Pranav Vishal Deshmukh

Roll No. : 230102073
B.Tech - Electronics and Communication Engineering
Minor in Data Science and Artificial Intelligence
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Education

Degree/Certificate	Institute/Board	CGPA/Percentage	Year
B.Tech. Major	Indian Institute of Technology, Guwahati	9.30	2023-Present
B.Tech. Minor	Indian Institute of Technology, Guwahati	9.00	2024-Present
Senior Secondary	TSBIE Board	97.7%	2023
Secondary	CBSE Board	97.8%	2021

Experience

- **Hanyang University** *Dec 2025 – Present*
  Research Intern Seoul, South Korea
  – Developing a hybrid control framework by integrating **TD-MPC** (Temporal Difference Learning for Model Predictive Control) and **MPPI** (Model Predictive Path Integral) to enhance trajectory optimization for high-dimensional robotic systems.
  – Implementing **Diffusion Policy** to model multi-modal action distributions, significantly improving the robustness of behavioral cloning in dynamic environments.
  – Exploring **Vision-Language-Action (VLA)** models to ground semantic commands into low-level control policies, enabling the agent to generalize across unseen manipulation tasks.

- **International Institute of Information Technology (IIIT), Hyderabad** *May 2025 - Present*
  Research Internship with Prof. Pawan Kumar Hyderabad
  – Extended **Direct Preference Optimization** to craft a reward-based defense against adversarial attacks, formulating a **numerically stable DPO loss** with cross-entropy for balanced accuracy and robustness.
  – Engineered a **teacher–student** pipeline in PyTorch, using an adversarially trained ResNet-18 teacher to generate preference labels and train student CNNs under **one-pixel, multi-pixel, and FGSM** attack scenarios on MNIST and CIFAR-10 and able to achieve a **98.6%** accuracy on perturbed images using DPO.
  – Currently investigating the robustness of pixel space diffusion models.

Projects

- **End-to-End DDPM Implementation** *May - Jun 2025*
  Personal Project bit.ly/44NZOKT
  – Implemented **end to end** training and sampling workflows based on the original denoising diffusion paper.
  – Developed reusable **U-Net**, noise scheduler, and **optimizer wrappers** in PyTorch for fast experimentation.
  – Evaluated on CIFAR-10/MNIST with FID/IS metrics and integrated accelerated solvers to cut sampling time.

- **Deep Reinforcement Learning for CartPole** *Aug - Nov 2024*
  Course Project - DA241M (Prof. Teena Sharma) bit.ly/3I6JaOH
  – Developed a **Deep Q-Network agent** for OpenAI Gym's CartPole-v1, environment.
  – Engineered stable training with experience replay, target networks, and a decaying **epsilon greedy policy**.
  – Achieved an average reward of > 195 over 100 consecutive episodes, meeting the CartPole-v1 solve criterion through systematic hyperparameter tuning.

- **Scholarship Finder** *May - Jun 2025*
  Coding Club - Summer Project bit.ly/4kjRnwd
  – Created a scholarship finder tool that scrapes available scholarships using **BeautifulSoup** from popular platforms and designed a matching algorithm that generates a personalized list for each student based on relevance.
  – Implemented the backend in Python using FastAPI with **MongoDB**, designed **React** components for a user-friendly interface, utilized **Vader** for Sentiment Analysis of the scholarships, and **Dockerized** the project into containers.

Technical Skills

- **Programming**: Python, C/C++, PyTorch
- **Electronics**: Xilinx Vivado*, LTspice, MATLAB*
- **Miscellaneous**: LaTeX*
- **Tools/Frameworks**: Numpy, Pandas, Scikit-Learn, Matplotlib, Pytorch, Tensorflow*
- **Operating Systems**: macOS, Windows, Linux*

** Elementary proficiency*

Key courses taken

- **Mathematics**: Linear Algebra, Multivariable Calculus, Differential Equations, Probability & Random Processes**
- **Computer Science**: Introduction to Computing(Theory + Lab), Mathematical Foundations of Data Science, Artificial Intelligence, IITG.ai (Summer Course), Stanford Certification in ML (Coursera)
- **Electronics and Communication**: Digital Circuits (Theory + Lab), Signals and Systems, Analog Circuits*, Circuit Theory*, Control Systems*, Basic Electronics (Theory + Lab), Measurement and Instrumentation (Theory + Lab)*

** Awarded AA grade (10/10), ** Awarded AS grade(Rank 1)*

Achievements

- **All India Rank 1524**, in **Joint Entrance Examination (JEE) Advanced** among 1,50,000+ students *2023*
- **All India Rank 1743**, in **Joint Entrance Examination (JEE) Mains** among 10,00,000+ students *2023*
- **All India Rank 909**, in **Kishore Vaigyanik Protsahan Yojana (KVPY) SA** among 1,00,000+ students *2022*
- **8th rank**, among all students in Telangana state in **National Talent Search Examination (NTSE)** *2021*
- **Top 1 percent**, among all students in Telangana state in **National Standard Examination in Physics (NSEP)** *2022*

Extracurricular Activities

– **Cepstrum**, Served as the **Academic Representative** in the student body of the EEE Department *2024 - 2025*
– **Tennis Club**, Active member of the tennis club and participated in most major tournaments *2023 - Present*