Aniket Anand Deshmukh

CONTACT INFORMATION

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EDUCATION

University of Michigan (UMich), Ann Arbor, MI USA — CGPA: 4.14/4.0
Ph.D., Electrical and Computer Engineering — *Aug'13 - Jan'19*

- PhD Thesis Projects: Domain Generalization [3], Multitask Learning for Contextual Bandits [8], Simple Regret Minimization for Contextual Bandits [7]
- Graduate Student Instructor: EECS 545 Machine Learning (Fall 2016, Fall 2018)

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

PROFESSIONAL EXPERIENCE

Senior Applied Scientist, Microsoft Ads, Mountain View, CA, USA — *Mar'19 - present*

- Auto-bidding using Reinforcement Learning for Advertisers:
  - Developed a controller based algorithm which automatically decides the bid for advertisers on Microsoft ads platform. It currently handles close to 40000 advertisement campaigns per day.
  - Resource constrained offline reinforcement learning (ORL) for auto-bidding: During deployment, many agents have resource constraints, e.g. compute power, available energy. In this project, we propose a new method for ORL with resource constrained online deployment [4].
- Multi Media Ads (Retrieve images from general purpose corpus for Ad text):
  - The proposed trained image-text multimodal model achieved the gain of 1.5% in click through rate in A/B test and gain of 9.4% over OPEN AI's CLIP model on internal evaluation.
  - Lead all meetings, documentation and request of GPU resources, worked with cross-functional team, multiple managers and software engineers to setup evaluation pipeline and A/B testing.
- Image attribute classification for product shopping:
  - Developed image classification model using curriculum learning for classifying attributes. The model is currently in production on Microsoft Ads shopping platform which brings $2M revenue per day. This work is also published at ECCV 2020 [5].
  - Labelling images for the project was expensive and time consuming. Mentored an intern to develop state-of-the art clustering method which aimed to reduce the labelling efforts of the team and increase efficiency. This work is also published at IJCNN 2021 [2].
- Smart Campaigns (AI powered feature to help small businesses manage their advertising):
  - Developed representation learning approach to calculate keyword-query similarity using click data. The model is currently in production and used by 10K advertisers on the Microsoft Ads platform to search for any relevant keywords that match to their ads and keyword.

Graduate Student Research Assistant, UMich, Ann Arbor, MI, USA — *Aug'13 - Jan'19*

- Contextual Bandits:
  - Modeled the problem of providing personalized recommendations in the multi-task learning for contextual bandits setting and proved the regret bound [8].
  - Modelled a resource constrained, adaptive sensor selection in interplanetary spacecraft using a novel simple regret minimization framework in contextual bandits. Demonstrated improvement in simple regret of more than 25% over algorithms designed to minimize the cumulative regret [7]. This project got the multiple awards especially the best paper award at the ICML 2019 workshop of "Exploration in RL".
- Domain Generalization (Out of Distribution Learning):
  - Reduced the time complexity of 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 [3].

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

- Proposed and implemented Word2Vec variant of CDSSM algorithm to improve text embedding of a search query from click feedback.
- Developed self supervised learning for contextual bandits algorithms. Achieved the cumulative reward gains from 0.5% to 46.11 % over Neural-UCB on standard computer vision datasets [9].

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

- 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 Parkinson's Telemonitoring dataset as compared to transfer learning method.

Skills

Languages	Python, SQL, Latex, HTML
Tools	PyTorch, Keras, TensorFlow, Scikit-learn, Pandas, Matlab, Azure ML, etc

Positions of Responsibility

- Outstanding Reviwer award at NeurIPS 2021 and AISTATS 2022 *Jun'21 - Dec'21*
- Reviewer, NeurIPS, ICML, ICLR, CVPR, AISTATS, JMLR, UAI, AAAI, etc *Jan'18 - current*
- Co-ordinator, Machine Learning Reading Group, Microsoft Ads Signals Team *Mar'19 - current*
- Co-ordinator, Statistical Machine Learning Reading Group, UMich *Sep'17 - Apr'18*
- Mentor, Center for Engineering Diversity & Outreach, UMich *Sep'15 - May'17*
- Science & Technology Secretary, Student Gymkhana, IIT-H *May'11 - Apr'12*

Selected Publications

1. Aniket Anand Deshmukh, Jayanth Reddy Regatti, Eren Manavoglu, and Urun Dogan. Representation learning for clustering via building consensus. *arXiv preprint arXiv:2105.01289. Accepted at Springer Machine Learning Journal*, 2022
2. Jayanth Reddy Regatti, Aniket Anand Deshmukh, Eren Manavoglu, and Urun Dogan. Consensus clustering with unsupervised representation learning. In *2021 International Joint Conference on Neural Networks (IJCNN)*, pages 1–9. IEEE, 2021
3. Gilles Blanchard, Aniket Anand Deshmukh, Urun Dogan, Gyemin Lee, and Clayton Scott. Domain generalization by marginal transfer learning. *Journal of Machine Learning Research*, 22(2):1–55, 2021
4. Jayanth Reddy Regatti, Aniket Anand Deshmukh, Frank Cheng, Young Hun Jung, Abhishek Gupta, and Urun Dogan. Offline rl with resource constrained online deployment. *arXiv preprint arXiv:2110.03165*, 2021
5. Urun Dogan, Aniket Anand Deshmukh, Marcin Machura, and Christian Igel. Label-similarity curriculum learning. In *European Conference on Computer Vision*, pages 174–190. Springer, 2020
6. Udit Maniyar, Aniket Anand Deshmukh, Urun Dogan, and Vineeth N Balasubramanian. Zero shot domain generalization. In *British machine vision conference (BMVC) 2020*, 2020
7. Aniket Anand Deshmukh, Srinagesh Sharma, James W Cutler, Mark Moldwin, and Clayton Scott. Simple regret minimization for contextual bandits. In *Exploration in RL, ICML 2019 workshop arXiv preprint arXiv:1810.07371*, 2018
8. Aniket Anand Deshmukh, Urun Dogan, and Clay Scott. Multi-task learning for contextual bandits. In *Advances in Neural Information Processing Systems*, pages 4848–4856, 2017
9. Aniket Anand Deshmukh, Abhimanu Kumar, Levi Boyles, Denis Charles, Eren Manavoglu, and Urun Dogan. Self-supervised contextual bandits in computer vision. *arXiv preprint arXiv:2003.08485*, 2020