

ANUSHTUP NANDY

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EDUCATION

Columbia University

MS in Mechanical Engineering specializing in Robotics

New York City, NY, USA

BITS Pilani

BE in Mechanical Engineering with minor in Robotics

Hyderabad, TG, IN

TECHNICAL SKILLS

Programming: Python, C, C++, MATLAB/Simulink, JavaScript, HTML/CSS, Bash Script, NodeJS, React, Julia

Instruments: Raspberry Pi, Jetson Nano, NI DAQ (9237), PTC High-Speed Camera, Intel RealSense D435i Depth Cam, Meta Quest 2

Technologies: Linux, ROS 2, GitHub, LabVIEW, SolidWorks, CMake, Docker, Electro-Mechanical assembly, LangChain, Langgraph

PROFESSIONAL EXPERIENCE

Armatrix

Control Systems Engineer

Bengaluru, KA, IN

Jan 2026 - Present

- Designed hierarchical 3-layer control stack running at 20 Hz, cutting tracking error by 96% and MPC solve time by 82%
- Ensured recursive feasibility using convex decomposition & geometric refinement for safe navigation w/ sub-5 cm clearance
- Lead a team of 5, architecting end-to-end software systems and developing deterministic 24-DOF SE(3) path planning with real-time collision checking using Sobol-sampled D-PRM*
- Architected a zero-copy POSIX shared-memory transport layer w/ lock-free seqlock reads for C++ RT loops and semaphore-blocked Python bridge, scaled with compile-time schema validation to eliminate silent memory corruption

Neocis Inc.

Robotics Intern

Miami, FL, USA

May 2025 - August 2025

- Developed analytical dynamic model of YOMI, 7DOF robot arm, using RNEA, CRBA & System ID techniques
- Incorporated dynamic model to perform Computed Torque control running on RTOS, enabling advanced complaint control
- Collaborated w/ engineering teams to adapt and deploy the model on hardware helping reducing cost of YOMI by 20%
- Designing critical CAD models for PCB fixtures, integrating encoders into the arm's control system.

Carnegie Mellon University

Research Scholar

Pittsburgh, PA, USA

Mar 2023 - Dec 2023

- Formulated and implemented a novel Heuristic-Search algorithm in C++ for resource constrained shortest path finding
- Improved efficiency by over 2-8x by employing heuristic search, dominance & partial path pruning
- Devised ROS 2 framework to implement 2 motion planning algorithms in autonomous systems, proving ours as 2x faster

PROJECTS AND RESEARCH

Probabilistic Modeling of 3-DOF Postural Control using MoGP

NYC, NY, USA

Columbia University | Supervisor: Dr. Sunil Agrawal

Oct 2024 - Dec 2025

- Developed a PD-based haptic teleoperation control system for pWRAPS rehabilitation robot, facilitating remote SCI therapy
- Modelled 3DOF mechanical impedance in seated posture w/ System ID & Gaussian processes to investigate postural control
- Conducted extensive experiments w/ ADDVERB haptic device, integrating AR & VR feedback for remote therapy solution

Transformer-based Model Predictive Control of 7-DOF Robot

NYC, USA

Columbia University | Supervisor: Dr. Hoomayun Beigi

Sept 2024 - Dec 2025

- Designed transformer MPC controller achieving 97.5% MSE reduction & 84% RMSE improvement over baseline tracking
- Trained attention model on 20K PyBullet samples with cosine LR scheduling; deployed in CasADi for real time planning
- Implemented multi-head self-attention with 10-timestep - temporal context modeling for coupled joint dynamics prediction
- Deployed controller in simulation with 0.05s control rate, and <1.03 rad tracking error across 18-second test trajectories

RSCPP with Refuelling (PF-RF)

Pittsburgh, PA, USA

CMU| Undergraduate Thesis | Supervisor: Prof. Howie Choset & Dr. Richard Ren

Mar 2023 - Dec 2023

- Wrote algorithm employing A*-like search to minimize cost in shortest path problem with fuel and stop constraints
- Achieved 2 times faster performance over Dynamic Programming baseline leveraging dominance & partial path pruning
- Implemented algorithm design in C++ & tested on cities with 400+ gas stations, utilized CMake to automate build & testing
- Deployed & exp validated combinatorial search (MS* & DMS*) on ROSBot 2R using ROS & Python.
- Published findings as first author[1] and co-author[3] in two separate IEEE Robotics and Automation Letters (RA-L) papers.

PUBLICATIONS

[1] S. Zhao, A. Nandy, H. Choset, S. Rathinam and Z. Ren, "Heuristic Search for Path Finding With Refuelling," in *IEEE Robotics and Automation Letters*, vol. 10, no. 4, pp. 3230-3237, April 2025, doi: 10.1109/LRA.2025.3540736

[2] Anushtup Nandy, Subash Seshathri, and Abhishek Sarkar. "Maze Solving Using Deep Q-Network". In: *Advances In Robotics - 6th International Conference of The Robotics Society. AIR 2023. Ropar, India: Association for Computing Machinery, 2023. ISBN: 9781450399807. DO I: 10.1145/3610419.3610458. U RL: https://doi.org/10.1145/3610419.3610458*

[3] Zhongqiang Ren, Anushtup Nandy, Sivakumar Rathinam, and Howie Choset. "DMS*: Towards Minimizing Makespan for Multi-Agent Combinatorial Path Finding". In: *IEEE Robotics and Automation Letters* 9.9 (2024), pp. 7987-7994. D OI: 10.1109/LRA.2024.3436333