



AGRICULTURAL & FOOD ENGINEERING/ARTIFICIAL INTELLIGENCE MACHINE LEARNING AND APPLICATIONS

MICRO SPL. in ENTREPRENEURSHIP AND INNOVATION

EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2023	M.TECH Dual Degree 5Y	IIT Kharagpur	8.90 / 10
2018	All India Senior School Certificate Examination	Sir Padampat Singhania School, Kota	90%
2016	All India Secondary School Examination	Sir Padampat Singhania School, Kota	10 / 10

INTERNSHIPS

Software Development Intern | Track and Trace, Honeywell

May '22 - Jun '22

- Worked in an **agile** production environment with **100+** UX design iterations for a redesigned Track & Trace for Manufacturers portal
- Integrated a Dashboard and Serialization Engine with the Track & Trace for Manufacturers portal using **React** for frontend development
- Embedded a dynamic world map to the Dashboard using **GoogleMaps API**, showing real time inventory data relevant to manufacturer
- Built **docker container** clusters on AWS, utilized Kubernetes and Docker for the runtime environment of the CI/CD deployment pipeline

Flight Search Caching | Data Science Research Intern | ixigo

Feb '22 - Apr '22

- Researched methods like **MCMC**, **Survival Analysis** to generate predictions for pre-emptive caching of flight search and price change data
- Processed search data in accordance with survival data, **engineered features** with journey sector, time of search for multivariate modeling
- Trained and benchmarked **linear** (Kaplan Meier's, Cox Proportional Hazard) and **ensemble** models (Random Survival Forest, Survival SVM)
- Calculated the **average posterior death probability** using training set, which is then used over test set to predict time till price change

Address Standardization | Data Science Intern | OneCard, FPL Technologies

Feb '22 - Mar '22

- Implemented an in-house **address standardization API**, which parses rough addresses and restructures them into a standardized format
- Extracted primary components of addresses using **rule-based string matching**, exposed the feature as HTTP endpoint using **REST APIs**
- Minimized the probability of fraud and saved mailing expenses by **~15%**, by correcting **1,00,000+** addresses for credit card shippings

Growth Intern | Pristyn Care

May '21 - Jun '21

- Conducted **primary research** on corporate healthcare firms among **50+** survey participants and created pitch-decks for corporate tie-ups
- Evaluated the potential **points of acquisition**; contributed **17%** of quarterly acquisition target by partnering with MakeMyTrip & Myntra

PROJECTS

Explainable Weather forecast using Deep Spatial Autoencoders | Masters Thesis Project

Jul '22 - Present

Prof. Adway Mitra, COEI, IIT Kharagpur | <https://github.com/jainaviral898/weather-forecasting-with-autoencoders>

- Implemented a Data Driven Weather Prediction model, used a Data Assimilation algorithm (**DDWP + DA framework**) to ingest noisy data
- Built a spatial transformer-based **U-NET** to capture features of spatiotemporal weather data, implemented a multi-timestep method

Wheat Head Identification for Yield Monitoring | Bachelors Thesis Project

Sep '21 - Dec '21

Prof R. Machavaram, Dept of Agricultural and Food Engineering, IIT Kharagpur | <https://github.com/jainaviral898/Wheat-Head-Detection>

- Performed **Exploratory Data Analysis** over our 8,500+ images large data pool sourced from three publicly available wheat head datasets
- Implemented and trained image detection models like **Faster-RCNN**, **EfficientDet**, **YOLO** to predict bounding boxes over wheat heads
- Benchmarked the detection models using **10+** metric functions like computational time, **Recall**, **Jaccard Index**, **Mean Average Precision**

Multi Agent Pathfinding Problem and its applications in Agriculture | Course Project

Sep '21 - Nov '21

Prof. Partha Pratim Chakraborty, COEI, IIT Kharagpur | <https://github.com/jainaviral898/mapp-cbs-aifa>

- Modeled the **multi agent path finding problem** for managing aerial and ground (obstacle-constrained) swarms for precision agriculture
- Implemented a bi-level **Conflict Based Search** algorithm which performs constraint search on each agent and the whole conflict tree

Breast Histopathology Image Segmentation| Machine Vision Lab, IIT Roorkee

Dec '20 - Feb '21

Dr. Balasubramanian Raman, Machine Vision Lab, IIT Roorkee | <https://github.com/jainaviral898/Cell-Nuclei-Segmentation-using-cGAN>

- Built several classification models for benign and malignant Breast Ultrasound images using SOTA architectures like **VGG_16**, **ResNet50**
- Devised pre-processing methods like **binary thresholding**, and a custom **U-NET** like segmentation model with ResNet blocks, jump links
- Achieved excellent accuracy over several metrics like Dice (**88%**), Jaccard Index (**93%**), Specificity (**93.8%**) and Hausdorff dist. (**5.57**)

COURSEWORK INFORMATION

Graphical and Generative Models for ML | Machine Learning | Deep Learning | Artificial Intelligence Foundations | Big Data Processing
Linear Algebra for AI/ML | Data Structures and Algorithms | Probability & Statistics | Partial Differential Equations | Entrepreneurship

SKILLS AND EXPERTISE

Programming Languages: C,C++, Python **Libraries/Packages:** numpy, pandas, PyTorch, Tensorflow, Keras, sklearn, OpenCV, NLTK, React
Skills: Web Development, Git, Linux Shell, SQL, Data Structures and Algorithms, Excel, Photoshop and Graphic Design, Figma

POSITIONS OF RESPONSIBILITY

Head of Photography | Technology Filmmaking and Photography Society

Aug '20 - Jul '21

- Involved in the Freshers' Induction, Selections and Workshops related to filmmaking and photography during the academic year 2020-21
- Oversaw the production of **7 short films** during the remotely conducted Fresher's Production, managed the society with **120+** members
- Worked on initiatives like **interactive workshops**, **a photography magazine** and **online photography contests** during the pandemic

EXTRA CURRICULAR ACTIVITIES

- Volunteered as a **Student Mentor** for **5+** first year UG students from the Agricultural and Food Engineering Department, IIT Kharagpur
- Part of **Gold** winning Team in the Online Short Filmmaking and Photography event at Inter-IIT Cultural Meet 5.0 (Bombay, 2019)
- **Best Sound Design winner** and part of **Gold** winning team of Patel Hall of Residence in the Stageplay General Championship (2019-20)
- Part of **Silver** winning (2018-19) and **Gold** winning (2019-20) team of Patel Hall of Residence in the Ad-Design General Championship