

Pranav Deshpande

RESEARCH LEAD (VICE PRESIDENT)

☎ (+1) 929-324-2523 | ✉ definitelyPranav@gmail.com | 📄 pranav-deshpande

Summary

I am a research scientist & software developer. My interests include AI/Deep Learning, software development, & finance. I have 10+ patents at the USPTO and have published multiple research papers at leading industry/academic conferences and journals (NeurIPS, ACM CHI, IEEE ISMAR, Quantum Journal). I have a dual research & engineering skill set with the primary focus on applying deep learning to financial use cases.

I bridge the gap between cutting-edge research and real-world product impact, ensuring that research delivers practical value beyond theory and drives business success. I am the software lead for the **Advanced Algorithms Team** under **Applied Research** at JPMorganChase, where I manage the delivery process of ensuring that State-of-the-Art Research has an impact on the front office.

Work Experience

JPMorganChase

New York, NY, United States

APPLIED RESEARCH LEAD, VP

February 2024 - Present

- **Software and Delivery Lead** for the **Advanced Algorithms Team** under **Global Technology Applied Research** at JPMorgan Chase. - AI/Deep Learning and classical algorithmic ML, combinatorial optimization and other computational problems.
- Responsible for designing and running experiments in classical ML & Deep Learning/AI for clustering, sampling, language modeling, fine-tuning, ML explainability etc., designed for modern multi-node GPU architectures (in Python)
- I act as the functional lead for the experimentation part of all the above projects; assigning work to multiple folks and also stepping in to code when required.
- Use-cases impacted:
 - News analytics for quantitative research - deriving alpha from alternative data sources.
 - Solvers for Combinatorial optimization, mixed-binary optimization and integer optimization to solve various formulations of portfolio optimization problems.
 - Accelerating analysis of call center conversations by using LLM-based embeddings and hierarchical topic modeling through clustering techniques.
 - Custom algorithm to fine-tune ultra-massive multimodal models on proprietary data for multiple downstream use-cases.
- Released all developed methods as software libraries for generic internal usage at the firm - across areas such as investment banking, quantitative finance and internal software applications.

APPLIED RESEARCH LEAD, VP

February 2023 - January 2024

- Team - **Global Technology Applied Research** at JPMorgan Chase as a cloud computing & AI/deep learning researcher.
- I am conducting research (patents/publications) and building tools to automate code writing and develop software. My research involves fine-tuning smaller language models for relevant downstream tasks (code generation, document analysis) - Python, PyTorch, HuggingFace Transformers/PEFT.
- Applied Deep Learning techniques to Mixed Reality for designing adaptive content placement algorithms and leveraging Vision Language Models to power Digital Assistants and Avatars for customer facing (consumer) banking applications.

RESEARCH ASSOCIATE

February 2022 - January 2023

- My main focus was on Cloud Computing and Networking. I designed a query optimization algorithm specific to retrieve data from cross-location sharded databases.
- My research on query optimization resulted in 2 patents. The technology stack mainly involved Java for the application, Apache Calcite (a data management framework) for building the database query engine and tools such as Docker and Kubernetes.

JP Morgan Chase & Co.

Bangalore, India

ASSOCIATE SOFTWARE ENGINEER

February 2020 - January 2022

- Developed a cryptocurrency for B2B payments (JPMCoin/Onyx) - JPMorgan's flagship cryptocurrency.
- Tech stack: Backend services in Java+Spring & Python, frontend UI in React; and blockchain tech in Solidity.
- Worked on building a secure infrastructure for digital tokens and currencies using advanced cryptography techniques - FHE (Fully homomorphic encryption), MPC (Multi-party computation) and PPML (privacy preserving machine learning).

ANALYST SOFTWARE ENGINEER

July 2018 - January 2020

- Developed microservices for a payment application with high throughput (millions of transactions per minute) and low latency.
- Technology stack: Java + Spring Framework, Cassandra (DB), Gemfire (Cache/In-memory DB), Kafka (stream processing).

Free Software Foundation

Remote Work

SOFTWARE DEVELOPER

May 2017 - July 2017

- Contributed to GNU Chess - search parallelization,
- The technology stack was C++

Indian Institute of Technology Bombay

Mumbai, India

SOFTWARE ENGINEERING INTERN

May 2016 - July 2016

- Developed a toolbox for Scilab to **solve optimization problems** relevant to Operations Research.
- Tech stack: C++, MATLAB, Scilab

Education

New York University

MASTER OF SCIENCE IN COMPUTER SCIENCE, GPA: 3.6/4

New York, NY, United States

Graduated Dec 2023

Visvesvaraya National Institute of Technology

B.TECH. IN ELECTRICAL & ELECTRONICS ENGINEERING, GPA: 8.08/10

Nagpur, India

Graduated May 2018

Publications

- Javier Lopez-Piqueres, **Pranav Deshpande**, Archan Ray, Mattia J. Villani, Marco Pistoia, and Niraj Kumar. 2025. MetaTT: A Global Tensor-Train Adapter for Parameter-Efficient Fine-Tuning. *arXiv preprint arXiv:2506.09105*. <https://arxiv.org/abs/2506.09105>
- Tyler Chen, Akshay Seshadri, Mattia J. Villani, Pradeep Niroula, Shouvanik Chakrabarti, Archan Ray, **Pranav Deshpande**, Romina Yalovetzky, Marco Pistoia, and Niraj Kumar. 2025. A Unified Framework for Provably Efficient Algorithms to Estimate Shapley Values. *arXiv preprint arXiv:2506.05216*. <https://arxiv.org/abs/2506.05216>
- Tyler Chen, Archan Ray, Akshay Seshadri, Dylan Herman, Bao Bach, **Pranav Deshpande**, Abhishek Som, Niraj Kumar, and Marco Pistoia. 2025. Provably Faster Randomized and Quantum Algorithms for k-Means Clustering via Uniform Sampling. *arXiv preprint arXiv:2504.20982*. <https://arxiv.org/abs/2504.20982>
- Feiyu Lu, Mengyu Chen, Hsiang Hsu, **Pranav Deshpande**, Cheng Yao Wang, and Blair MacIntyre. 2024. Adaptive Content Placement in Mixed Reality Through Empirical User Behavioral Patterns. In *Adjunct Proceedings of the 2024 IEEE International Symposium on Mixed and Augmented Reality (ISMAR-Adjunct '24)*. IEEE, 199–204. <https://doi.org/10.1109/ISMAR-Adjunct64951.2024.00049>
- Joseph Ligman, **Pranav Deshpande**, and Elvir Azanli. 2024. Data Management For Immersive Spaces. In *Adjunct Proceedings of the 2024 IEEE International Symposium on Mixed and Augmented Reality (ISMAR-Adjunct '24)*. IEEE, 29–31. <https://doi.org/10.1109/ISMAR-Adjunct64951.2024.00016>
- Cindy Xu, Mengyu Chen, **Pranav Deshpande**, Elvir Azanli, Runqing Yang, and Joseph Ligman. 2024. Enabling Data-Driven and Empathetic Interactions: A Context-Aware 3D Virtual Agent in Mixed Reality for Enhanced Financial Customer Experience. In *Adjunct Proceedings of the 2024 IEEE International Symposium on Mixed and Augmented Reality (ISMAR-Adjunct '24)*. IEEE, 186–192. <https://doi.org/10.1109/ISMAR-Adjunct64951.2024.00047>
- Feiyu Lu, Mengyu Chen, Hsiang Hsu, **Pranav Deshpande**, Cheng Yao Wang, and Blair MacIntyre. 2024. Adaptive 3D UI Placement in Mixed Reality Using Deep Reinforcement Learning. In Extended Abstracts of the 2024 CHI Conference on Human Factors in Computing Systems (CHI EA '24). Association for Computing Machinery, New York, NY, USA, Article 32, 1–7. <https://doi.org/10.1145/3613905.3651059>

Granted Patents

- Tummala, Narayana R., Marco Pistoia, Joseph W. Ligman, Elvir Azanli, and **Pranav Deshpande**. “System and methods for processing data queries in hybrid data mesh architectures.” U.S. Patent 12,393,590, issued August 19, 2025.
- Khaykovich, Helene, Shravan Kumar Parunandula, **Pranav Deshpande**, and Jacob Mendel. “System and method for fact verification using blockchain and machine learning technologies.” U.S. Patent 12,081,684, issued September 3, 2024.
- Tummala, Narayana R., Marco Pistoia, **Pranav Deshpande**, Elvir Azanli, Joseph W. Ligman, and Frank Schaffa. “Systems and methods for optimized cloud database query execution.” U.S. Patent 11,899,660, issued February 13, 2024.
- Davis, Jerry, Shravan Kumar Parunandula, **Pranav Vishwas Deshpande**, Krishna Kumar Ramadas, Uche Ojukwu, and V. A. N. Frank. “Systems and methods for secure user logins with facial recognition and blockchain.” U.S. Patent 11,244,146, issued February 8, 2022.

Published Patents

- Manoj Samuel Anand, Elvir Azanli, Omari Hitson, Joseph W Ligman, **Pranav Deshpande**. “Systems and methods for structured communication optimization.” U.S. Patent Application US18/806,857 (US20260051320A1), published Feb 19, 2026.
- Pranav Deshpande**, Mengyu Chen, Elvir Azanli, Monica Lander, Kristine W Ma, Joseph W Ligman, Marco Pistoia. “Systems and methods for providing intelligent embodied interactive agents with spatial understanding.” U.S. Patent Application 18/778,292 (US20260024286A1), published Jan 22, 2026.
- Ligman, Joseph, Elvir Azanli, **Pranav Deshpande**, and Marco Pistoia. “Systems and methods for immersive data management in spatial computing.” U.S. Patent Application 18/616,376 (US20250310316A1), published Oct 2, 2025.
- Ligman, Joseph, Elvir Azanli, **Pranav Deshpande**, and Marco Pistoia. “Systems and methods for generating carbon efficient code.” U.S. Patent Application 18/585,879 (US20250272067A1), published Aug 28, 2025.
- Lu, Feiyu, Mengyu Chen, Hsiang Hsu, **Pranav Deshpande**, Cheng Yao Wang, and Blair MacIntyre. “Systems and methods for placement of virtual content objects in an extended reality environment based on reinforcement learning.” U.S. Patent Application 18/407,003, published Jul 8, 2025.

Projects

Chess Engine

University Project (2016)

- A chess engine for learning algorithms related to classical Game Artificial Intelligence - alpha beta pruning, negamax, quiescence search and iterative deepening. I used modern C++ to build this game and plugged in a standard UI called xboard.

Awards

Feb 2025 **Prolific Inventor**, Corporate Award, JPMorganChase

New York, NY

Skills

Programming Python, Java + Spring Framework, C/C++ & STL, bash scripting, software systems design, Javascript + React

Data Analysis Tabular analysis and predictive modeling, numpy, pandas, Machine Learning, scikit-learn

Deep Learning

PyTorch, HuggingFace Transformers, language and multi-modal model fine-tuning, PEFT methods, Computer vision (ViTs/CNNs), NLP

Cloud & DevOps

Docker, Kubernetes

Tools & IDEs

Git, LaTeX, SQL, IntelliJ Rider/Idea/PyCharm, Basic Excel programming, VSCode