# Aniket Anand Deshmukh

| CONTACT INFORMATION | *Google Scholar:* shorturl.at/cmxJS <br> *Web:* https://aniketde.github.io/ | *Email:* aniketde@umich.edu <br> *Phone:* (734) 277-3529 |
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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 using Large Language Models (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 shortlisted 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 | | |
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| | *Languages* | Python, SQL, Latex, HTML |
| | *Tools* | PyTorch, Keras, TensorFlow, Scikit-learn, Pandas, Matlab, Azure ML, AWS, etc |

POSITIONS OF RESPONSIBILITY
- Outstanding Reviwer 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