Abhilekh Borah

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Education

Manipal University Jaipur 2022-2026
Bachelor of Technology in Computer Science and Engineering *Jaipur, Rajasthan*

- **CGPA: 8.9/10.0** (Till 4th Semester); Dean's List; Student Excellence Award
- **Relevant Coursework:** Data Structures and Algorithms, Soft Computing, Machine Learning, Automata, Object Oriented Programming, Computer System and Architecture, Computer Networks, Statistics

Delhi Public School Numaligarh, Assam
High School Diploma - Science Stream *2020 – 2022*

- Percentage : **94%**
- Relevant Coursework: Physics, Chemistry, Mathematics, Python, SQL

Experience

Research Intern Sep 2024 – Present
AI Instiute, University of South Carolina *Columbia, South Carolina*

- Developed **Visual Counter Turing Test (VCT^2)** to expose limitations in AI-generated image detection (AGID) techniques and introduced the Visual AI Index (V_{AI}) to evaluate generative models. *(Submitted to CVPR 2025)*
- Developing an **attribution** based **Question-Answering** system using **Neuro-Symbolic** AI and language models to answer academically relevant questions, providing citations/sources.

Summer Research Intern May 2024 – July 2024
Indian Institute of Technology, Guwahati *Guwahati, Assam*

- Developed **"SignRAG" - a Continuous Sign Language Recognition and Translation Framework** for domain-specific retrieval in Large Langauge Models (LLMs), achieving up to **30%** improvement in ROUGE and BLEU scores compared to state-of-the-art methods. *(Submitted to IEEE Transactions on Computational Social Systems)*
- Implemented a **Video-to-Gloss** model using CNN and Bi-LSTM, and a **Gloss-to-Text Retrieval System** using large language models for natural language understanding and generation.
- Integrated an **Emotion** model based on the valence-arousal theory to classify emotions in sign language videos, and used a **Text-to-Speech** module with WaveNet and Tacotron to synthesize emotion-captured text into audio.

Research Intern Jan. 2023 – Jun. 2024
Indian Institute of Information Technology, Allahabad *Prayagraj, Uttar Pradesh*

- Developed a **Crowd Anomaly Detection** framework for analyzing crowd behaviors and detecting anomalies in video footages using LSTM and ConvNets, classifying video segments into seven real-life distinct crimes.
- Achieved a **96.15%** AUC score in anomaly detection, significantly reducing false positives.

Research Intern Oct. 2023 – Jun. 2024
Indian Institute of Science Education and Research, Kolkata *Kolkata, West Bengal*

- Developed **"RAKSHA" (Retrieval-based Ayurvedic Knowledge System for Healthcare Advice)** using Large Language Models (LLMs), implementing RAG, achieving **77.01%** higher accuracy compared to baseline LLMs.
- Correlated patient-like representations with Ayurvedic medical data to predict diseases based on symptoms (Doshas, Dhatus, Srotas).
- Utilized a curated dataset from Ayurvedic institute doctors, ensuring the framework's novelty and domain-specific relevance.

Technical Skills

Languages: Python, C/C++, Swift, Java
Areas of Interest: **Trustworthy ML**, **Ethical Alignment**, **Neuro-Symbolic AI**, **Information Retrieval**, **Conversational AI**, **Multi-Agent Systems**, **Multimodal AI**, **Cognitive Modelling**, **AI for Social Good**
Frameworks: LangChain, LangGraph, LlamaIndex, PyTorch, Tensorflow, Neo4j, NLTK, Transformers, OpenCV, Scikit-learn, SwiftUI, RealityKit, ARKit
Developer Tools: Git, Google Cloud Platform, VS Code, Jupyter Notebook, Xcode

Projects

AcharyaGPT | *Conversational AI, RAG, LLMs*

- An iOS chatbot developed using OpenAI's GPT-3.5 Turbo, fine-tuned on our dataset, for Ayurvedic consultations with context-aware dialogue management.
- Integrated a domain-specific knowledge base, allowing the LLM to deliver accurate and personalized Ayurvedic formulations and instructions.

GyanSrota | *Conversational AI, RAG, Agents, LLMs*

- A web-based chatbot that provides answers about academic and campus-related topics.
- It uses a retrieval pipeline with Langchain for **RAG**, Google's Gemini 1.5 Pro for response generation, and buffer memory for context retention.
- Implemented a **Multi-Agent Orchestration** framework to extract relevant information from the university's corpus to ensure accurate and context-aware responses, and efficient query routing based on the specific task.

CampusChayan | *Conversational AI, RAG, LLMs*

- A **Multilingual** AI Assistant that handle queries on admissions, eligibility criteria, fee structures, scholarships, curriculum, hostel facilities, placement opportunities, and college-specific allotments for engineering and polytechnic institutes under the Department of Technical Education, Rajasthan, reducing the need for manual effort and improving response times.
- Utilizes a **RAG** Framework for efficient keyword mapping to generate accurate, context-aware responses by retrieving verified data and citing sources. Supports **Natural Language Processing** (NLP) for voice-based assistance in both English and Hindi for broader accessibility.

Multimodal Query Engine | *Conversational AI, Multimodal Interaction, RAG, LLMs/VLMs*

- An image/text retrieval framework for knowledge intensive tasks that incorporates a **multimodal** language model, enabling multiple modalities such as image-to-text, text-to-image, and simultaneous text and image generation.
- Integrated **YOLO** for object detection and **OCR** methods for accurate text extraction from PDFs and diverse image data. The framework enables efficient data retrieval and analysis, facilitating user interaction across complex datasets in **information retrieval**.

Achievements

- Recipient of the **Dean's Excellence in Academics** and the **Student Excellence** Award for outstanding achievement across academics and research.
- Emerged as the **Winner** at the Talent Hunt Hackathon (the first official hackathon conducted by Manipal University Jaipur), becoming the only freshman to achieve this honor.
- Built a solar-powered tricycle and secured the **4th** position nationwide out of 10,000+ participants in the National Science Concours 2015-16 conducted by Pivotal India.

Communities, Clubs & Chapters

- As a **Beta Microsoft Student Learn Ambassador** (MLSA), I have actively engaged with the community by organizing events and inspiring 100+ peers with Microsoft technologies. I have conducted several sessions on AI, particularly in the NLP domain, and developed web applications and machine learning models using *Microsoft Azure* and *AzureML*.
- **Project & Research Head** at Manipal University Jaipur's **ACM** Student Chapter where I have led various events, developed multiple *Augmented Reality* projects, including setting goals and objectives, allocating resources, and ensuring that projects are completed within specified timelines and budgets.

Non-Technical Skills

Music Production & Songwriting: Have produced and written over 6 original tracks published across *100+* platforms, amassing over **1 million** streams worldwide. Additionally, I play a variety of instruments including the *Guitar, Ukulele*, and *Keyboard*.

Public Speaking: Have actively engaged in various *debates*, *group discussions*, and *Model United Nations* events, earning recognition and awards for my participation.