

# Aniket Anand Deshmukh

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## CONTACT INFORMATION

*Google Scholar:* [shorturl.at/cmxJS](https://scholar.google.com/citations?hl=en&user=cmxJS)  
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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

**Applied Scientist, AWS AI Labs, Amazon**, Santa Clara, CA, USA *Jan'23 - Present*

- Tech Lead, Personalizing Retrieval-Augmented Generation (RAG):
  - Currently leading the development of a personalized RAG model for a large-scale AWS service, aimed at improving efficiency and user experience
- Tech Lead, Next Best Action (NBA):
  - Led the Next Best Action (NBA) project, advancing personalization by recommending actions to boost long-term user engagement and loyalty. Developed a propensity model predicting user actions, with NBA adopted by 10+ AWS customers shortly after launch.
  - Conducted interviews with 20+ external AWS customers and 5+ Amazon teams to understand NBA needs, shaping the project's direction. Collaborated closely with product managers and a team of 10+ engineers to design, model, and launch NBA as an AWS service at Re-Invent 2023.
- Chat for Data Prep (AWS Low code No Code):
  - Contributed to the "Chat for Data Prep" feature in AWS Canvas, facilitating user interaction with data via chat for queries, manipulation, and visualization.
  - Designed the automation for query recommendations and created an automated testing engine to assess the Chat with Data pipeline.
- Hiring Lead, Amazon Personalize 2024 Science Internships:
  - Spearheaded the intern selection process, from outreach to finalizing hires. Successfully short-listed over 15 candidates from hundreds of applications, conducted interviews, and coordinated the allocation of selected interns to various project teams.

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

- Multi Media Ads (Retrieve images from general purpose corpus for Ad text):
  - Enhanced Multi Media Ads by developing an image-text multimodal model, achieving a 1.5% increase in click-through rate via A/B testing and outperforming OPEN AI's CLIP model by 9.4% in internal evaluations.
  - Coordinated across functions, leading meetings, documentation, and GPU resource requests, and collaborated with managers and engineers to establish an evaluation pipeline and A/B testing framework.
- Image attribute classification for product shopping:
  - Developed and deployed a curriculum learning-based image classification model for attribute classification on Microsoft Ads shopping platform, generating \$2M daily revenue; work published in ECCV 2020 [5].
  - Labelling images for the project was expensive and time consuming. Mentored an intern on a state-of-the-art clustering method to streamline image labeling, enhancing team efficiency; findings published in IJCNN 2021 [2].
- Smart Campaigns (AI powered feature to help small businesses manage their advertising):

- Developed a representation learning model to assess keyword-query similarity based on click data, now aiding over 10,000 advertisers on the Microsoft Ads platform in identifying relevant keywords for their ads.

**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, AWS, etc

## POSITIONS OF RESPONSIBILITY

- Outstanding Reviewer award at NeurIPS 2021, AISTATS 2022 and NeurIPS 2023 *Jun'21 - current*
- 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 - Jan'23*
- 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