

Ameet Deshpande

Princeton University Indian Institute of Technology Madras

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Education

Princeton University

Ph.D. candidate in Natural Language Processing

Advisor: Dr. Karthik Narasimhan

Princeton, USA

2019–present

Princeton University

Masters in Computer Science, GPA – 3.94/4

Princeton, USA

2019–2021

Indian Institute of Technology Madras

Bachelor of Technology, GPA – 9.73/10

Senior Thesis: Leveraging Sentiment Analysis for Reinforcement Learning

Chennai, India

2015–2019

Professional Experience

Allen Institute for Artificial Intelligence (AI2)

Student Research Intern

Seattle, WA (Virtual)

Oct 2022–Mar 2023

- Developed a cognitively inspired system (SPARTAN) for improved inference efficiency of NLP Models
- Improved throughput by over 90% on low-resource computational engines

IBM Research

Research Intern

Yorktown Heights, NY

June 2021–Aug 2021

- Worked with the question-answering team to develop a **continual learning system** using memory networks and adapters
- Adapted the system to **enable continued evolution** by customers without access to specialized hardware
- Defended the patent** for our framework which performs on par with pre-trained models while using only 1% of the parameters

Microsoft India (R&D) Pvt Ltd.

Software Engineering Intern

Hyderabad, India

May 2018–July 2018

- Enabled **faster scale-in** and **scale-out** by **migrating** the core component of Microsoft Azure's Real Time VM Replication service (used for Business Continuity and Disaster Recovery–BCDR) to Azure Service Fabric, a **microservices framework**
- Improved **parallelization** by creating **consistent** and **exclusive** storage structures which facilitated the **migration** of the core
- Reduced CPU usage by 57%** post hosting the service and achieved close to production performance

Wipro Limited

Research Intern

Bengaluru, India

May 2017–July 2017

- Achieved **higher accuracy** by using **hierarchical classification** (HC) instead of flat classification to organize documents
- Induced hierarchies** in a semi-supervised setting by performing **term clustering** based on corpus and **WordNet** similarities
- Authored** a **white paper** highlighting the **technical and business aspects** of Hierarchical Classification

Scholastic Achievements and Awards

- Received the **Princeton Graduate School Teaching Award** for significant contribution to undergraduate **teaching**
- Awarded the **CMC Prize** for securing **Branch Rank 2** among 61 students (B.Tech+Dual Degree) of CSE at IIT Madras
- Won the **Dr Dilip Veeraraghavan Memorial Award** awarded to the second topper in humanities courses at IIT Madras
- Won **silver medal** in the **International Chemistry Olympiad 2015**, Azerbaijan (representing India) contested by 80 countries
- All India Rank - 122** in **JEE (Advanced) 2015**, taken by 1.3 million students (99.99 percentile) and **first** rank in Karnataka
- Received the government's **MCM scholarship** for being in the **top 10** out of 850 students admitted to IIT Madras in 2015

Publications and Preprints

* indicates equal contribution and **boldface** highlights my name. Please click on the title to view the paper.

Conferences, Patents, and Workshops

[1] *REMIND: Iterative Distillation for Domain Adaptation*

A. Deshpande, M. A. Sultan, A. Ferritto, A. Kalyan, K. Narasimhan, and A. Sil

Patent pending (2023).

- [2] [MUX-PLMs: Pre-training Language Models with Data Multiplexing](#)
V. Murahari, **A. Deshpande**, C. E. Jimenez, I. Shafran, M. Wang, Y. Cao, and K. Narasimhan
Patent pending (2023).
- [3] [When is BERT Multilingual? Isolating Crucial Ingredients for Cross-lingual Transfer](#)
A. Deshpande, P. Talukdar, and K. Narasimhan
NAACL (2022).
- [4] [Guiding Attention for Self-Supervised Learning with Transformers](#)
A. Deshpande and K. Narasimhan
Findings of EMNLP (2020).
- [5] [CLEVR Parser: A Graph Parser Library for Geometric Learning on Language Grounded Image Scenes](#)
R. Saqr and **A. Deshpande**
Proceedings of Second Workshop for NLP Open Source Software (NLP-OSS), EMNLP (2020).
- [6] [Leveraging Ontological Knowledge for Neural Language Models](#)
A. Deshpande and M. Jegadeesan
Proceedings of the ACM India Joint International Conference on Data Science and Management of Data (2019).
- [7] [FigureNet: A deep learning model for question-answering on scientific plots](#)
R. Reddy, R. Ramesh, **A. Deshpande**, and M. M. Khapra
2019 International Joint Conference on Neural Networks (IJCNN) (2019).

Notable Preprints

- [1] [SemSup-XC: Semantic Supervision for Zero and Few-shot Extreme Classification](#)
P. Aggarwal, **A. Deshpande**, and K. Narasimhan
arXiv preprint arXiv:2301.11309 (2023).
- [2] [SPARTAN: Sparse Hierarchical Memory for Parameter-Efficient Transformers](#)
A. Deshpande, M. A. Sultan, A. Ferritto, A. Kalyan, K. Narasimhan, and A. Sil
arXiv preprint arXiv:2211.16634 (2022).
- [3] [Semantic Supervision: Enabling Generalization over Output Spaces](#)
A. Deshpande*, A. W. Hanjie*, and K. Narasimhan
arXiv preprint arXiv:2202.13100 (2022).
- [4] [ALIGN-MLM: Word Embedding Alignment is Crucial for Multilingual Pre-training](#)
H. Tang, **A. Deshpande**, and K. Narasimhan
arXiv preprint arXiv:2211.08547 (2022).
- [5] [Sentiment Analysis for Reinforcement Learning](#)
A. Deshpande and E. Fleisig
arXiv preprint arXiv:2010.02316 (2020).
- [6] [Evaluating a Generative Adversarial Framework for Information Retrieval](#)
A. Deshpande and M. M. Khapra
arXiv preprint arXiv:2010.00722 (2020).
- [7] [Improvements on hindsight learning](#)
A. Deshpande, S. Sarma, A. Jha, and B. Ravindran
arXiv preprint arXiv:1809.06719 (2018).

Social and Professional Service

Diversity in AI	<ul style="list-style-type: none"> ▪ Princeton AI4ALL, 2020: Research instructor for Princeton AI4ALL, an initiative intended to increase diversity and inclusion in the field of artificial intelligence. Developed material, taught classes, and mentored a group of six students on a natural language processing project on detecting fake news ▪ Deep Learning Master Class, 2019: Conducted classes for an audience of 90 undergraduates and post-graduates from different departments, covering the basics of machine learning and deep learning [Slides]
NLP for Social Good	<ul style="list-style-type: none"> ▪ Founder member of Princeton NLP4SocialGood, an initiative to provide natural language processing advice to individuals, start-ups, and non-profit organizations championing social impact projects
Teaching	<ul style="list-style-type: none"> ▪ COS324: Introduction to Machine Learning (Prof. Sanjeev Arora), Fall 2020 ▪ COS484: Natural Language Processing (Prof. Danqi Chen and Prof. Karthik Narasimhan), Spring 2020

Reviewing/PC

- TMLR (2023), NeurIPS (2022), NAACL (2022), ICML (2022), ARR (2022), EMNLP (2021), AAAI (2020), Computer Speech & Language

Talks and Posters

- Guiding Attention for Self-Supervised Learning with Transformers
- CLEVR Parser: Geometric Learning on Language Grounded Scenes

IBM Research, Yorktown, 2020

NLP-OSS, EMNLP 2020

Extra-curricular activities

- ## Sports

- Part of Inter-College IIT Madras Soccer 'B' team for two consecutive years; Dorm soccer **captain** ('17-'18)
- Won 3 **silvers** in cycling, 2 **silvers** in Road-Race (7.8 km), and a **bronze** in football (Inter-Hostel Sports)

Sci-tech

- Finished **second out of 500 teams** in Mimamsa 2017, an **All India Science Quiz** held by IISER Pune
- Part of the hostel team which finished **1st** in Inter Hostel Technical Meet (**TechSoc**) 2017 and **3rd** in 2016

Relevant Courses

- Reinforcement Learning
- Deep Learning
- Natural Language Processing

- Topics in Reinforcement Learning
- Principles of Machine Learning
- Theoretical Machine Learning

- Computational Models of Cognition
- Computational Neuroscience
- Philosophy of Mind