

EDUCATION

Indian Institute of Technology Kharagpur

Dual Degree 5Y - Chemical Engineering; GPA: 8/10

Minor 4Y - Computer Science & Engineering

Kharagpur, India

July 2019 - March 2024

INTERNSHIPS

NGI Summer of Nix

Packaging open source projects for Nix, a package manager

Jul 2023 - Oct 2023

- Packaged 2 projects, **KiKit** and **mCaptcha**, and added the package, modules, services, and their respective dependencies to **ngipkgs**
- Developed a **flake-based** mono-repo that aims to expose a repository for open-source projects funded by **New Generation Internet**
- Worked in a mob programming format, teaming up with 4 fellow programmers from all around the world to work on improving Nix

Google Summer of Code - Matrix

VoIP support and features to the open source Matrix client, Nheko

Jun 2022 - Sep 2022

- Improved **webRTC** & **gstreamer** based Voice-over-IP to ensure compatibility with specification changes to the **Matrix** protocol
- Implemented **trickle ICE** support and developed a pipeline to improve **signalling** to accelerate the process of establishing a session
- Added improved functionality to allow seamless call transfers, group voice and video calls, muting and noise cancellation and self calls
- Restructured the C++ based client API library called **mtxclient** to allow easier and more universal portability to other Matrix clients

Google Summer of Code - OpenCV

Cross-platform implementation and documentation of OpenCV optimization libraries

Jun 2021 - Aug 2021

- Implemented a **2D convolution** in the spatial domain for multi-channel matrices and optimised it to exploit maximum CPU capacity
- **Vectorized** algorithms to improve runtime by 100% over the **SSE** instruction set using **AVX** (256 bits) compatible SIMD Intrinsics
- Authored three tutorials explaining the use of the **parallel_for_** utility and introduced **Universal Intrinsics** for parallel computation
- Documented the Universal Intrinsic module and its internal intrinsic functions to allow a better user experience and more flexibility

RESEARCH PROJECTS

Bayesian Neural Networks and Model Uncertainties

Solving approximate inference in real-world intractable specifications

Dr. Adway Mitra

Sep 2022 - Nov 2022

- Implemented 5 state-of-the-art bayesian neural networks and compared classification and regression results against a baseline (MAP)
- The classification task was performed against the MNIST Digit Dataset and test set errors were calculated for model evaluation.
- A toy homoscedastic regression task was used and the models were trained against artificial data generated by GP using RBF Kernels

Deep Reinforcement Learning in Vision Modelling

'Supervised' Reinforcement Learning techniques for improved visual understanding

Dr. Adway Mitra

May 2022 - Nov 2022

POSITIONS OF RESPONSIBILITY

Event Captain — Drona Aviation — InterIIT Technology Meet 11.0

Deploying a vision and control system in proprietary drone firmware, Pluto

Feb 2022 - April 2022

- Lead all logistical and budget-related undertakings, mentored second years, and synergised with seniors to produce excellent results
- Conducted upwards of 250 interviews, to shortlist and select 15 team members, 10 forming the core, and 5 supporting members
- Coordinated alongside the design and dev teams to facilitate effective communication between the event members and the contingent

HONORS AND AWARDS

Gold | InterIIT Technology Meet 11.0

Deploying a vision and control system in proprietary drone firmware, Pluto

Feb 2022 - April 2022

- Awarded Gold for the high-prep InterIIT Tech event **Drona Aviation UAV Vision and Controls**, among a pool of 21 IITs
- Developed an RGB based vision module, using the Realsense D435i, which localised the drone with respect to multiple ArUco tags
- Implemented a depth based tracker as a fail-safe mechanism for allowing the drone to return when it leaves the RGB frame of view
- Implemented and tuned a PID based controller creating a closed-form feedback loop with the localisation module to navigate the drone

Solo Gold | InterIIT Technology Meet 10.0

UAV based planning and UGV navigation over mountainous terrains in low visibility

Feb 2022 - April 2022

- Awarded a Solo Gold for the mid-prep InterIIT Tech event **DRDO UAV-UGV Navigation Challenge**, among a pool of 21 IITs
- Developed a **depth map based path detection** model to allow accurate planning over low visibility and unfavourable terrains
- Generated a final path using an **Extended Kalman Filter** over the originally obtained points to ensure feasible traversal
- Implemented and tuned a **Model Predictive Control** based controller to navigate a sensorless UGV along the generated path

EXTRACURRICULAR ACTIVITIES

- **Encore - English Technology Dramatics Society**: Participated in several stage plays, street plays and online skits. Wrote and directed plays for our annual production. Auditioned **100+** applicants and organized workshops for introducing dramatics to the larger audience.
- **General Championship - Football**: Part of the **Gold Winning** Lal Bahadur Shastri Hall of Residence Football Team. Trained and mentored 20+ juniors for the Inter-Hall General Championship
- **Competitive Programming**: Proficient with C++. Participated in various competitive programming contests and qualified for ICPC regionals in class 11, under a reserved participation metric for school students.