Deepak Gopinath

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Education

Carnegie Mellon University — Pittsburgh, PA
M.S., Language Technologies Institute, School of Computer Science — Aug 2015 – Dec 2016

Birla Institute of Technology and Science, Pilani — Pilani, India
B.S. in Computer Science — 2010 – 2014

Work Experience

Apple Inc — New York City, NY
Machine Learning Researcher, Foundation Models — March 2023 – current

- Large Language Model (LLM) research as part of the core model training team for Foundation Models (FM) that power Apple Intelligence and FM Developer API [blog][technical report]
- Leading efforts on pre-training, post-training and evaluation of language models, with a focus on web scale data, pretraining recipes and multilinguality. Heading multiple work streams that collectively engage 25+ contributors
- Skills: Python, Jax, Apache Beam on Dataflow, AXLearn/Ajax LLM training frameworks

Meta AI (Facebook AI Research) — Menlo Park, CA; Pittsburgh, PA
Research Engineer, AI for Creativity — July 2019 – March 2023

- Lead Engineer for AI for Creativity supporting exploratory research in animating human characters with sequence models and reinforcement learning (RL). Developed and open-sourced the fairmotion and ScaDiver libraries to enable human motion research [11]
- Initiated and led cross-functional projects to apply research to production. Established collaborations with Habitat for Embodied AI research, Horizon Worlds VR product, Sanzaru game studio, FAIR Paris/Menlo Park, and The Movement Lab at Stanford University
- Published research at ACM SIGGRAPH [6] [9] [10], NeurIPS [8], and SIGGRAPH Asia [7] (under review)
- Tech lead for multiple projects involving 20+ engineers in total at Meta AI. Mentored 9 Research and SWE interns, supported 20+ new team members and mentored 5 junior engineers in technical mentorship programs
- Skills: Python, PyTorch, TorchServe; RLLib for distributed RL training; PyBullet and Isaac Gym physics simulators; OpenGL, Blender, Unity for character/scene building, animation and rendering.

Research Engineer, Language and Translation Technologies — Jan 2017 – July 2019

- Co-developed and shipped the first neural machine translation (NMT) system to power translations for all user content on Facebook and Instagram (7B+ translations per day) [blog][press]
- Tech lead for a team that modeled and deployed the first multilingual NMT systems to production [blog] [press]
- Planned and managed "engineering excellence" projects that involved architecting optimized workflows for data processing, model training, evaluation and packaging, transitioning models to PyTorch, addressing reproducibility, determinism and safety in translations.
- Skills: Python, PyTorch; ONNX, C++ for production code; Hive, Spark for data processing

Software Engineering Intern, Language Technology — May 2016 – Aug 2016

- Developed neural network language models on the (newly) open sourced deep learning framework Caffe2.0

LinkedIn — Bangalore, India
Software Engineer, Content Search — July 2014 – Aug 2015

- Developed the prefix query tagger library to predict autocompletions and tags for an incomplete query
- Co-implemented and deployed federated search and auto-complete search for several verticals on linkedin.com

- Actively involved in recruitment and onboarding of university grad hires and co-mentored 3 SWE interns
- Skills: Java, Lucene, Pig, Flex, Play Framework with JQuery and Bootstrap, JavaScript

Microsoft Research Bangalore, India
Research Developer Intern, Applied Sciences Jan 2014 – July 2014

- Fraud detection in Azure services and sentiment analysis of Azure users in social media
- Launched the Indian Elections Game web app, an interactive prediction market for the public to make predictions on the 2014 Indian Elections [blog]

Amazon Bangalore, India
Machine Learning Intern May 2013 – July 2013

- Adult content detection for Amazon Android AppStore, leading to a 30% load reduction for human reviewers
- Developed a system to cluster Amazon seller FAQs using Latent Dirichlet Allocation (LDA) and map customer queries to the clusters with logistic regression, SVMs, and supervised LDA

Awards and Honors

- Project Acyut: A team of 5 undergraduate students that built India's first indigenously developed autonomous humanoid robot. I designed and implemented all aspects of the computer vision and robot behavior modules [press coverage]
  - 3rd Prize at RoboCup 2011 in Autonomous Humanoid Team Soccer
  - 2 silver medals at RoboGames 2011, the (then) world's biggest open robotics event
- Placed 4th in ACM ICPC, Asia Regionals, Kharagpur site in December 2013
- Placed 2nd in Amazon Machine Learning HackEnd 2013 Kindle summary relevance challenge
- Winner of LinkedIn Bangalore HackDay 2015 for developing realtime viewer statistics aggregating system using NodeJS

Publications

[1] "Interleaved Reasoning for Large Language Models via Reinforcement Learning" [pdf]
R. Xie, D. Qiu, **D. Gopinath**, D. Lin, Y. Sun, C. Wang, S. Potdar, B. Dhingra
Neurips (under submission), 2025.

[2] "Apple Intelligence Foundation Language Models" [pdf]
T Gunter, Z Wang, C Wang, R Pang, ..., **D. Gopinath**, Apple Inc.
arXiv preprint arXiv:2407.21075, 2024.

[3] "Simulation and Retargeting of Complex Multi-Character Interactions" [pdf]
Y Zhang, **D. Gopinath**, Y Ye, J Hodgins, G Turk, J Won
ACM Special Interest Group on Computer Graphics (SIGGRAPH), 2023.

[4] "CIRCLE: Capture In Rich Contextual Environments" [pdf]
JP Araújo, J Li, K Vetrivel, R Agarwal, J Wu, **D. Gopinath**, AW Clegg, K Liu
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2023.

[5] "Motion In-betweening for Physically Simulated Characters" [pdf]
D. Gopinath, J. Won, and H. Joo
ACM Special Interest Group on Computer Graphics Asia (SIGGRAPH Asia), 2022.

[6] "Physics-based Character Controllers using Conditional VAEs" [webpage][pdf]
J. Won, **D. Gopinath**, and J. Hodgins
ACM Special Interest Group on Computer Graphics (SIGGRAPH), 2022.

[7] "Transformer Inertial Poser: Attention-based Real-time Human Motion Reconstruction from Sparse IMUs" [pdf]
Y. Jiang, Y. Ye, **D. Gopinath**, J. Won, A.W. Winkler, and C.K. Liu
ACM Special Interest Group on Computer Graphics Asia (SIGGRAPH Asia), 2022.

[8] "Leveraging Demonstrations with Latent Space Priors"
J. Gehring, **D. Gopinath**, J. Won, G. Synnaeve, A. Krause, and N. Usunier
Conference on Neural Information Processing Systems (NeurIPS) (under review), 2022.

[9] "Control Strategies for Physically Simulated Characters Performing Two-player Competitive Sports". [webpage][pdf]
J. Won, **D. Gopinath**, and J. Hodgins
ACM Special Interest Group on Computer Graphics (SIGGRAPH), 2021.

[10] "A Scalable Approach to Control Diverse Behaviors for Physically Simulated Characters" [webpage][pdf]
J. Won, **D. Gopinath**, and J. Hodgins
ACM Special Interest Group on Computer Graphics (SIGGRAPH), 2020.

[11] "fairmotion - Tools to load, process and visualize motion capture data" [code]
D. Gopinath and J. Won
GitHub, facebookresearch/fairmotion, 2020.

[12] "Harnessing Indirect Training Data for End-to-End Automatic Speech Translation: Tricks of the Trade" [pdf]
J. Pino, L. Puzon, J. Gu, X. Ma, A. D. McCarthy, and **D. Gopinath**
International Conference on Spoken Language Translation (IWSLT), 2019.

[13] "Deep Multimodal Fusion for Persuasiveness Prediction" [pdf]
B. Nojavanasghari*, **D. Gopinath***, J. Koushik*, T. Baltrušaitis, and L. P. Morency
ACM International Conference on Multimodal Interaction (ICMI), 2016.

Graduate Courses

10701 Machine Learning	10807 Topics in Deep Learning	10705 Intermediate Statistics
11777 Advanced Multimodal ML	11642 Search Engines	11641 ML for Text Mining
10605 ML for Large Datasets	11611 NLP	11513 Intro to Comp Systems