldi, R. Schloss, and R. G. Baraniuk, "QG-Net: A Data-Driven Question Generation Model for Educational Content," ACM Conference on Learning at Scale (L@S), pp. 1–10, June 2018
15. M. Khodak, L. Zheng, A. S. Lan, C. Joe-Wong, and M. Chiang, "Learning Cloud Dynamics to Optimize Spot Instance Bidding Strategies," IEEE International Conference on Computer Communications (INFOCOM), Apr. 2018
16. A. S. Lan, M. Chiang, and C. Studer, "Linearized Binary Regression," Conference on Information Sciences and Systems (CISS), pp. 1–6, Mar. 2018
17. R. Ghods, A. S. Lan, T. Goldstein, and C. Studer, "PhaseLin: Linear Phase Retrieval," Conference on Information Sciences and Systems (CISS), pp. 1–6, Mar. 2018
18. A. S. Lan, A. E. Waters, C. Studer, and R. G. Baraniuk, "BLAh: Boolean Logic Analysis for Graded Student Response Data," IEEE Journal of Selected Topics in Signal Processing (JSTSP), Vol. 11, Issue 5, pp. 754–764, Aug. 2017

19. A. Aghazadeh, A. S. Lan, A. Shrivastava, and R. G. Baraniuk, "RHash: Robust Hashing via ℓ_∞ -norm Distortion," Proc. International Joint Conference on Artificial Intelligence (IJCAI), pp. 1386–1394, Aug. 2017
20. A. S. Lan, C. Brinton, T. Yang, and M. Chiang, "Behavior-Based Latent Variable Model for Learner Engagement," Proc. International Conference on Educational Data Mining (EDM), pp. 64–71, June 2017
21. J. Michalenko, A. S. Lan, and R. G. Baraniuk, "Data-mining Textual Responses to Uncover Misconception Patterns," Proc. International Conference on Educational Data Mining (EDM), pp. 208–213, June 2017
22. Z. Wang, A. S. Lan, P. Grimaldi, and R. G. Baraniuk, "A Latent Factor Model For Instructor Content Preference Analysis," Proc. International Conference on Educational Data Mining (EDM), pp. 290–295, June 2017
23. A. E. Waters, P. Grimaldi, A. S. Lan, and R. G. Baraniuk, "Short-Answer Responses to STEM Exercises: Measuring Response Validity and Its Impact on Learning," Proc. International Conference on Educational Data Mining (EDM), pp. 374–375, June 2017
24. J. Michalenko, A. S. Lan, and R. G. Baraniuk, "Personalized Feedback for Open-Response Mathematical Questions using Long Short-Term Memory Networks," Proc. International Conference on Educational Data Mining (EDM), pp. 350–351, June 2017
25. J. Michalenko, A. S. Lan, and R. G. Baraniuk, "Data-mining Textual Responses to Uncover Misconception Patterns," Proc. ACM Conference on Learning at Scale (L@S), pp. 245–248, Apr. 2017 (work-in-progress session)
26. I. Manickam, A. S. Lan, and R. G. Baraniuk, "Contextual Multi-armed Bandit Algorithms for Personalized Learning Action Selection," Proc. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 6344–6348, Mar. 2017 (**invited paper**)
27. D. Vats, A. S. Lan, C. Studer, and R. G. Baraniuk, "Optimal Ranking of Test Items using the Rasch Model," Proc. Annual Allerton Conference on Communication, Control, and Computing, pp. 464–473, Sep. 2016
28. A. S. Lan and R. G. Baraniuk, "A Contextual Bandits Framework for Personalized Learning Action Selection," Proc. International Conference on Educational Data Mining (EDM), pp. 424–429, June 2016
29. A. S. Lan, T. Goldstein, R. G. Baraniuk, and C. Studer, "Dealbreaker: A Nonlinear Latent Variable Model for Educational Data," Proc. International Conference on Machine Learning (ICML), pp. 266–275, June 2016
30. A. S. Lan, C. Studer, and R. G. Baraniuk, "Self-Expressive Clustering of Binary Data via Group Sparsity," Signal Processing with Adaptive Sparse Structured Representations (SPARS), July 2015
31. A. S. Lan, D. Vats, A. E. Waters, and R. G. Baraniuk, "Mathematical Language Processing: Automatic Grading and Feedback for Open Response Mathematical Questions," Proc. ACM Conference on Learning at Scale (L@S), pp. 167–176, Mar. 2015
32. A. S. Lan, C. Studer, and R. G. Baraniuk, "Time-Varying Learning and Content Analytics via Sparse Factor Analysis," Proc. ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), pp. 452–461, Aug. 2014
33. A. S. Lan, C. Studer, and R. G. Baraniuk, "Quantized Matrix Completion for Personalized Learning," Proc. International Conference on Educational Data Mining (EDM), pp. 292–295, July 2014

34. A. S. Lan, A. E. Waters, C. Studer, and R. G. Baraniuk, "Sparse Factor Analysis for Learning and Content Analytics," *Journal of Machine Learning Research (JMLR)*, Vol. 15, pp. 1959–2008, June 2014
35. A. S. Lan, C. Studer, and R. G. Baraniuk, "Matrix Recovery from Quantized and Corrupted Measurements," *Proc. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 4973–4977, May 2014
36. D. Vats, C. Studer, A. S. Lan, L. Carin, and R. G. Baraniuk, "Test-size Reduction for Concept Estimation," *Proc. International Conference on Educational Data Mining (EDM)*, pp. 292–295, July 2013
37. A. S. Lan, C. Studer, A. E. Waters, and R. G. Baraniuk, "Joint Topic Modeling and Factor Analysis of Textual Information and Graded Response Data," *Proc. International Conference on Educational Data Mining (EDM)*, pp. 324–325, July 2013
38. A. S. Lan, C. Studer, A. E. Waters, and R. G. Baraniuk, "Tag-Aware Ordinal Sparse Factor Analysis for Learning and Content Analytics," *Proc. International Conference on Educational Data Mining (EDM)*, pp. 90–97, July 2013
39. A. E. Waters, A. S. Lan, and C. Studer, "Sparse Probit Factor Analysis for Learning Analytics," *Proc. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 8776–8780, July 2013 (**invited paper**)

2. Preprints

1. A. E. Waters, A. S. Lan, R. Ning, C. Studer, and R. G. Baraniuk, "SPRITE: A Data-Driven Response Model For Multiple Choice Questions," preprint, Feb. 2016
2. D. Vats, C. Studer, A. S. Lan, L. Carin, and R. G. Baraniuk, "Test-size Reduction via Sparse Factor Analysis," preprint, Apr. 2014

Patents

1. R. G. Baraniuk, A. S. Lan, C. Studer, and A. E. Waters, "Sparse Factor Analysis for Learning Analytics and Content Analytics," US Patent 9,704,102, July 2017
2. A. S. Lan, D. Vats, A. E. Waters, and R. G. Baraniuk, "Mathematical Language Processing: Automatic Grading and Feedback for Open Response Mathematical Questions," US Patent App. No. 14/967,131, June 2016