Harsh Sagar
Indian Institute of Technology Madras +91 6352010302 | harsh.sagar2107@gmail.com | Github **Linkedin**

EDUCATION

Program	Institution	CGPA/%	Year of Completion
Dual Degree in Biological Sciences	Indian Institute of Technology, Madras	7.94	2019-2024
XII (GSEB)	Best High School, Ahmedabad	80%	2019
X (GSEB)	Best High School, Ahmedabad	87.17%	2017

SCHOLASTIC ACHIEVEMENTS

- **Only** student from **2019 batch** to achieve **Panasonic Scholarship Program**
- **Gold Medal** for Class Rank 1, cleared 1st Level and secured **Int. Rank 3359** in 2nd Level of National Science Olympiad in **Class X**
- Secured International **Rank 859** in International Science Olympiad in **Class IX** conducted by **Science Olympiad Foundation (SOF)**

RELEVANT COURSES AND SKILL

*Completed Prof. Course, ** Coursera, ***NPTEL

• Data Structures & Algorithms for Biology*	• Biostatistics*	• Fundamentals of Operation Research*
• Statistics for Data Science with Python**	• Convolutional Neural Networks**	• Introduction to DL & NNs with Keras **

Tools Used: Angular, TypeScript, HTML, CSS, Bootstrap , Node.js, APIs **Programming Languages:** C, SQL, Python, React Native

WORK EXPERIENCE

ML Engineer Intern
FN MathLogic Consulting Services Gurgaon
May'23 – July '23

Developing a Conversational Question Answering System using Large Language Models (LLMs)

- Explored **LLM memory retention** via various **model finetuning methods** on **ICICI Lombard Policy QnA data**
- Implemented **Transfer Learning** on Microsoft's **DialoGPT** model that retained chat memory for **4-5 conversations**
- **Nodejs** based frontend interacted with user. **Dialogflow** was used to detect intentions from user messages
- **FastAPI** based backend was used to call **LLM model** to generate answer and send them back to frontend

Document Parsing for Question Answering using LLMs with Langchain framework

- Transformed **ICICI Lombard docs** into chunks, each were converted to embedding using **LLM/encoder-only** model
- Used **Langchain** & utilized **Flan-T5 model** as **LLM** & **embedding** of **HuggingFace** platform led to **30% rouge score**

Software Intern
Street Style Store
May'22 – Aug'22

Conversation Classification for Enhancing User Experience

- Worked on **Classification** of conversation between user & agent regarding online order to improve user experience
- Utilized **N-grams** stored as **Bag of Words** & compared **Recall values** for SVM model that gave **96.4%** accuracy
- Used **Docker** & managed deployment on **AWS** infrastructure,configured **SQL database** for data storage & retrieval
- Implemented **CI/CD** pipelines to automate build, test, & deployment phases, enhancing operational efficiency

RESEARCH EXPERIENCE

ML Research Intern
IIT Varanasi
Research Paper
June'21 – July'21

Machine Learning for Milk Foam Analysis, Guide: Prof. Abhishek Dhoble

- Worked on Classification of **Surfactants** to study milk foam quality as demand for **Cappuccino foams** has increased
- **Randomforest** achieved **0.955 roc-auc score** & **88.1% test accuracy**, also applied algorithms eg **SVM, XGBoost etc**
- Explored **Casein** reaction with **surfactants**, this study also got published as the **research paper** in **Springer Nature**

DDP PROJECT
IIT Madras
July'23- Ongoing

Evaluating ML models for Chest X-ray of Diseases, Guide: Prof. Ganapathy Krishnamurthi

- Applied **Transfer Learning** on **Ensemble** of **CNN** models & **Self Supervised** methods such as **MoCo** & **Vision Transformers** finetuning for Pneumonia detection
- **Self Supervised** models performed better with **MoCo** model obtaining **98.7%** test accuracy & **Vision Transformers** obtained **97.5%** test accuracy

COURSEWORK

Monte Carlo Simulation [BT 2042: Fundamentals of Biophysical Chemistry]

- Observed polymer assemblies using **Monte Carlo Metropolis criterion** in **matlab** at different interaction energies between atoms
- When interaction energy is **low** the polymer formed aggregate. When only some atoms can interact then polymer had more energy

PROJECTS

To-Do List Web Application (Angular) *Jul'22-Aug'22*

- Developed dynamic & user-friendly To-Do List web application using Angular framework, allowing users to efficiently manage time
- Implemented features to add, delete, & update tasks, along with the capability to create & manage multiple sub-todos within each task

Bus Tracking Web Application *Jul'22- Aug'22*

- Developed real-time bus tracking web application for campus transport. Devised user interface & backend logic to display live bus location
- Utilized GPS data from buses via APIs to provide accurate real-time coordinates. Implemented features for route visualization, bus arrival predictions, and user-friendly interface.

Rent A Car Application using Angular

- Built and maintained a dynamic Single-Page Application (**SPA**) using Angular, empowering efficient car rental management
- Implemented admin functionalities for cars, brands, colors & services, empowering efficient data management.

POSITION OF RESPONSIBILITY

Computer Vision & Intelligence Club Project Member, Shaastra 2022 *June'21 – April'22*

- Worked on **YOLO v5 model** for detecting circuit components and the **mAP** score of the model evaluated with 25 images is **92.7%**
- Detected **terminal points**, **nodes** in circuit using **BFS algorithm** and generated netlist about connectivity of components with others

EXTRA-CURRICULAR ACTIVITIES

Sports	• Selected for NSO Fitness program and also participated in Samanvay Marathon 2019