Abhay

Email | LinkedIn | GitHub | Google Scholar | Homepage

Education

Indian Institute of Technology Bombay — Powai, India
Master of Science by Research, Computer Science — *July 2025 – Present*

- CGPA: 10
- Courses: Foundations of Machine Learning, Probabilistic Foundations of AI, Software Lab

Indian Institute of Technology Ropar — Ropar, India
Bachelor of Technology in Electrical Engineering — *Nov 2020 – May 2024*

- CGPA: 8.09
- Courses: Machine Learning, Deep Learning for Computer Vision, Data Science, Artificial Intelligence, Linear Algebra

Publications

Abhay Kumar, Kunal Verma, Armaan Garg, and Shashi Shekhar Jha. *Attentive A* for Visual Cue based Path Planning in Complex Environments*. **Accepted** at ECAI 2024 Workshop on Agents and Robots for Reliable Engineered Autonomy. [Link]

(Pre-print) **Abhay Kumar**, Vigneshwaran Shankaran, Rajesh Sharma. *ProvocationProbe: Instigating Hate Speech Dataset from Twitter*. [Link]

Research Work

Audio Deepfake Detection - CVPR Lab, IIT Ropar — Sep 2023 – May 2024
Guide: Prof. Santosh Kumar Vipparthi | *Tools Used: PyTorch, TTS* — *Project Link*

- Worked as part of my B.Tech final year project (Capstone Project). Developed *IndieFake Dataset (IFD)*, a dataset for detecting audio deepfakes in Indian contexts.
- Evaluated deepfake detection models (such as LCNN, MesoNet, and RawNet3) using IndieFake against benchmark datasets like ASVspoof21 and ITW.

Instigating Hate - CSS Group, University of Tartu — Jan 2023 – May 2024
Guide: Prof. Rajesh Sharma | *Tools Used: Snscrape, NLTK, Perspective API*

- Curated *ProvocationProbe*, a dataset of 20k tweets to analyze instigating hate speech.
- Identified distinguishing features between hate speech and instigating hate speech along with targeted groups.

Key Projects

PG Admissions Chatbot | *Guide: Prof. Sunita Sarawagi* | Presentation | Report — Jul 2025 – Nov 2025

- *Tools Used*: OpenAI LLM stack, FastAPI, Cloud Run, Firestore, Google Cloud Storage, Docker
- Implemented RAG pipeline using OpenAI GPT-4.1 and OpenAI Vector Store for answering PG Admission queries.
- Developed a web scraping service to collect data from dynamically changing websites, enabling automated data refresh for the RAG system.
- Designed a human-in-the-loop feedback mechanism by emailing conversation summaries to administrators and incorporating feedback to evaluate LLM responses.

Disaster Aid Application | Code — Jul 2025 – Nov 2025

- *Tools Used*: Flask, MongoDB
- Designed and implemented a location-based disaster aid platform connecting affected users with verified NGOs, integrating real-time National Disaster Management Authority (NDMA) alerts, shelter mapping, and disaster risk assessment.
- Architected the backend as a modular microservice system enabling independent scaling, fault isolation, and maintainable service evolution.
- Implemented OTP-based user and NGO verification, disaster request submission and prioritization workflows, and LLM-based disaster guidance services.

PlantDoc | Code | *Guide: Prof. Subrahmanyam Murala* Jan 2023 – May 2023

- *Tools Used*: Tensorflow, GCP, FastAPI
- Constructed a deep learning model using **MobileNetV1** architecture for disease detection in potato & corn crops.

Recolorization of GrayScale Images | Code April 2023

- *Tools Used*: Tensorflow, scikit-learn, Matplotlib
- Developed a GAN model for colorizing grayscale images with a **U-Net** based generator.

Placement Cell Manager | Code June 2022 – July 2022

- *Tools Used*: Django, HTML, CSS, MySQL
- Co-developed a Django website with Institute ID authentication, multi-level user roles, and advanced filtering.

Work Experience

Accenture | Java Developer Jun 2024 – Apr 2025

Technologies worked on: Java, Spring, Python, Typescript, AWS *Bangalore, India*

- Contributed to Amazon's Clinic Project.
- Assisted in launching the Coupon-Code feature, enabling patients to book in-person consultations.

Samsung R&D Institute | SDE Intern in Network Modem Team Jun 2023 – Aug 2023

Memory Optimization of Header Files | Technologies used: C/C++, Python *Bangalore, India*

- Got to know about data padding in compilers and how it results in the allocation of additional memory.
- Optimized memory utilization of header files containing C structures using Python.

Technical Skills

Languages: C/C++, Python, Java, Latex, TypeScript, HTML/CSS, MATLAB

Frameworks/Developer Tools: Flask, FastAPI, Spring, Django, Git, AWS, GCP (Cloud Run, Fire Store, Google Cloud Storage (GCS)), Docker

Libraries: PyTorch, Tensorflow, OpenAI LLM Stack, Keras, OpenCV, Mediapipe

Miscellaneous

- Among the top 10,000 candidates out of 1.5 lakhs candidates in JEE Advanced 2020.
- Founded and led the AI club, IOTA Cluster, at IIT Ropar.
- Actively contributed to NSS events on community service, education, and sustainability.