Mitul Tiwari

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About Me

I have a Ph.D. in Computer Science from UT Austin and over 17 years of work experience leading AI initiatives, I bring a unique combination of academic rigor and practical expertise in developing cutting-edge AI solutions. Most recently, as Director of AI and Machine Learning Engineering at ServiceNow, I led the development of language models and AI agents (TapeAgents), including work on LLM-based Retrieval Augmented Generation (RAG) and innovative Text2Workflow solutions using Code LLM.

My track record demonstrates the exceptional achievement research and development, with 23+ publications in top conferences and significant contributions to large-scale AI systems. At LinkedIn, I led the development of People You May Know, scaling it to analyze billions of edges for social connection prediction, while at Passage AI (acquired by ServiceNow), I built a conversational agent platform from the ground up. My recent completion of courses in Reinforcement Learning, Deep Generative Models, and LLM Engineering shows my commitment to staying at the forefront of AI advancement.

Education

- **Ph.D. in Computer Science** University of Texas at Austin, 2007
- **M.S. in Computer Science** University of Texas at Austin, 2003
- **B.Tech. in Computer Science** Indian Institute of Technology, Bombay, 2001

Skills & Abilities

Technical Expertise
Deep technical and working expertise in Conversational AI, Language Modeling, Generative Models, Natural Language Processing, Deep Learning, Recommender Systems, Data Science, Machine Learning, Information Retrieval, Search, Social Network Analysis, and Network Algorithms. Strong foundation in linear algebra, probability, statistics, and calculus, particularly applied to machine learning algorithms and system optimization.

Research & Innovation
Co-authored 23+ publications in top conferences such as AAAI, ACL, KDD, WWW, VLDB, SIGIR, and SPAA. Extensive self-study in AI fundamentals, including recent completion of courses like Deep Generative Models (Stanford). These courses have equipped me with the theoretical and practical knowledge required to excel in the residency program.

Leadership & Management
Built, managed, and led high functional, talented, and diverse teams. Involved in strategic planning and defining multi-year roadmaps. Hired and mentored both senior ICs and managers.

Work Experience

Head of Natural Language AI / Director of Engineering 02/2020 – 03/2024
ServiceNow *Santa Clara, CA*
Led development of natural language processing driven production features including Conversational AI for Virtual Agents, Incident Auto Resolution, Question-Answering for Search (RAG), and Text2Code for Workflows. We built next generation of Natural Language Processing technologies using some of the latest Language Models and Deep Learning techniques and scaling to thousands of large enterprise customers to improve work experience of 70M+ enterprise users.

Key Achievements:

- **Conversational AI for Virtual Agents:**
  - Re-platformed PassageAI technologies and integrated with ServiceNow stack
  - Created new enterprise language models (ServiceNow Language Models)
  - Introduced Thoughts or Dialog Acts abstractions for flexible, natural VA conversations
  - Built TapeAgents: truly conversational experience using large language models for tasks
  - Enabled 50X growth in customers using conversational AI
- **Question-Answering for Search:**
  - Re-platformed PassageAI technologies to introduced Machine Reading Comprehension based Question-Answering in Search pipeline
  - Introduced Dense Passage Retrieval for semantic search
  - Developed LLM-based Retrieval Augmented Generation (RAG) for answering questions
- **Text2Workflow:**
  - Created natural language to workflow conversion using Code LLM
  - Pioneered GenAI feature for next-best-action recommendations in flow designer
- **Incident Auto Resolution (IAR):**
  - Created deep learning classification pipeline for incident intent identification
  - Automated workflows in Virtual Agents based on identified intents
- **Thought Leadership:**
  - Published papers in top conferences (ACL, IAAAI, EMNLP) and filed multiple patents
  - Delivered talks at Baylearn, Data Council, and other venues

CTO and Co-founder 06/2016 – 01/2020
Passage AI *Mountain View, CA*
Built a conversational agents creation platform for customer and employee services using the latest Deep Learning and Natural Language Processing technologies. Led the NLP and Deep Learning efforts at Passage AI. Built a world-class Machine Learning and Deep Learning team.

Passage AI's natural language understanding and processing platform can be used to create an intelligent conversational virtual agents for any enterprise. These virtual agents can then be deployed with minimal effort on a website, mobile app, voice platforms or on messaging platforms. Passage AI got acquired by ServiceNow in February 2020.

Head of People You May Know and Growth Relevance / Manager 02/2011 – 09/2015
LinkedIn *Mountain View, CA*

Built data-driven products for network growth, membership, and relationships. Worked at the intersection of products, machine learning, and big data solutions.

Key Achievements:

- **People You May Know (PYMK):**
  - Built large-scale recommender system analyzing billions of edges to predict social connections
  - Increased connections from PYMK by 15X through feature development and model improvements
- **Growth Initiatives:**
  - *Guests You May Know (GYMK):* Developed new growth product from scratch, significantly increasing membership through extended PYMK capabilities
  - *Landing Page Optimization (Heathrow):* Optimized post-connection invitation pages, driving substantial increases in connections and new member acquisition
  - *Feed Relevance:* Pioneered one of the first relevance-based algorithms using PYMK-generated connection strength
- **Search Innovation:**
  - Developed search query recommender system significantly increasing related search clicks
  - Published and presented technical research paper on the implementation
- **Thought Leadership:**
  - Co-authored 8 papers on recommender systems, link prediction, and social network analysis
  - Presented at major conferences: KDD, WWW, RecSys, CIKM, SIGIR, QCon
  - Published posts on LinkedIn's main blog and engineering blog (4 total)
  - Led successful hackday projects: won 2 competitions, with 3 projects incorporated into products
- **Mentorship & Community:**
  - Mentored 3 interns directly and co-mentored 6 additional interns
  - Organized technical reading group and hosted multiple talks at LinkedIn
  - Conducted external talks at Web and Analytics Summit, Big Data meetup, UT Austin, and USF

Lead Member of Technical Staff 10/2007 – 01/2011
Kosmix *Mountain View, CA*

I worked on building the next generation information retrieval platform. I worked on query, tweets and document classification/categorization, text analysis, query parsing, query expansion, information extraction, and search relevance. I also worked on building high performance, scalable systems for data fetching, data storage, and distributed processing.

Technical Skills

- **Recent Courses:** Reinforcement Learning (Stanford, 2024), Deep Generative Models (Stanford, 2024), LLM Engineering (AI Makerspace, 2024), AI Engineering Bootcamp (AI Makerspace, 2024)
- **Programming Languages:** Python, Java, C, C++, Perl, R, Shell scripting, SQL
- **Technologies & Frameworks:** PyTorch, Hadoop MapReduce, Kafka

Selected Publications

1. TapeAgents: a Holistic Framework for Agent Development and Optimization. With Dzmitry Bahdanau, Nicolas Gontier, Gabriel Huang, Ehsan Kamalloo, Rafael Pardinas, Alex Piché, Jordan Prince Tremblay, Karam Ghanem, Soham Parikh, and Quaizar Vohra. Technical report, October 2024.
2. Exploring Zero and Few-shot Techniques for Intent Classification. With Soham Parikh, Prashil Tumbade, and Quaizar Vohra. In Proceedings of ACL (Industry track), July 2023.
3. Improving Dialogue Act Recognition with Augmented Data. With Khyati Mahajan, Soham Parikh, Quaizar Vohra, and Samira Shaikh. In Proceedings of EMNLP Gem Workshop, December 2022.
4. Automated Utterance Generation. With Soham Parikh and Quaizar Vohra. In Proceedings of AAAI/IAAI, Februrary 2020.
5. Dynamics of Large Multi-View Social Networks: Synergy, Cannibalization and Cross-View Interplay. With Yu Shi, Myunghwan Kim, Shaunak Chatterjee, Souvik Ghosh, Romer Rosales. In Proceedings of the 22nd ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), August 2016.
6. Influence of First Steps in a Community on Ego-Network: Growth, Diversity, and Engagement, with Atef Chaudhury and Myunghwan Kim. In Proceedings of the 25th International Conference Companion on World Wide Web (WWW), April 2016.
7. Global Diffusion via Cascading Invitations: Structure, Growth, and Homophily, with Ashton Anderson, Jure Leskovec, Jon Kleinberg, and Daniel Huttenlocker. In Proceedings of the 24th International World Wide Web Conference (WWW), May 2015.
8. The Browsemaps: Collaborative Filtering at LinkedIn, Lili Wu, Sam Shah, Sean Choi, Mitul Tiwari, Christian Posse. In Proceedings of the 6th ACM RecSys Workshop on Recommender Systems and the Social Web, October 2014.
9. Modeling Impression Discounting in Large-scale Recommender Systems , Pei Li, Laks V.S. Lakshmanan, Mitul Tiwari, Sam Shah. In Proceedings of the 20th ACM Conference on Knowledge Discovery and Data Mining (KDD), August 2014.
10. Structural Diversity in Social Recommender Systems, Xinyi Huang, Mitul Tiwari and Sam Shah. In Proceedings of the 5th ACM RecSys Workshop on Recommender Systems and the Social Web, October 2013.
11. Entity Extraction, Linking, Classification, and Tagging for Social Media: A Wikipedia-Based Approach. With Digvijay S. Lamba, Nikesh Garera, Xiaoyong Chai, Sanjib Das, Sri Subramaniam, Anand Rajaraman, Venky Harinarayan, AnHai Doan. In Proceedings of the 39th International Conference on Very Large Data Bases (VLDB), August 2013.

12. Social Media Analytics: The Kosmix Story. With Xiaoyong Chai, Omkar Deshpande, Nikesh Garera, Wang Lam, Digvijay S. Lamba, Lu Liu, Michel Tourn, Zoheb Vacheri, STS Prasad, Sri Subramaniam, Venky Harinarayan, Anand Rajaraman, Adel Ardalan, Sanjib Das, Paul Suganthan G.C., AnHai Doan. In IEEE Data Engingeering Bullettin, 36 (3), 4-12.
13. Organizational Overlap on Social Networks and its Applications. With Cho-Jui Hsieh, Deepak Agarwal, Xinyi (Lisa) Huang, and Sam Shah. In Proceedings of the 22nd International World Wide Web Conference (WWW), May 2013.
14. Metaphor: a system for related search recommendations. With Azarias Reda, Yubin Park, Christian Posse, and Sam Shah. In *Proceedings of the 21st International Conference on Information and Knowledge Management*, October 2012.
15. Social Networking in Developing Regions. With Azarias Reda, Sam Shah, Anita Lillie, and Brian Noble. In *Proceedings of the International conference on Information and Communication Technologies and Development*, March 2012.
16. Online compression caching. With C. Greg Plaxton, Yu Sun, and Harrick Vin. *Lecture Notes in Computer Science*, 5124 Springer, 2008, ISBN 978-3-540-69900-2.
17. Online aggregation over trees. With C. Greg Plaxton, and Praveen Yalagandula. In *Proceedings of the 21st IEEE International Parallel and Distributed Processing Symposium*, March 2007.
18. Reconfigurable resource scheduling with variable delay bounds. With C. Greg Plaxton, Yu Sun, and Harrick Vin. In *Proceedings of the 21st IEEE International Parallel and Distributed Processing Symposium*, March 2007.
19. Online hierarchical cooperative caching. With Xiaozhou Li, C. Greg Plaxton, and Arun Venkataramani. In *Theory of Computing Systems*, 39:851-874, 2006.
20. Reconfigurable resource scheduling. With C. Greg Plaxton, Yu Sun, and Harrick Vin. In *Proceedings of the 18th Annual ACM Symposium on Parallelism in Algorithms and Architecture*, July 2006.
21. Online hierarchical cooperative caching. With Xiaozhou Li, C. Greg Plaxton, and Arun Venkataramani. In *Proceedings of the 16th Annual ACM Symposium on Parallelism in Algorithms and Architectures*, June 2004.
22. Memex: A browsing assistant for collaborative archiving and mining of surf trails. With Soumen Chakrabarti, Sandeep Srivastava, and Mallela Subramanyam. In *Proceedings of the 26th International Conference on Very Large Data Bases*, September 2000.
23. Using Memex to archive and mine community Web browsing experience. With Soumen Chakrabarti, Sandeep Srivastava, and Mallela Subramanyam. In *Proceedings of the 9th International World Wide Web Conference*, May 2000.

Awards and Honors

- ServiceNow Unified Technology Group Team award for Question-Answering, 2023.
- ServiceNow Advanced Technology Group Team award for Text2Workflow, 2023.
- Forbes Technology Council, 2018-2020.
- Received Kosmonauts and Kosmix Kreed awards for innovative and team work towards building next generation information retrieval platform (at Kosmix - now WalmartLabs), 2009.
- Received MCD fellowship, University of Texas at Austin, 2001–2005.

- Placed 49th amonth 100,000 students (top 0.05%) of all examinees of IIT–JEE 1997.
- Placed in the top 25 students selected for the gold medal of Indian Physics Olympiad 1997.

Professional Activities

Program Committee member for SIGIR 2025, WSDM 2025, SIGIR 2024, WSDM 2024, SIGIR 2023, The Web 2023, WSDM 2023, SIGIR 2022, The Web 2022, WSDM 2022, The Web 2021, WSDM 2021, RecSys 2021, The Web 2020, WWW 2019, RecSys 2018, WWW Research Track 2018, WWW Demo Track 2018, WWW Research Track 2017, WWW Demo Track 2016, RecSys 2015, WWW Demo Track 2015, RecSys 2014, RecSys 2013, SIGIR Industrial track 2013. Co-chair for the 8th Workshop on Social Network Mining and Analysis (held with KDD), SNAKDD 2014.

Work Eligibility: US Citizen