Prasanna Paithankar

Third Year Undergraduate
Department of Computer Science and Engineering, Indian Institute of Technology Kharagpur
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Education

Indian Institute of Technology Kharagpur November 2021 - April 2026
Integrated(BTech+MTech) Computer Science and Engineering *CGPA: 9.22*

Alpha Junior College of Science and Commerce, Mumbai June 2019 - April 2021

Lakshadham High School, Mumbai June 2013 - April 2019
School 1st Rank Holder *ICSE: 97.67%*

Research Experience

Fiber Optics, Nano and Quantum Photonics Group (FONQP) July 2022 - Present
Advanced Photonics Laboratory, Indian Institute of Technology Kharagpur *Advisor: Dr. Shailendra K. Varshney*

- Constructed PINN's for inverse designing of metamaterials and ring resonator graphs with 400 times speedup over conventional adjoint optimization and achieving over 92% accuracy with insights into novel geometries
- Hardware realization and statistical analysis of quantum (entangled pair correlation), stochastic (femtosecond and other random lasers) and optoelectronic chaotic random number generators (further details in publications)
- Studies on quantum communication and security (PQC) protocols using low to mid-depth photonic circuits
- NU-TMM analytical studies aided with FTDT simulations of hBN and graphene-integrated Microring Resonators

Autonomous Ground Vehicles Research Group (AGV) June 2022 - Present
Indian Institute of Technology Kharagpur

- Reinforcement learning based Decision Diffuser and Game Theoretic Planner for F1 Tenth competition.
- Adaptive Extended Kalman Filter for SoC Determination, implementation of MPC, LQR controller implementation, and local and global path planning on ROS2 based navigation stack for in-house autonomous vehicles.

Publications

[1] Femtosecond Laser based Post-Processing Free True Random Number Generator October 2023
*Amritash Sharma†, **Prasanna Paithankar**†, Shailendra K. Varshney*
FiO LS 2023, Washington, USA *-Poster presentation*

[2] Microring Resonators and its Applications June 2023
*Sauradeep Kar, Sridhar Singhal, **Prasanna Paithankar**, Shailendra K. Varshney*
Indian Journal of Pure and Applied Physics (IJPAP) 61(7), 601-621 *-Invited Review Article*

[3] Tunable Graphene-Integrated Cascaded Silicon Microring Resonators November 2022
***Prasanna Paithankar**, Sridhar Singhal, Sauradeep Kar, Shailendra K. Varshney*
COPaQ 2022, Indian Institute of Technology Roorkee *-Poster presentation*

Awards & Competitions

Inter IIT Tech Meet 11.0 - ISRO Moon Mapping - Gold February 2023
Indian Institute of Technology Kanpur

Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship 2020 & 2021
Indian Institute of Sciences, Bengaluru

Technical Skills

Languages: C/C++, Python, Java, JavaScript
Frameworks: UWP, Robot Operating System (ROS2), MuJoCo, Angr, Burp Suite, Gazebo, COMSOL Multiphysics
Libraries: PyTorch, JAX, TensorFlow, OpenCV, CUDA, Selenium, AVR C, Qiskit, system call libraries (UNIX)

Relevant Academic Coursework

Statistical Learning Theory, Info. & Sys. Security, Photonic Quantum Information Technologies, Algorithms-II, Formal Language & Automata Theory, Computer Networks, DBMS, Stochastic Processes, Operating Systems

Projects

32-bit RISC Processor November 2023

Computer Organization & Architecture Laboratory

- Designed and synthesized 32-bit MIPS like ISA with 4GB of memory. Deployed on Arty A7-100T FPGA Board.

not your casual PPT Gesture Control July 2023

Technology Robotix Society

- Used Agile development philosophy to guide juniors to accomplish the stack and deploy for our on-stage events
- Backend processing executed using MediaPipe hosted by UWP framework making the project robust. Hardware stack implemented on stage with processing and networking optimization to minimize latency

GST Scraper July 2023

Bhushan & Associates *to be published on Microsoft Store*

- Created a Universal Windows Platform (UWP) application which calls Selenium (bypassing the sandbox) to scrape and organize essential data needed by Chartered Accountants and Tax Professionals in India

Agent Daily Collection Portal May 2023

Bhushan & Associates *live at: mahasahakar.in*

- Hosted the service on in-house server (Apache HTTP) with utmost security considerations (HSTS, salting, cookies)
- Deployed commercially by the firm and used by 10s of agents and 100s of customers on daily basis

Video Rental and Recommendation System April 2023

Software Engineering Laboratory Project

- Used tf-idf to measure similarities between movie descriptions, genre and other metadata of over 40,000 titles to recommend movies based on previous rentals
- Flask and SQLite backend along with NLP implemented using NLTK

Lunar T-GAN for Super-Resolution and Atlas Stitching February 2023

Inter IIT Tech Meet 11.0

- A novel GAN-based architecture (Lunar T-GAN) with turing test based adversaries for ensuring accurate reconstruction of craters and hills.
- Achieved a competitive SSIM of 0.794 while increasing image spatial resolution from 5m - 30 cm per pixel (16x)
- Pipeline capable of tiling and super-resolving an image using HAT, RealESRGAN and sharpening algorithms.
- Developed a Lunar Atlas by correcting coordinates & stitching together individual image patches (about 2TB of total image data) from the Chadrayaan-2 TMC payload.

RubixBot – Rubik's Cube solver September 2022

Technology Robotix Society

AEKF for SoC Determination July 2022

Autonomous Ground Vehicle Research Group

Other: Numerous scrapers, crawlers, automation and system administration scripts. Handful elementary websites. Various demonstration robots for Technology Robotix Society events. Coursework including SMTP/POP3 Stack in C, URL-Shortener, Shell in C, projects revolving around PostgreSQL/JDBC, etc.

Handouts

[1] Markovian Decision Process in Bipedal Locomotion

[2] Analysis of Physical Qubit Systems

Other Institute Involvements

Technology Robotix Society January 2022 - Present

Indian Institute of Technology Kharagpur

- Involvement in conducting of Kshitij 2023, Winter School of AI and Robotics ('22, '23) and Makerspace ('22, '23)
- Algorithms team lead of cube solving bot (RubixBot) and made various robots and computer vision applications

IEEE Student Branch IIT Kharagpur December 2021 - Present