Ajinkya Deshpande

Research Fellow, Microsoft Research

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Professional Summary

Pre-doctoral researcher (Research Fellow) at **Microsoft Research Lab India**, interested in **graph learning** and **artificial intelligence**, hoping to enhance my research skills and direction through the MS CS program. Received the **Bachelor of Engineering in Computer Science Degree**, along with a Minor in Physics from **BITS Pilani** in 2021. Most recently, our conference paper on graph unsupervised representation learning under heterophily, for which I was first author, was accepted at **NeurIPS '23**.

Research Papers

[c] **FiGURe: Simple and Efficient Unsupervised Node Representations with Filter Augmentations.**
Ajinkya P. Deshpande*, Chanakya Ekbote*, Arun Iyer, Ramakrishna Bairi and Sundararajan Sellamanickam
Neural Information Processing Systems (NeurIPS) 2023 Link.

[w] **FiGURe: Simple and Efficient Unsupervised Node Representations with Filter Augmentations.**
Ajinkya P. Deshpande*, Chanakya Ekbote*, Arun Iyer, Ramakrishna Bairi and Sundararajan Sellamanickam
Workshop on Mining and Learning with Graphs (MLG) at KDD 2023 Link.

[j] **Capturing Symmetries of Quantum Optimization Algorithms Using Graph Neural Networks**
Ajinkya Deshpande, Alexey Melnikov
Symmetry by MDPI 2023 Link.

c = conference, w = workshop, j = journal

Patents

Method And System For Solving Qubo Problems With Hybrid Classical-Quantum Solvers
Ajinkya Deshpande, Alexey Melnikov
European Patents Office, United States Patent and Trademark Office - Pending

Education

⋆ **Birla Institute of Technology and Science, Pilani** *2017 - 2021*
Bachelor of Engineering in Computer Science and Minor in Physics. CGPA: 8.48 *India*

Experience

⋆ **Microsoft Research India** *Sept 2022 - Present*
Pre-doctoral Researcher (Research Fellow) | Advisors: Dr. Arun Iyer, Dr. Aditya Kanade and Dr. Sundararajan Sellamanickam

- ▷ Working on problems related to: Representation Learning in Graphs, Node Classification and Spectral Methods.
- ▷ Exploring the use of graph machine learning techniques for analyzing code graphs like the Control Flow Graph, Data Flow Graph and Code Property Graph.
- ▷ Developed an efficient PyTorch based MetaLearning library, with computational speed gains over existing libraries.

⋆ **Walmart Global Tech, Bangalore, India** *July 2021 - Aug 2022*
Software Engineer II | Manager: Amrito Kumar Banerjee

- ▷ Identified potential savings totaling around 1M $, and cumulatively saved approximately 600 hours of engineer time by using CI/CD pipelines and Agile principles to develop dashboards (React, Grafana) and backend scripts (Python, PowerShell) to monitor the compute infrastructure.
- ▷ Received a 'Bravo Award' in recognition of my work

⋆ **Terra Quantum AG, St. Gallen, Switzerland** *March 2021 - June 2021*
Research Consultant | Primary Advisor: Dr. Alexey Melnikov

- ▷ Designed and implemented graph neural network-based hybrid quantum-classical algorithms.

- ▷ Submitted patent "Method And System For Solving Qubo Problems With Hybrid Classical-Quantum Solvers" and journal article "Capturing Symmetries of Quantum Optimization Algorithms using Graph Neural Networks."

⋆ **Walmart Global Tech, Bangalore, India** *May 2020 - July 2020*
Software Engineer (Summer Intern) | Manager: Satyanarayana Murthy Viswanatha

- ▷ Created solutions to scale the parallelization of automated Android E2E tests by nearly 100 times using Sauce Labs. Implemented context switching between Android and Web Tests in a Spring Boot E2E testing Java application.

Selected Projects

⋆ **Application of GNNs to Quantum Computing | Undergraduate thesis** *Jan 2021 – May 2021*
Moscow Institute of Physics and Technology (MIPT)

- ▷ Explored the use of Machine Learning for identifying quantum advantage in random walks on graphs.
- ▷ Conducted an extensive review and read over 100 papers of existing literature surrounding graph neural networks and quantum machine learning.

⋆ **PAL | Screentime Intervention Desktop Application** *Dec 2020 – March 2021*
Media Lab, Massachusetts Institute of Technology (MIT Media Lab)

- ▷ Built obstacle detection and path planning stack using Robot Operating System (ROS) in Python
- ▷ Implemented Rapidly Exploring Random Trees (RRT) for path planning in complex indoor environments

⋆ **MESSiah, Goa, India | Co-Founder** *Feb 2019 – March 2020*
BITS Pilani

- ▷ Created a first of its kind campus dining hall food-ordering Android application for students called MESSiah, which received more than 1000 downloads and handled over 50 percent of all dining hall transactions within the first two months post launch.

Leadership Roles and Extracurricular Activities

⋆ **Licensee | TEDx** *Aug 2019 – May 2020*

- ▷ Curated an eclectic set of 11 speakers with diverse ideas to create the 11th edition of university TEDx conference by leading a 30-member team consisting of students in their freshman, sophomore, and junior year.

⋆ **Core Member | The Literary and Debating Club** *Aug 2018 – May 2019*

- ▷ Organized various workshops, literary events and debate tournaments including the flagship debate tournament 'Contention' that saw a participation of nearly 200 people from more than 20 colleges across the country.

Volunteering

⋆ **Intern | Sunshine School for Differently Abled Children** *Jan 2021 – March 2021*

- ▷ Conducted group sessions including games, art and craft and assisted teachers and children in the classroom.

Skills

- ▷ **Programming Languages:** Python, Java, JavaScript, PowerShell
- ▷ **Frameworks:** PyTorch, Pytorch-Geometric, HuggingFace, React, Flutter
- ▷ **Spoken Languages:** English, Hindi, Marathi