Dhivya Eswaran

Carnegie Mellon University
101 Lytton Avenue
Palo Alto, CA 94301

Email: deswaran@amazon.com
www: https://dhivyaeswaran.github.io
Last Update: August 28, 2021

Education

- **PhD** in Computer Science *August 2015 - May 2020*
  Carnegie Mellon University, Pittsburgh, USA
  Advisor: Prof. Christos Faloutsos
  Research: Graph and Time-Series Mining, Anomaly Detection, Semi-Supervised Learning, Machine Learning
- **BTech (with Honors)** in Computer Science and Engineering *August 2011 - May 2015*
  Indian Institute of Technology Madras, Chennai, India
  CGPA: 9.77/10. Minor: Micro-electronics

Positions

- **Amazon Search**, Palo Alto, USA *May 2020 - present*
  Applied Scientist II
  I help innovate, develop, evaluate, and launch deep-learned models to fuel next-generation Amazon Search, with a focus on improving search quality in new and emerging locales. Given a customer query, these models can shortlist thousands of matching products from a multi-million catalog within tens of milliseconds.
- **Microsoft Research**, Redmond, USA *May 2019 - August 2019*
  Research Intern, Information and Data Sciences Group. Mentors: Paul Bennett, Shamsi Iqbal, Adam Fourney
  Research: Prediction on personal corpora
- **Amazon**, Palo Alto, USA *May 2018 - August 2018*
  Research Intern, AWS Artificial Intelligence Lab. Mentors: Nina Mishra, Yonatan Naamad
  Research: Early warning of abnormal health conditions
- **Amazon**, Palo Alto, USA *May 2017 - August 2017*
  Research Intern, Core Machine Learning. Mentors: Nina Mishra, Sudipto Guha
  Research: Anomaly detection in streaming graphs
- **Facebook**, Menlo Park, USA *May 2016 - August 2016*
  Research Intern, Core Data Science. Mentors: Smriti Bhagat, Stanislav Funiak, Aude Hofleitner
  Research: Matching graphs with nodal attributes
- **Toyota Technological Institute**, Chicago, USA *May 2015 - August 2015*
  Research Intern, CS Department. Mentors: Mohit Bansal, Kevin Gimpel, Karen Livescu
  Research: Learning word embeddings from multiple languages
- **Microsoft Research**, Redmond, USA *May 2014 - August 2014*
  Research Intern, Contextual Learning, User Experience and Search. Mentor: Paul Bennett
  Research: Webpage classification using website topical cohesion

Awards & Distinctions

- Invited to Microsoft Research AI Breakthroughs Workshop, 2019
- Snap Graduate Research Fellowship, 2019
- Symantec Graduate Research Fellowship Finalist, 2019
- ECML-PKDD Best Student Data Mining Paper (Runner-Up), 2018
- Travel awards: IEEE ICDM 2018, ACM SIGKDD 2018, CRA-Women Graduate Student Cohort 2016, Xerox Research Center India Open 2014

- O.P. Jindal Engineering and Management Scholarship, 2011 & 2012
- Aditya-Birla Scholarship Finalist, 2011 (one of 25 candidates across India)
- All India Rank 96 in IIT-Joint Entrance Examination, 2011
- All India Rank 24 in All India Engineering Entrance Examination, 2011
- Kishore Vaigyanik Protsahan Yojana Scholarship, 2011
- Tamil Nadu State Rank 2, Regional Mathematics Olympiad, 2010

Publications

Refereed Conference Publications

13. Eswaran, D., Kumar, S., & Faloutsos, C. (2020, April). **Higher-order label homogeneity and spreading in graphs.** In *Proceedings of The Web Conference 2020* (pp. 2493-2499).
12. Eswaran, D., Faloutsos, C., Mishra, N. and Naamad, Y., 2019, November. I**ntervention-aware early warning.** In *2019 IEEE International Conference on Data Mining (ICDM)* (pp. 1030-1035). IEEE.
11. Eswaran, D., & Faloutsos, C. (2018, November). **Sedanspot: Detecting anomalies in edge streams.** In *2018 IEEE International Conference on Data Mining (ICDM)* (pp. 953-958). IEEE.
10. Hooi, B., Akoglu, L., Eswaran, D., Pandey, A., Jereminov, M., Pileggi, L., & Faloutsos, C. (2018, October). **Changedar: Online localized change detection for sensor data on a graph.** In *Proceedings of the 27th ACM International Conference on Information and Knowledge Management* (pp. 507-516).
9. Eswaran, D., Rabbany, R., Dubrawski, A. W., & Faloutsos, C. (2018, September). **Social-affiliation networks: Patterns and the SOAR model.** In *Joint European conference on machine learning and knowledge discovery in databases* (pp. 105-121). Springer, Cham.
8. Hooi, B., Eswaran, D., Song, H. A., Pandey, A., Jereminov, M., Pileggi, L., & Faloutsos, C. (2018, September). **Gridwatch: Sensor placement and anomaly detection in the electrical grid.** In *Joint European Conference on Machine Learning and Knowledge Discovery in Databases* (pp. 71-86). Springer, Cham.
7. Gupta, N., Eswaran, D., Shah, N., Akoglu, L., & Faloutsos, C. (2018, September). **Beyond outlier detection: Lookout for pictorial explanation.** In *Joint European Conference on Machine Learning and Knowledge Discovery in Databases* (pp. 122-138). Springer, Cham.
6. Eswaran, D., Faloutsos, C., Guha, S., & Mishra, N. (2018, July). **Spotlight: Detecting anomalies in streaming graphs.** In *Proceedings of the 24th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining* (pp. 1378-1386).
5. Rabbany, R., Eswaran, D., Dubrawski, A. W., & Faloutsos, C. (2017, May). **Beyond assortativity: proclivity index for attributed networks (ProNe).** In *Pacific-Asia Conference on Knowledge Discovery and Data Mining* (pp. 225-237). Springer, Cham.
4. Eswaran, D., Günnemann, S., Faloutsos, C., Makhija, D., & Kumar, M. (2017). **Zoobp: Belief propagation for heterogeneous networks.** *Proceedings of the VLDB Endowment*, 10(5), 625-636.
3. Shin, K., Lee, E., Eswaran, D., & Procaccia, A. D. (2017, August). **Why you should charge your friends for borrowing your stuff.** In *Proceedings of the 26th International Joint Conference on Artificial Intelligence* (pp. 395-401).
2. Eswaran, D., Günnemann, S., & Faloutsos, C. (2017, June). **The power of certainty: A dirichlet- multinomial model for belief propagation.** In *Proceedings of the 2017 SIAM International Conference on Data Mining* (pp. 144-152). Society for Industrial and Applied Mathematics.
1. Eswaran, D., Bennett, P. N., & Pfeiffer III, J. J. (2015, August). **Modeling Website Topic Cohesion at Scale to Improve Webpage Classification.** In *Proceedings of the 38th International ACM SIGIR Conference on Research and Development in Information Retrieval* (pp. 787-790).

Refereed Workshop Publications

2. Gupta, N., Eswaran, D., Shah, N., Akoglu, L., & Faloutsos, C. **Beyond Anomaly Detection: LookOut for Pictorial Explanation.** In *the 5th Workshop on Outlier Detection De-constructed, co-located with the 24th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining* (no proceedings).
1. Matthew, D., Eswaran, D., Chakraborti, C (2015, May). **Towards Creating Pedagogic Views from Encyclopedic Resources.** In *Proceedings of the 10th Workshop on Innovative Use of NLP for Building Educational Applications, co-located with the 2015 Conference of the North American Chapter of the Association for Computational Linguistics* (pp. 190-195).

Patents

- Eswaran, D., Mishra, N., Faloutsos, C., & Naamad, Y. **Intervention-Aware Early Warning** *U.S. Patent Application No. 16/574,564.* Filed Sep 18, 2019.
- Eswaran, D., Mishra, N., & Guha, S. (2021). **Anomaly Detection in Streaming Graphs** *U.S. Patent No. 11,003,717.* Filed Feb 8, 2018. Granted May 11, 2021.

Graduate-Level Coursework

At Carnegie Mellon University

- *The ABCDE of Statistical Methods in Machine Learning* with Prof. Aaditya Ramdas
- *Information Theory* with Prof. Pulkit Grover
- *Causal Discovery, Statistics, and Machine Learning* with Prof. Peter Spirtes
- *Intermediate Statistics* with Prof. Larry Wasserman
- *Algorithms in the Real World* with Prof. Anupam Gupta and Prof. Guy Blelloch
- *Multimedia Databases and Data Mining* with Prof. Christos Faloutsos
- *Graduate Artificial Intelligence* with Prof. Tuomas Sandholm and Prof. Zico Kolter
- *Spectral Graph Theory* with Prof. Gary Miller
- *Programming Language Semantics* with Prof. Stephen Brookes

At Indian Institute of Technology Madras

- *Data Mining* with Prof. Balaraman Ravindran and Prof. Sayan Ranu
- *Introduction to Machine Learning* with Prof. Balaraman Ravindran
- *Social Network Analysis* with Prof. Balaraman Ravindran
- *Reinforcement Learning* with Prof. Balaraman Ravindran
- *Topics in Design and Analysis of Algorithms* with Prof. Pandu Rangan
- *Geometry and Photometry-based Computer Vision* with Prof. Anurag Mittal
- *Digital Video Processing* with Prof. Anurag Mittal
- *Natural Language Processing* with Prof. Sutanu Chakraborti
- *Memory-based Reasoning in Artificial Intelligence* with Prof. Sutanu Chakraborti
- *Optimization Methods in Signal Processing and Communication* with Prof. Krishna Jagannathan

Activities

Peer Reviewing

- ACM International Conference on Web Search and Data Mining: 2022
- Journal on Data Mining and Knowledge Discovery: 2021
- ACM International World Wide Web Conference: 2020, 2021
- ACM Transactions on Knowledge Discovery from Data: 2020
- ACM Computing Surveys: 2020
- International AAAI Conference on Web and Social Media: 2020
- Journal of Machine Learning Research: 2018, 2019, 2020

Mentoring

- Nan Jiang, Applied scientist intern at Amazon, 2021
- Nitin Chandra Badam, Masters student at Carnegie Mellon University, 2016-17
- Soumya Wadhwa, Masters student at Carnegie Mellon University, 2017-18

Teaching

- Teaching assistant for *Algorithms for Big Data*, by Prof. David Woodruff, in spring 2017
- Teaching assistant for *Practical Data Science*, by Prof. Zico Kolter, in fall 2016

Invited Talks

- MIDAS Consortium, University of Michigan, November 2019
- Chinese Academy of Sciences, November 2019, hosted by Shenghua Liu
- CyLab Partners Conference, September 2017 and September 2019
- Technical University of Munich, September 2017, hosted by Stephan Günnemann

Miscellaneous

- Member of Speakers' Club at Carnegie Mellon University, 2017-20
- Vice-President, Indian Graduate Student Association at Carnegie Mellon University, 2016-17
- Cultural Chair, Indian Graduate Student Association at Carnegie Mellon University, 2015-16
- Member of Avanti Fellows program at Indian Institute of Technology Madras, 2014-15
- Co-ordinator of technical fests (Shaastra, Exebit) at Indian Institute of Technology Madras, 2012-14