Name: Harsh Sagar| Roll No: BS19B013
Indian Institute of Technology Madras
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

• Principle of Economics	• Computational Economics	• Climate Economics
• Fundamentals of Operation Research	• Series and Matrices	• Biostatistics

WORK EXPERIENCE

Data Science Intern at 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 data** for answering user's query
- Implemented **Transfer Learning** on **Microsoft DialoGPT** LLM & **Reinforcement Learning** from **Human Feedback** finetuning method

Document Parsing for Question Answering using LLMs with Langchain framework

- Retrieved chunks from **ICICI policy docs** that are alike to user query using Langchain. **Flan-T5 LLM** embeddings were used for answering

Machine Learning Intern at Street Style Store Company, Delhi *May'22 – Aug'22*

- Applied different machine learning models for improving user's experience by analysing chats of user & agent

Data Science Intern at Supratech Lab, Gujarat Nov'*21 – Dec'21*

- Identified crucial **biomarker genes** for enhancing **IVF treatment** using machine learning algorithm that got 82% test accuracy
- Reduced **57k** gene features to **6k**, using **PCA**, **t-SNE** for dimensionality reductions, and **T-test** for feature significance.

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 the chest x-ray images of Pneumonia and Normal person • Implemented Image Data Generator for increasing training data to avoid **overfitting** & obtained **93.7%** accuracy

COURSEWORK

Finance Plus, Finance & Economics Club IIT Guwahati

- Completed assignments based on concept of **asset** evaluation like future cash flow from lease, rental payments & capital appreciation
- Applied statistical concepts to real-world situations, such as estimating **population variance** for quantifying investment risk

Real Estate Auction System, [HS4007: Computational Economics]

- Created **payoff matrix** of **hawk-dove** game to simulate contest for maximizing player payoff in **real estate** trades using **game theory**
- Assigned bids using **Gaussian distribution** or **compounding** prior values & evaluated based on final bid price to highest valuation of bidder

Forecasting CO_2 Emission and Evaluating its Impacts on Climate Change, [HS4870: Climate Economics]

- **Assessed** the overall financial burden posed by each metric ton of **CO2** released by assigning monetary values to repercussions
- **Polynomial Regression** was used to **forecast** per capita annual carbon emissions for the years **2021-2030** using past records since 1960

PROJECTS

Trading Strategy on Time Series data

- Meticulously designed stock trading strategy and backtest on **TATASTEEL** data from 2021. Calculated the **P/L** of entire backtest at end
- **Bought** the stock if current closing price (**CP**) exceed both Support1 (**S1**) & Simple Moving Average(**SMA**) that ensured potential uptrend
- **Sold** the stock if current CP was below S1 & 20-period SMA that enhanced risk management. Fixed **1% Profit Target** & **0.5% Stop Loss**

Trading Strategy using Momentum

- Developed trading strategy based on momentum indicators using the historical **Closing prices (CP)** of stocks for a subset of the **S&P500**
- Implemented functions to resample prices, compute **log returns** and generated **trading signal** using **Momentum** for **1 month** period
- Evaluated the performance of the resulting portfolio through hypothesis testing using **T-test** and calculated **p vlaues**

Stocks & Crypto Currencies Price Prediction Using LSTM

- Developed Long Short-Term Memory (**LSTM**) models with Keras to predict **Closing price** values based on over a decade of trade data
- While training, past **19** days values used as input to predict next day's value. Achieved mean squared error (**MSE**) of **0.465** on testdata

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 was **92.7%**

Biogen Super Coordinator, Shaastra 2022 *July'21 – Jan'22*

- **Supervised** all the coordinators in **theme ideation** & related events to be organized related to biotechnology under the Biogen Team
- **Collaborated** with other teams of Shaastra which help organizing event and also assist them with the **publicity** of the event

Public Relations Volunteer, Shaastra 2020 *Sept'19 – Feb'20*

- Reached out to various **social media** accounts as a part of PR activity for our social campaign named **"BLINK ".**
- Planned and executed **"Walk in the Dark"** and various activities for our stall at KV ground and spread **campaign motto**

EXTRA-CURRICULAR ACTIVITIES

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