Niraj Kamal Karunanidhi

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Education

Georgia Institute of Technology **Aug 2024 – May 2026 (Expected)**
MS in Computer Science (GPA - 4.0/4.0) *Atlanta, USA*
- NLP, GPU HW/SW, Vision Language Models, Computer Vision, CUDA, Machine Learning. LLM Inference.

Indian Institute of Technology (IIT) Roorkee **2016 – 2021**
Bachelor of Architecture (GPA - 8.07/10.0) *Roorkee, India*
- Data structures and Algorithms, Computational Graphics and Rendering. ***Gold Medalist*** - Inter-IIT Tech.

Experience

IBM Research **May 2025 – Aug 2025**
*AI Research Intern (**PyTorch, Foundational Models Stack**)* *North Carolina*
- Enhanced PyTorch: Authored 6 pull requests, reviewed 8 PRs (700+ lines each), and won 2nd price in Docathon
- Developed 5+ PyTorch certification lessons (250+ lines each) with quizzes and notebooks, for PyTorch Foundation.
- Contributed to **IBM - FMS** enhancements for new methods of attention - i.e, paged attention, flex attention.

Mercedes-Benz Research and Development **Dec 2022 – Jul 2024**
*Software Development Engineer - Autonomous Driving (**Bronze-Star Awardee**)* *Bangalore, India*
- Developed simulations for verification and validation of ADAS features using stochastic methods, trajectory prediction, adversarial models and RL using Python.
- **LLM Model Development:** Led proprietary in-house Large Language Model development for code generation, executing ***parallel distributed training*** on base models using PyTorch and modified Torchtune training across 8 Nvidia A100 GPUs. Reduced Simulation design, and scenario scripting time from *3 days to 2.5 hours*.
- Developed a funneled dataset creation framework on python to convert internal codebase in DSL with 50k+ scripts into chain-of-thought dataset for LLM traning. Built hyper-parameter optimizer based on available GPU memory.

Shape Computation Lab, Georgia Tech **Aug 2024 - Dec 2024**
Graduate Research Assistant *Atlanta, GA*
- Implemented Shape detection in Python and Rhino for pattern matching, and stochastic map generation.

Snaptrude **May 2022 - Oct 2022**
Product Manager/ Data Scientist *Bangalore, India*
- Lead and Owned ***Building Energy Prediction feature***, related R&D, and Data Analytics from production to feature release. Built building type detection based on model parameters, increasing prediction accuracy by 40%.

UniAcco **Jul 2021 - May 2022**
Product / Product Analyst *Mumbai, India*
- ***Lead UX research, design direction and product development*** of 3 products - UniAcco, UniCreds and UniScholars. Scaled to ***1 Million MAU from 1000 MAU*** (Monthly Active Users) in 10 months.

Awards and Honors

- 3-times **IIT Roorkee Heritage Awardee** 2018-20 (Outstanding academic & extra-curricular excellence)
- **Gold Medalist**, Inter IIT Tech Meet 2018. (Computer Vision). Competed with top 21 teams from other IITs.
- **DAAD Research Scholar** - DAAD STIBET-III Scholarship 2020-21, for research on programmable materials.
- **Bronze star Award** - for innovative and pioneering spirit - Mercedes-Benz Research and Development India.
- **United Nations (UN) - Green Solutions Award** at COP26 Glasgow, (among other awards) - for Humanscapes.
- **Keynote Speaker** - delivered workshops and lectures on Autonomous Driving and Simulation generation.

Publications

- (***Journal - Robotics***) **Karunanidhi, N.K.**, Sobczyk, M., Wiesenhütter, S. et al. (2023). Programmable multi-layered auxetic mechanisms. Journal of Materials Science - Springer 58, 13253–13268.
- (***Conference - Computational Optimization***) Ayer, S., Prasad, R., **Karunanidhi, N.K.** (2022). Humanscapes Habitat - Integrated design for sustainable living Design for adaptive comfort for reduced operational energy consumption. PLEA 2022, Santiago.

Technical Skills

Languages: Python, C++, CUDA, Nvidia HSDL, OpenScenario 2.0, HTML/CSS, JavaScript, SQL.
Technologies: Pytorch, Linux, NVIDIA Drivesim/ Omniverse, Git, AWS - HPC Cloud Computing, Simulations.
Robotics: Computer Vision, RL, RCNN, Perception and Decision-making algorithms, Software in Loop (SIL).