Vinayak Dhruv

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Education

University of Maryland — College Park, MD
Master's in ML with Specialization in Generative AI — *Aug 2024 - Dec 2025*

- **Highlighted Coursework**: Multimodality, NLP, Prob and Stats, Machine Learning fundamentals
- **Research**: Generative AI, LLMs, MOE, MLLMs, Foundational Models, NLP, Vision

Delhi Technological University — Delhi, India
Bachelor's in Technology, GPA : 3.4 — *2018 - 2022*

- **Highlighted Coursework**: Mathematics - 1&2, Programming Fundamentals, Probability and Statistics, Machine Learning, Introduction to Deep Learning, Bayesian Methods of Deep Learning, Computer Vision
- **Research**: Computer Vision, NLP, Autonomous Systems, IoT Systems

Skills

Generative AI, *LLMs*, *Foundational Models*, *MOEs*, *Multimodals*, *Prompt Engineering*, *NLP*, *Computer Vision*, *Machine Learning*, *Deep Learning*, *PyTorch*, *RAG Systems*, *AWS*, *Time series*, *EDA*, *Parallel Computing*, *Linux*

Professional Experiences

OLA Krutrim — Bangalore, India
AI Research Scientist — *Jan 2023 – Aug 2024*

- As the **founding member, built India's first LLM Chatbot for indic languages**[Link] and developed foundational LLM models, responsible for multiple research projects in MOEs, MultiModals, LLMs, Speech, Chat Bots, etc.
- Conducted experiments on supervised fine-tuning (SFT) and analysis of multilingual data. Our Krutrim SFT model **outperformed LLama2 Chat SFT across various standard English benchmarks such as COPA, ARC, HellaSwag etc.**
- Worked as **lead researcher on the 'Orchestrator' pipeline and Web-RAG**[Link].
- Researched and worked on techniques like **Peft-LORA for SFTs, continual pre-training strategies, DPO.**
- Developed live-streaming lip syncing for multiple languages by improving Wav2Lip on better resolution videos by **12%**.[Link].
- Led efforts on building a AI based Customer Care services at OLA, resulting in **automation of 60% of customer interactions.**

OLA Electric — Bangalore, India
Data Scientist — *Jun 2022 – Jan 2023*

- Improved driver allocation model by building better features using GNNs, which brought a **5% increase** in the revenue.
- **Invented an autonomous Proximity Unlock solution** for OLA e-Scooters, with an **accuracy of 93.7%.** [Link]
- Worked on Criticality Score prediction auto-response pipeline for customer queries and emails with a **90+% accuracy**.
- Built projects regarding SoH prediction of batteries and time to recharge with **92.7% accuracy** and deployed to production.
- Devised a VoiceBot project for answering customer care queries, **automatized 86%** of company's pipeline, saving millions.

Amazon — Bangalore, India
ML Engineer — *Jan 2022 – Jun 2022*

- Worked towards forecasting Out of balance dates for the advertisers at Amazon, using time series prediction to predict their spends, with an **accuracy of 92.4%** and pushed it to production over cloud infrastructure.
- Developed complete Review Summarization pipelines using DistillBert models, **achieved 4% improvement** against SOTAs.

VenueMonk — Delhi, India
Data Science Intern — *Dec 2020 – Mar 2021*

- **Automated 100% of the image handling and validation system** of the company for their website [Link] utilizing image processing techniques.
- Deployed a venue ranking and clustering model for venues with a score of **91.7% accuracy** on the cloud using AWS.

Research Experiences

Unmanned Ground Vehicle Team — DTU, India
Team Captain under Vice Chancellor S. Indu — *Sept 2018 – April 2022*

- Worked as the Team Captain in developing Unmanned vehicles and Autonomous systems on ROS [Link]], designing algorithms and building navigation stacks for **obstacle avoidance and path planning**. Designed models for lane reconstruction and a self-built monocular depth estimation model to help in autonomous navigation.
- Led a team of 25 students on IGVC-2020 Oakland, and also **won the 9th position** overall. Part of team in 2019 IGVC built a semi-autonomous bot for handling lane following tasks and obstacle avoidance.[Link]
- Developed and worked on a WeedBot for classifying weeds in the farms, with an accuracy of **89%**.
- Participated in Micromouse and similar national competitions on robotics and simulations on problems like maze solving and path finding, as **team lead of UGV-DTU** [Link].

XERO Technologies Delhi, India
Co-founder @ XERO Tech *Nov 2020 – Mar 2021*

- **Developed a startup venture** on Traffic Count and Classification [Link], an application that supports the tracking, classification, and counting of vehicle classes on visual data derived from Indian Roadways.
- Worked on Image analysis and night based image detection by image enhancement and data augmentation.
- **Led the Vision team** for developing Object detection for traffic vehicles and developed an algorithm to keep track of the detected vehicle and also determine the total toll collected.

CALIBRE Research Community DTU, India
Research Assistance under Dr. Rahul Katarya *Jan 2019 – June 2019*

- Researched and assisted in NLP related projects like sentiment analysis and comparative study of ML algorithms to solve it, developed my own model for analysing Meta tweets with a **92.3% acc.** for Hinglish hate speech.
- Developed a COVID-antiviral drug prediction model with my partner in research, curated a complete dataset from various sites and open source datasets, built a Bi-LSTM based classification model to predict the antiviral drug set best suited for any genome chain with **94.5% acc.**

Projects

A Robust Underwater Plastic Detection System
to better distinguish between Jellyfish and plastic bags for underwater detection for trash [Link] *Aug 2023 - Nov 2023*
Prof. Biplab Banerjee, IIT Bombay

- Analysed and found that **90% of available datasets are biased** and do not consider negative classes properly. Developed a better dataset for countering the plastic bag classification problem.

Loan Amount Sanction System
to predict the loan amount for a loan applicant [Link] *Sept 2021 - Dec 2021*

- Developed a Loan amount sanctioning predictor using XGBoost for loan amount sanctioned for houses considering various features using Exploratory Data Analysis. Received a score of **87% on CIPLA Data Scientist Challenge.**

Smart Face Lock
for preventing privacy attacks on phones [Link] *Jan 2021 - Feb 2021*

- Attempted to detect live faces on phones, using a KNN model and a simple CNN for recognition of familiar faces on recognized images to classify if it's live, with a **0.2% error rate.**

Soldier Strap
finalist for Smart India Hackathon 2020 [Link] *Jan 2020 - Mar 2020*

- Worked as team lead to develop a solution for soldier straps that helps maintain optimum motion patterns, and keep track of weak points using clustering algorithms. Brought about a **12% increase in speed.**

Centaur - Unmanned Rover
an unmanned ground vehicle under Prof. S.Indu for IGVC 2020 [Link] *Sept 2019 - Apr 2020*

- Handled lane detection and navigation stack on the ROS to travel on grass lanes, won **9th position** in IGVC Oakland.

Publications

- V. Dhruv, R. Awasthi and S. Pawar, **User Intent-Based Proximity Unlock: A Novel Approach For Secure Vehicle Unlocking**, IOSR Journal of Computer Engineering (IOSR-JCE), e-ISSN: 2278-0661,p-ISSN: 2278-8727, Volume 25, Issue 6, Ser. 1 (Nov. – Dec. 2023), PP 32-37 [Link]
- H. Kaushal, V. Dhruv and I. Sreedevi, **Minotaur - A Single Lane Navigation System**, 2022 8th International Conference on Automation, Robotics and Applications (ICARA), 2022, pp. 113-117. [Link]
- V. Dhruv, A. Jha, and D. Chandel, **Traffic Count and Classification Application**, Technical Report, Xero Technologies, 2021. [Link]

Awards, Honors, and Scholarships

- Won the first place in NASA Astronomy Olympiad, at Senior Secondary school.
- As a member of YETi was a College Finalist at Smart India Hackathon 2020.
- As captain of UGV won 9th position overall with 5th in Cyber Security in IGVC-2019 at Michigan, Oakland University.
- Gold Star at Hackerrank Problem solving in C++ and 3 star at CodeChef with best Global Rank as 354.

Positions of Responsibilities

- Team Captain of Team UGV-DTU from 2020 to 2022 (continued as team advisor) and led the team into many competitions
- Class representative for 5th semester CO327 Course — Aug 2020 - Dec 2020
- Team Captain for my Volleyball team in my 10th standard — March 2015 - March 2016
- Head Boy of my school — 2017-2018
- Head of Disciplinary Committee — 2016-2017