Aniket Anand Deshmukh

Contact Information

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Research Interests

Multi-Task Learning, Deep Learning, and Reinforcement Learning

Education

University of Michigan (UMich), Ann Arbor, MI USA *Sep'13 - Dec'18*
MS-Ph.D Candidate, Electrical and Computer Engineering CGPA: 4.14/4.0

- Advisor: Dr. Clayton Scott
- Courses: Machine Learning, Sequential Decision Making (Reinforcement Learning), Image Processing, Methods in Optimization Statistics, Functional Analysis, High Dimensional Probability
- Graduate Student Instructor: EECS 545 Machine Learning (Fall 2016)

Indian Institute of Technology Hyderabad (IIT-H), India *Jul'09 - Jul'13*
Bachelor of Technology with Honors, Electrical Engineering CGPA: 8.63/10.0

- Courses: Mathematics behind Machine Learning, Image & Video Processing, Speech Signal Processing, Adaptive Signal Processing, Information Theory & Coding

Professional Experience

Applied Scientist Intern, Microsoft AI & Research, Sunnyvale, CA, USA *May'18 - Aug'18*
Multi-Modal Learning & Reinforcement Learning

- Proposed and implemented Word2Vec variant of CDSSM algorithm to improve text embedding of a search query from click feedback. Currently, working on scalable implementation of the algorithm to handle millions of queries.
- Developed contextual bandits algorithms to better predict the click probability for Bing Ads platform.

Research Intern, Mitsubishi Electric Research Labs, Cambridge, MA, USA *May'16 - Aug'16*
Semisupervised Learning

- Proposed a distribution free, graph based approach for semisupervised transfer learning.
- Demonstrated that the additional information added in the form of unlabeled data improves prediction by 5.9% on the Parkinsons Telemonitoring dataset and can improve classification by 27.3% in synthetic manifold data as compared to standard transfer learning methods.

Publications

Aniket Anand Deshmukh*, Srinagesh Sharma*, James Cutler, Mark Moldwin, Clayton Scott, "Simple Regret Minimization for Contextual Bandits." Under Review.

Gilles Blanchard, **Aniket Anand Deshmukh**, Urun Dogan, Clayton Scott, "Domain Generalization by Marginal Transfer Learning." Under Review at Journal of Machine Learning Research (JMLR).

Aniket Anand Deshmukh, Urun Dogan, Clayton Scott, "Multi-Task Learning for Contextual Bandits." Neural Information Processing Systems (NIPS) 2017.

Aniket Anand Deshmukh, Ankit Bansal, Akash Rastogi, "Domain2Vec: Deep Domain Generalization." https://arxiv.org/abs/1807.02919

Aniket Anand Deshmukh, Emil Laftchiev, "Semi Supervised Transfer Learning using Marginal Predictors." IEEE Data Science Workshop (DSW) 2018.

Aniket Anand Deshmukh, Srinagesh Sharma, James W Cutler, Clayton Scott, "Multi-class Domain Generalization." Limited Labelled Data: Neural Information Processing Systems (NIPS) Workshop 2017.

Aniket Anand Deshmukh*, Aditya S. T.*, M. Z. Ali Khan, "Input-Output Logic based Fault-Tolerant Design Technique for SRAM-based FPGAs." https://arxiv.org/abs/1311.0602

Posters

Aniket Anand Deshmukh, Srinagesh Sharma, Clayton Scott, James Cutler, Mark Moldwin, "Simple Regret Minimization for Contextual Bandits." The 2^{nd} Midwest ML Symposium, Chicago, 2018 and The Michigan Institute for Data Science (MIDAS) Annual Symposium, 2018. **Most Interesting Methodological Advancement Award.**

Aniket Anand Deshmukh, Feng Wei, Clayton Scott, "Hyperparameter Selection for Multi-Armed Bandit Problems." The 3^{rd} Annual Michigan Institute for Data Science Symposium, 2017.

Aniket Anand Deshmukh, Urun Dogan, Clayton Scott "Multi-Task Learning for Contextual Bandits." The 1^{st} Midwest ML Symposium, Chicago, 2017. **Best Poster Award**.

Research Experience

Domain2Vec: Deep Domain Generalization *Jun'17 - Apr'18*
Akash Rastogi, Ankit Bansal (UMich)

- Designed the neural network architecture to learn domain-specific embeddings.
- Improved the image classification accuracy to 70.82% on VLCS dataset which is 1.6% better than the best state of the art method.

Machine Learning for crop yield prediction and maximization *Jun'15 - Present*
Cheruvu (UMich)

- Worked with an interdisciplinary team to help farmers in India to get soil nutrient recommendations based on soil test
- Analyzing the satellite imagery data of corn crop using CNN to predict the yield

Multi-Task Learning for Contextual Bandits *Nov'15 - May'17*
Dr. Urun Dogan (Microsoft Research), Dr. Clayton Scott (UMich)

- Devised and kernelized "Upper Confidence Bound" algorithm using multi-task learning for a contextual bandit problem.
- Established a corresponding regret bound and interpreted this bound to quantify the advantages of learning in the presence of high task (arm) similarity.

Marginal Predictors for Transfer Learning *Aug'14 - May'16*
Dr. Clayton Scott (UMich)

- Reduced the complexity of distribution-free, kernel-based domain generalization algorithm from $O(n^2)$ to $O(n)$ using kernel approximation technique and proved the upper bound on the approximation error.
- Outperformed the state of the art techniques in the three real-world datasets used.

Other Projects

- Appl. of stochastic proximal gradient algorithm to sum of least squares, UMich *Aug'15 - Dec'15*
- Convex multi-task learning using squared and hinge loss, UMich *Aug'14 - Dec'14*
- Video copy detection by sparse coding, UMich *Jan'14 - Apr'14*
- Video search using fingerprinting system, IIT-H *Jul'12 - Apr'13*
- Audio search equipped with song recognition by humming, IIT-H *Jan'12 - Apr'13*

Skills

Languages Python, Perl, C, Latex, HTML
Tools Azure Cosmos DB, TensorFlow, Keras, Matlab

Honors

- EECS department fellowship, University of Michigan *Sep'14 - Apr'15*
- Best project award in "Image & Video Processing" coursework, IIT-H *Aug'12 - Dec'12*
- JENESYS scholarship (industrial visit to Japan) *May'10*
- Top 1 % in India in the National Standard Examination in Physics *Mar'09*
- All India rank 31 in the Science Olympiad, conducted by SOF *Mar'08*

Leadership

- Co-ordinator, Statistical Machine Learning Reading Group, UMich *Sep'17 - Apr'18*
- Science & Technology Secretary, Student Gymkhana, IIT-H *May'11 - Apr'12*