DIVYANSH

Senior Undergraduate, Computer Science & Engineering | IIT Kanpur

divyansh21@iitk.ac.in | Divyanshsingh1910 | divyansh1910 | +91 8306579828 | 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

- Completed 2 month Research Programme (**SURGE 2023**) at **IITK** under Prof. Ashutosh Modi(NLP)
- Represented IIT Kanpur at **National Level Research Conference** - Engineer's Conclave of **Inter IIT 11.0**
- 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**: 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**
- Conducted **Cases over Coffee**, an intellectual discussion series on topics like **ONDC**, **Gen-AI**

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 **patent application**, currently pending, 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 anlysis, generating **AST**
- Implemented **symbol table**, **register allocation**, **3AC** and **x86 code generation**
- Supported **classes**, **multilevel inheritence**, **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**.