Prakhar Gupta

Indian Institute of Technology, Goa

Fourth Year **Undergraduate**, **Computer Science and Engineering**
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Education

BTech, Computer Science and Engineering, Indian Institute of Technology Goa	CGPA : **7.48/10**	2021 – Present
Class 12, CBSE, St.Xavier's High School, Ailwal	Aggregate: **93.2** %	2019 – 2021
Class 10, ICSE, Jyoti Niketan School, Atlas Tank	Aggregate: **95.4** %	2017 – 2019

Projects

CIFAR10 [Github] (Apr 24 – Jun 24)

- Implemented distinct CNN Architectures such as **Simple CNN**, Visual Geometry Group CNN **(VGG Mini)**, Residual Network CNN **(ResNet Mini)** using Tensorflow via Keras APIs.
- Trained respective CNN Architecture models and evaluated them on the **CIFAR-10** dataset, consisting of 60,000 32x32 color images in 10 classes.
- Systematically compared their accuracy with the Simple CNN achieving test accuracy of 80%, the VGG Mini 81%, and the ResNet Mini 86%.

Novel AutoComplete [Github] (May 24 – Jun 24)

- Developed and implemented a **LSTM** neural network architecture that effectively captured long-range dependencies in text, resulting in a 30% improvement in the model's performance compared to recurrent network on complex literary datasets.
- Built on TensorFlow with nominal encoding such as one-hot encoding.
- Implemented **Beam Search** for decoding text sequences. Beam search selects the most likely sequences, which improves the quality and coherence of the generated text.
- Trained on Alice in Wonderland and Frankenstein novels, generating text that reflects the distinctive characteristics of these classic works.

AI Pacman[Github] (Sept 23 – Nov 23)

- Completed 10+ AI algorithms implementation as part of academic lab in python.
- Performed AI searching like **Uninformed** and **Informed search** methods, **CSPs** (constraint satisfaction problems consisting of backtracking search, forward checking as well as constraint propagation).
- Integrated Game Playing technique comprising of **Minimax Search** and their optimisation like **alpha-beta pruning** and evaluation heuristic approximation improving speed by 32% for bigger trees.

OptiML[Github] (Jan 24 – Apr 24)

- Developed a **Deep learning library from scratch** and created a neural network with more than 8 layers on it for Boston Housing dataset.
- Coded fundamental machine learning algorithms and statistical methods, including Linear Regression, Perceptron, and Maximum Likelihood Estimation (MLE), Expectation Maximization (EM), K-Means and Gaussian Mixture Models (GMM).
- Addressed 9+ optimization problems like **Max flow**, **LP** using methods such as Newton's iterative method and Exact line search. Additionally, the project includes modelling and solving optimization problems using **Gurobi** APIs.

Skills

Programming Skills:	C, C++, C#, Python, Java, Haskell, JavaScript, TypeScript, Bash, R, Prolog, VHDL, SQL, MIPS Assembly.
Software Skills:	Auto-CAD, Solid works, Unity, LaTex, Git, GitHub, VS, VS Code, Vivado Xilinx, IntelliJ IDEA, Anaconda.
Frameworks/Libraries and OS:	Ubuntu, Fedora, Windows, Node, Express, Spring Boot, Bootstrap, React, MongoDB, Mongoose, TensorFlow, Sci-kit-learn, OpenGL, SDL, CUDA C, Posix.
Relevant Coursework	Data Structures and Algorithms, Algorithm Design, Computer Networks, Machine Learning, Artificial Intelligence, Probability and Statistics, Optimisation, Computer Architecture, Compiler Design, Unix Tools.

Positions of Responsibility

Wing Representative	Hostel Wing Representative in Student Panchayat	(2022 – 2023)
Core-Member	Alpha - Finance Club of IIT Goa	(2023 - 2024)
Event Overseer	Cepheus KBC Event Overseer	(2023 – 2024)

Extracurriculars & Hobbies

- Committed to environmental stewardship, volunteering with Varaha, the Climate Change Society of IIT Goa, to clean various beaches.
- Gaming enthusiast, engaging in fps, strategic, indie and open-world gameplays.
- Competitive table tennis player, participating in tournaments and friendly matches in spare time.
- Dedicated bookworm with a love for literature, exploring diverse genres and authors.