

ACADEMIC DETAILS

Degree	Year	Institution	Grade/Percentage
B.tech	2016-2021	Indian Institute of Technology, Kanpur	5.8/10*
12th	2016	DAV College	88.60%
10th	2014	DAV COLlege	83.80%

SCHOLASTIC ACHIEVEMENTS

- Selected for INSPIRE scholarship, awarded to the top 1% among 5.3lakh students by Department of Science & Technology.
- 2<sup>nd</sup> Position in Aviation Development Competition 2019 at IIT Kanpur.

KEY PROJECTS AND INTERNSHIP

- Field Inversion and Machine Learning

BTP supervisor: Dr. Rajesh Ranjan

May'20-'July20

  - Used Field Inversion Method then applied Machine Learning to improve the CFD model. Used 2-Equation K-omega model
  - Used tanh clustering for meshing, applied central finite difference method to get the second derivatives.
  - Used under Relaxation method to Evaluate Linear Equation the K and Omega correction equations.
  - MSE loss function for Field Inversion and Used Bolt Drive Method for Optimization and Used Discrete Adjoint method to calculate derivatives of loss function.
  - Designed 3 Neural Networks and Machine leaning model and compare their performance.
- Image Processing

(Coursera Course Project)

Jan'20-Apr'20

  - Brain MRI Segmentation** Used Kaggle Public lgg segmentation dataset. The dataset had only 4k images, used Keras in built IDG for augmentation. Built a small unet with 31million parameters. used custom loss functions Dice Coefficients and Jaccard index. Final model trained for 30 epochs had size of 335MB and 0.9 binary, 0.72 IOU, 0.84 Dice loss on training and validation sets. Model had 0.85, 0.67, 0.71 accuracy on test set respectively
  - Intel Image Classification** Used Intel Image Classification Dataset on kaggle. Dataset has 14k images. Created a smallle subset of dataset and Used Keras in built IDG for smooth training. Built model with 0.3 million parameters. Model trained for 30 epochs had accuracy of 0.94 on training, 0.89 on val set and 0.79 on test set
  - Face Swap** Used Pre-trained model to detect Landmarks on Face. Used Delaunay Triangulation to create mesh then used affine transformation to transform the landmark points. in the end used Seamless cloning.
- Toxic Comment Classification

(Self Project(Kaggle Competition))

May'20-'July20

  - Competition was to build a model which recognizes toxicity with imbalance dataset.
  - Built a new balanced dataset of all six classes, Performed visualization and correlation test, applied Cleaning, lexicon normalization and stopword removal.
  - Used TF-IDF unigram, bigram and trigram model for word embeddings.
  - Trained LogReg(0.91), KNN(0.66), BNB(0.76), MNB(0.87), SVM(0.91), Random Forest(0.91) with average accuracy on training data.
  - Built LSTM model for further improvement. used Keras embedding and 1 Layer of LSTM with 2 million parameters gave accuracy of 0.97 on training data. Future models: Bi-LSTM model, LSTM with Attention and Transformer architecture.
- The Battle of Neighbourhood

(Coursera Course Project)

Jan'20-Apr'20

  - Developed a Model to compare the Geo-location of two location by using foursquare api.
  - Scrapped data from Wikipedia using Beautiful soap. Converted HTML postal code as Data-frame.
  - used Geocoder to get Longitude and latitude.Used Foursquare API to get the Data of the neighbourhood of the specific Location.
  - Applied K-Means Clustering algorithm to Compare the similarity between to Location.
- Helicopter Coupled Trim Analysis

(Course Project AE:686)

Aug'19-Dec'19

  - Developed the coupled trim analysis code for data pertaining to UH-60A Black Hawk helicopter.
  - Developed codes on MATLAB to predict the aerodynamic performance of blade under different conditions.
  - Implemented various numerical methods six-point Gaussian Quadrature, **Newmark's Algorithm**.
  - Numerically solved the blade flap equation and calculated all the blade hub shear forces and moments in the rotating frame of reference as a function of azimuth angle.
- Design and Modelling Internship

VTOL Aviation India Pvt Ltd.

May'18-July'18

  - Worked as a part of Propulsion Team Analyzed the Rotor Performance to achieve **optimal Power Consumption of India's First AirTaxi(900kg)**, also worked on landing gear of 50kg UAV.
  - Developed simulation codes on MATLAB Using **BEMT** to predict the Performance parameters of the rotor.
  - Developed Codes on Visual C++ Using Lab-View to test the sensors of Test-Bench of The Bird.
- Solid Propellant Rocket and Parachute

(Course Project AE:461)

Jan'19-Apr'19

  - Developed CAD model of the prototype and used it to obtain 3-D printed structure.
  - Used **C6-3 solid Propellant Engine** and Successfully launched the rocket to a height more than 150m with **in-line parachute ejection deployment**.

- **Other Self Projects** Jan'19-Apr'19
  - **Housing Price Prediction Simon Game(Web), TicTacToe(Web), Pong Game(Python), Snake Game(python and Web)**

## TECHNICAL SKILLS AND TOOLS

- **Languages** :C++, JAVA, HTML5, Matlab, **Python**, SQL, JS, CSS, Octave.
- **Tools and Skills** : Auto-desk, Machine Learning, NLP, Deep Learning, AWS, Web Dev(Front), Git, Web Scrapping.

## RELEVANT COURSES

- **Institute Courses:** Fundamentals of Computing, **Linear Algebra**, **Finite Element Method**, Aircraft Propulsion, **Thermodynamics**, Optimal Space Flight Control, Modern Control System, Signal Processing, Rocket Propulsion. Helicopter dynamics
- **Online Courses** Machine Learning, **IBM Data Science**, **Deep Learning Specialization**, Complete Web Development, Python Code challenge.

## EXTRA-CURRICULAR

- Mentored Students of Various Colleges in **Boeing National Aeromodelling Festival'17**
- Participated in Techniti17 Aeromodelling Competitiont 'Sky Sparks'.
- Volunteered in Shiksha campaign to provide education to 6th-12th and JEE Mains Students.
- Volunteered in the National Service Scheme to provide education to underprivileged children in school.