Siddharth Choudhary

itzsid.github.io

Google Scholar: 1,223 citations, h-index: 14

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EDUCATION

Georgia Institute of Technology — Atlanta, GA
Ph.D. in Computer Science; GPA: 3.84 — *Aug. 2012 – Aug 2017*

IIIT Hyderabad — Hyderabad, India
Master of Science in Computer Science; GPA: 4.0 (10.0/10.0) — *Aug. 2010 – July. 2012*

IIIT Hyderabad — Hyderabad, India
Bachelor of Technology (Honors) in Computer Science; GPA: 3.31 (8.28/10.0) — *Aug. 2006 – July. 2010*

EXPERIENCE

Amazon AGI — San Francisco Bay Area, CA
Principal Applied Scientist — *April 2025-Present*

- **Amazon Nova 2.0 Lite**: Multimodal tech-lead responsible for finalizing the pretraining data mix and recipe for Nova 2.0 Lite model integrating vision, speech and language understanding capabilities at scale. Launched at AWS re:Invent 2025. Achieves state-of-the-art performance on 13 out of 15 benchmarks as compared to Claude Haiku 4.5.
- **Amazon Nova 2.0 Omni**: Led development of unified multimodal architecture and recipe integrating native image generation with text, vision, and speech understanding. Designed pre-training recipe that enable generative capabilities while preserving performance across all input modalities. Launched at AWS re:Invent 2025.

Senior Applied Scientist — *January 2024-April 2025*

- **Amazon Nova 1.0 Foundation Models**: Tech-lead on multimodal pre-training team responsible for developing image/video pretraining recipes for Amazon Nova foundation models launched at AWS re:Invent 2024. Achieved state-of-the-art performance on benchmarks against industry leaders Claude 3 Haiku and Gemini 1.5 Pro on multimodal understanding benchmarks.

Amazon Web Services (AWS AI Labs) — San Francisco Bay Area, CA
Senior Applied Scientist — *May 2023-January 2024*

- **Large vision language model**: Developed state-of-the-art multimodal model combining 1.8B ViT with a 100B parameter language model, outperforming SOTA open source models across 12 benchmarks. Designed 3-stage pretraining recipe within 1.5-month timeline.
- **Multimodal Hallucination Control**: Developed M3ID sampling method reducing VLM hallucinations by up to 28% without additional training. Published at CVPR 2024 and featured in AWS keynote at CVPR. Mentored intern on visual information grounding techniques.

Amazon Lab126 — Sunnyvale, CA
Senior Applied Scientist — *August 2020-May 2023*

- **Halo Body**: Developed MeasureNet CNN model for body measurements and waist-hip ratio prediction from smartphone images, achieving twice the accuracy of state-of-the-art models. Uniquely trained using only synthetic data, eliminating privacy concerns. Published in Nature Digital Medicine (2023) and filed multiple patents.
- **Halo Trainer**: Built transformer-based models for fitness activity understanding, including on-device real-time repetition counting and form error detection. Won Best Paper Award at Amazon Computer Vision Conference 2023.

Magic Leap — Sunnyvale, CA
Principal Computer Vision Researcher/Engineer — *October 2017-September 2020*

- **3D Object Recognition in AR Cloud**: Lead architect and developer for multiuser, scalable 3D object recognition system deployed in Magic Leap One (ML-19). Built complete pipeline from scratch with low memory footprint scaling to large numbers of concurrent users. Published at CVPR 2020 AR/VR Workshop and filed patents.
- **Learned Keyframe Selection for SLAM**: Designed PointNet-based neural network for frame embedding to improve localization recall by 10-30% while reducing memory requirements by 75% compared to Bag of Words algorithm.

- - **Scalable Infrastructure for SLAM Research**: Built scalable infrastructure to extract data from SLAM pipeline stages with ground-truth, enabling training and evaluation of machine learning algorithms for SLAM research.
- **Institute for Robotics and Intelligent Machines, Georgia Tech** — Atlanta, GA
  Graduate Research Assistant — *August 2012-August 2017*
  - - **Distributed Object-based SLAM**: Developed distributed algorithms using Distributed Gauss-Seidel methods for multi-robot trajectory estimation with minimal information exchange. Extended framework to include object-level semantics for distributed object-based SLAM. Published extensively in IJRR, ICRA, IROS with more than 500 citations.
  - - **Memory-efficient SLAM**: Proposed exactly sparse SLAM approach using multi-block Alternating Direction Method of Multipliers (ADMM) to enforce consistency among subgraphs.
- **Center for Visual Information Technology, IIIT Hyderabad** — Hyderabad, India
  Research Assistant — *August 2010-August 2012*
  - - **Bundle Adjustment on GPU**: Developed hybrid CPU-GPU implementations of sparse bundle adjustment achieving 30-40x speedup over standard CPU implementations on datasets with up to 500 images using NVIDIA Tesla C2050 GPU. Published in ECCV 2010 workshop on computer vision on GPUs.
  - - **Visibility Probability Structure from SfM Datasets**: Developed visibility probability structures encoding visibility information between points and cameras as conditional probabilities for improved image localization. Published at ECCV 2012 with 86+ citations.

PUBLICATIONS

Multimodal LLMs
- The Amazon Nova Family of Models: Technical Report and Model Card (**AWS re:Invent 2024 (38 citations)**)
- Multi-modal hallucination control by visual information grounding (**CVPR 2024 (157 citations)**)
- RAVEN: Multitask Retrieval Augmented Vision-Language Learning (**arXiv 2024 (7 citations)**)

Computer Vision & AR
- SplatArmor: Articulated Gaussian splatting for animatable humans from monocular RGB videos (**arXiv 2023 (45 citations)**)
- Development and Validation of an Accurate Smartphone Application for Measuring Waist-to-Hip Circumference Ratio (**Nature Digital Medicine 2023 (6 citations)**)
- Mesh Strikes Back: Fast and Efficient Human Reconstruction from RGB videos (**arXiv 2023**)
- Multi-task Transformer for Real-Time Fitness Activity Understanding from Videos (**Amazon Computer Vision Conference 2023 (Best Paper Award)**)
- Multiuser, Scalable 3D Object Detection in the AR Cloud (**CVPR 2020 workshop on AR/VR (4 citations)**)
- Practical time bundle adjustment for 3d reconstruction on the gpu (**ECCV 2010 Workshop (51 citations)**)
- Visibility Probability Structure from SfM Datasets and Applications (**ECCV 2012 (86 citations)**)
- CPU and/or GPU: Revisiting the GPU vs. CPU myth (**arXiv 2013 (16 citations)**)

Robotics & SLAM
- Data-efficient decentralized visual SLAM (**ICRA 2018 (279 citations)**)
- Distributed Mapping with Privacy and Communication Constraints: Lightweight Algorithms and Object-based Models (**IJRR 2017 (160 citations)**)
- SLAM with Object Discovery, Modeling and Mapping (**IROS 2014 (66 citations)**)
- Information-based Reduced Landmark SLAM (**ICRA 2015 (64 citations)**)
- Distributed Trajectory Estimation with Privacy and Communication Constraints: a Two-Stage Distributed Gauss-Seidel Approach (**ICRA 2016 (57 citations)**)
- Multi Robot Object-based SLAM (**ISER 2016 (47 citations)**)
- Exactly Sparse Memory Efficient SLAM using the Multi-Block Alternating Direction Method of Multipliers (**IROS 2015 (32 citations)**)

PATENTS

- Body dimensions from two-dimensional body images (**US Patent 11,861,860 (2024) (6 citations)**)
- Cross Reality System (**US Patent 11,227,435 (2022) (83 citations)**)
- Scalable three-dimensional object recognition in a cross reality system (**US Patent 11,257,300 (2022) (4 citations)**)
- Scene understanding using occupancy grids (**US Patent 12,444,136 (2022)**)

Academic Duties

- Conference reviewer for CVPR, ICCV, ECCV, 3DV since 2020.

- Conference reviewer for ICRA, IROS since 2014

- Journal reviewer for IEEE Transactions of Robotics.

- Journal reviewer for IEEE Robotics and Automations letters.

- Journal reviewer for International Journal for Robotics Research.

- Program Committee member of Robotics Science and Systems conference in 2016.

- Member of the Organizing committee for the tutorial on Perception at Magic Leap at the 2019 Conference on Computer Vision and Pattern Recognition.

Programming Skills

- **Languages**: Python, CUDA, Shell, JavaScript, C++

- **ML/AI Frameworks**: PyTorch, Megatron-LM, Transformers, DeepSpeed, Numpy, SciPy

- **Cloud/Infrastructure**: AWS SDK, Docker, Kubernetes