Yash Mehan

Areas of interest: 3D Vision, Scene Understanding, Autonomus Driving, GPU Infrastructure for ML

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Academic Qualifications

Year	Degree/Certificate	Institute	GPA/%
2020 - Present	B.Tech + MS by Research CSE	International Institute of Information Technology Hyderabad	8.53/10
2020	CBSE (XII) High School	Delhi Public School, Dwarka	94.8%

Professional Experience

- **Carnegie Mellon University**: Research Assistant (*Aug 2024- Ongoing*)
  - Working on Cross View Multi Object Tracking.
- **IBM Research**: Hybrid Cloud Infrastructure Intern (*May 2024 - Jul 2024*)
  - Developing GPU time and NCCL network profilers, methods to predict time and resource consumption for sharded and parallel LLM finetuning.
- **Robotics Research Center (RRC), IIIT Hyderabad**: Undergraduate Researcher (*Aug 2022 - Ongoing*)
  - Leading my group under **Prof. Madhava Krishna**, on **3D scene understanding** and topology aided robotic navigation, outperformed SoTA by **20%**. Oral at IROS 2024 and CVPR-W 2024 OpenSUN3D arXiv
  - Led work on **Visual Localization and Feature Matching for SLAM**: Visual Place Recognition for diverse viewpoint differences for identifying loop closure edges and rotation robust feature matching, with **University of Adelaide**. arXiv
- **Indian Institute of Science**: Machine Learning Researcher (Deep Generative Models) Intern (*May 2022- Aug 2022*)
  - Worked under **Prof. Prathosh AP** on deep generative modelling and Generative Domain adaptation on medical imaging using GANs and Energy Based Models.
- **Centre for Development of Telematics**: Hardware Engineering Intern (*Nov 2021- Dec 2021*)
  - Developed and successfully tested a low-level **12x** faster algorithm to facilitate autodiscovery of ports; and unsupervised Lambda Provisioning in fronthaul DWDM optical networks. Patent Pending.

Publications

- **Mehan Y*.**, ..., Krishna M., **QueSTMaps: Queryable Semantic Topological Maps for 3D Scene Understanding**, Open Vocabulary Scene Understanding workshop CVPR 2024 and IEEE/RSJ IROS 2024 **Oral presentation** arXiv project-page
- Sharma A*., **Mehan Y*.**, Dasu P., Garg S., Krishna M., **Hierarchical Unsupervised Topological SLAM**, IEEE Intelligent Transportation Systems Conference (ITSC) 2023. arXiv project-page

Select Projects

- **Points2Splat** Pytorch, GNNs, 3D Vision, Gaussian Splatting
  - Leveraging Graph Neural Networks to create Gaussian splats of 3D Objects from point clouds in a single inference step
  - Developed a method to learn color and structure separately for color space interpolation.
  - Our GNN based method outperform SoTA PSNR by **22.9%**
- **Analysis of Representations of 3D Objects for Robotic Grasping** Pytorch, NeRF, 3D Vision, Robotics
  - Implementing and evaluating different 3D representations (NeRFs, point cloud, depthmaps, etc) for different tasks (Registration, Grasping, Collision Avoidance etc.)
  - Analysing Grasp Quality prediction on various representations
- **Implementing BLAS** Systems, Performance, C++, OpenMP, Intel avx512
  - Implementing high performance **B**asic **L**inear **A**lgebra **S**ubprograms, benchmarking and roofline analysis
  - Profiling and Optimizing Vector-vector dot product, Matrix-Vector multiplication, and Matrix-Matrix Multiplication
- **xv6 enriched** Kernel C, Low level, Operating Systems
  - Enriched MIT xv6-riscv kernel by adding new tracing syscalls, and gathering metadata of running processes
  - Implemented FCFS, PBS, MLFQ Task scheduling algorithms

Awards and Achievements

- Finalist, Conrad Spirit of Innovation Challenge 2018, pitched at **Kennedy Space Center**, Cape Canaveral, USA. Received **NASA Goddard Technology Award**.
- Worldwide Ranked 1054, 1104 in Google Kickstart Round B and E.
- **ACM ICPC** 2021 Gwalior-Pune Regionalist.
- **Dean's Merit List** Awardee for Monsoon '22 and Spring '21, **Dean's Research List** Awardee for 2023 and 2024.
- **All India Rank 1400** in JEE Advanced 2020 (**Top 0.9%** nationwide), **All India Rank 2545** in JEE Main 2020 (**Top 0.2%**)

Skills and Relevant Coursework

- C/C++, Python, Pytorch, Lightning, Geometric, FSDP, DeepSpeed, Git, Docker, SLURM, NVIDIA Nsight, ROS, AWS
- **CS** Data Structures and Algorithms, Operating Systems, Computer Systems Organisation, High Performance Computing
- **Math** Real Analysis, Discrete Algebra, Linear Algebra, Probability Statistics, Automata Theory, Algorithm Design, Optimization
- **AI, Machine Learning & Robotics** Data Analytics, Statistical Methods in AI, Computer Vision, Mobile Robotics, Multi-view Geometry, Photogrammetry, Graph Neural Networks