

# DIVYANSH

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Kanpur, India

## EDUCATION

Indian Institute of Technology, Kanpur

BTech, CSE

CGPA: 8.7/10

2021 - Present

Kanpur, India

New Holy Ganges Public School, Khagaria

XII, CBSE

Percentage: 90%

2021

Khagaria, India

Ramakrishna Mission Vidyapith, Deoghar

X, CBSE

Percentage: 94.6%

2019

Deoghar, India

## SCHOLASTIC ACHIEVEMENTS

- My first **research paper** on Vision Language Model Attribution got accepted in **NAACL'25** main track.
- Got a **US-patent** accepted on my work on training-free scalable **Multimodal Attribution**
- Completed 2 month Research Programme (**SURGE 2023**) at IITK under Prof. Ashutosh Modi(NLP)
- Secured **All India Rank 823** in **JEE Advanced 2021**
- Secured **All India Rank 657** in **JEE Mains 2021**

## COURSES

: ongoing

- Database Management System\*
- Linux Kernel Programming
- Programming for Performance\*
- Networks
- Compiler Design
- Operating Systems
- Software Development
- Advanced Algorithms
- Computer Organisation
- Parallel Computing
- Introduction to ML

## TECHNICAL SKILLS

- ML frameworks:** PyTorch, OpenAI, Tensorflow, HuggingFace-transformers, SpaCy, NLTK
- Programming Languages:** Python, C, C++, Bash
- Utilities:** CUDA, Git, Linux, PAPI, HTML, CSS, Pandas, Matplotlib, sklearn, seaborn,  $\LaTeX$ , Django, Figma.

## LEADERSHIP

Leader, IITK Consulting Group *May'23 - May'24*

- Led team of **25 secretaries** and hosted **2 sessions** (200+ attendees) on **AI & tech consulting**
- Provided **pro-bono AI-driven consulting** to **non-profits** and **social organizations**

## AI for SOCIAL GOOD PROJECTS

Poverty Estimation in Haryana *Project Lead*  
CDIS | ICG *Aug'23-Apr'24*

- Fine-tuned **VGG16 & ResNet50V2** on satellite images + trained regression models using deep features and Open Street Map data to predict household income, obtaining a **0.88 r2score**.

Medical AI Assistant *Project Lead*  
Noora Health | ICG *Dec'23-May'24*

- Integrated OCR model ensembles on **Google Cloud's Vertex AI** to optimize patient report digitization
- Engineered multilingual medical query retrieval system using **RAG architecture** and **OpenAI APIs**

## WORK EXPERIENCE

Multimodal Attribution

Research Intern | Adobe Systems

*May 2024 - Jul 2024*

- Developed an innovative **post-hoc attribution** system for **multimodal question-answering**, addressing a critical gap in current AI credibility
- Engineered a versatile solution capable of **attributing answers** to both **textual and visual context** in docs, including charts, infographics, & scanned materials
- Implemented the system for LMMs such as **InternLM, LLaVa-NeXT, and Mini-Gemini**, and evaluated their performance using **novel evaluation technique**
- Integrated the attribution system with **GPU optimizations inference & Flask framework** enhancing user experience for practical applications
- Authored a comprehensive **research paper & patent application**, both accepted, detailing the system's methodology and potential applications

Short-Video propaganda detection with LLM-as-Judge

Research Intern (Remote) | UIUC

*Mar 2023 - Jul 2023*

- Conducted comprehensive research on **textual propaganda detection**, including literature review of **ACL** and **EMNLP** papers and short video data collection
- Developed innovative approach using **comments clustering** and fused frame captions with **GPT-4 prompting** for **video context & intent analysis**
- Initiated creation of **novel propaganda detection video dataset**, leveraging few-shot learning with **LLMs for weak labeling** and human gold annotation.

## KEY PROJECTS

Full Fork in Linux Kernel

Course Project | CS614 | Prof. Debadatta Mishra

*Jan'24-Apr'24*

- Developed new system call in Linux kernel to clone **multi-threaded** processes
- Implemented **SIGSTOP** modification to halt all threads except leader with back acknowledgement and engineered leader cloning and context entry via **schedule\_tail** hook, recreating thread group using **kernel\_clone**
- Designed **execution state copying** mechanism from original threads to new threads for seamless resumption of the **forked process**

Sankalak-Python Compiler

Course Project | CS335 | Prof. Swarnendu Biswas

*Jan'24-Apr'24*

- Developed compiler for a statically typed subset **Python** targeting **x86\_64** code
- Used **Flex** for lexical analysis, and **Bison** for syntactic analysis, generating **AST**
- Implemented **symbol table, register allocation, 3AC** and **x86 code generation**
- Supported **classes, multilevel inheritance, function overloading** and **recursion**

Unified Portal for Hostel-Automation

Course Project | CS253 | Prof. Indranil Saha

*Jan'23-Apr'23*

- Developed a software digitalizing hostel services in a 10-member team
- Adhered to **waterfall model**, while documenting all stages including **requirement specifications, design, implementation, testing, and user manual**
- Used **Django** Framework for backend development, **Django-Test** for unit-testing, **Selenium** for integration-testing attaining over **90%** test coverage

Pre-Hospital Management System(PHMS)

Prof. Priyanka Bagade, CSE, IITK

*Sept'22-May'23*

- Developed **Frame Compression and Prediction** Techniques for **Efficient Video Transmission** from ambulance in low network areas
- Employed **FFmpeg** to extract frames of patient's video for compression further used CNN based **ESPCN model** to reconstruct high resolution video frames
- Co-authored a manuscript submission to **IEEE Intelligent Systems** (in review)

ECG Signal Prediction

Prof. Priyanka Bagade, CSE, IITK

*Sept'22-Aug'23*

- Performed literature review for ECG feature extraction using **engzee algorithm** for single scan detection of **QRS complex** & reconstructed ECG signals using **gaussian bell curve** with an average correlation of **0.85**.
- Implemented **Conv1D, ConvLSTMs, TFTS, CNN-LSTMS** with skip connections to predict ECG with best r2score of **0.98**.