Ashwani Kumar

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ACADEMIC DETAILS

Degree	Year	Institution	Grade/Percentage
B.tech	2016-2021	Indian Institute of Technology, Kanpur	58%
12th	2015	DAV College	88.60%
10th	2013	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**nd **Position** in Aviation Development Competition 2019 at IIT Kanpur.

KEY PROJECTS AND INTERNSHIP

- **Field Inversion and Machine Learning** *BTP supervison: Dr. Rajesh Ranjan* Apr'21-'July21
  - Used Field Inversion Method and 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.
  - implemented under Relaxation method to Evaluate Linear Equation the K and Omega correction equations.
  - MSE loss function for Field Inversion and implemented **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** *(Self Project)* Jan'21-Aug'21
  - **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 **0.98 binary, 0.72 IOU, 0.82 Dice accuracy** on Test Set.
  - **Intel Image Classification** Used Intel Image Classification Dataset on kaggle. Dataset has 14k images. Created a smalle 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 total of 2 million parameters gave **accuracy of 0.97 on training data**. Future models:LSTM with Attention and Transformer architecture.
- **Design and Modelling Internship** May'18-July'18
  VTOL Aviation India Pvt Ltd.
  - 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.
- **Other Self Projects**
  - **Housing Price Prediction, Sentiment Analysis, Movie Review, Neural Style Transfer, Simon Game(Web), TicTacToe(Web), Pong Game(Python), Blog Website**

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,Rocket Propulsion. Helicopter dynamics
- **Online Courses** Machine Leaning, **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**
- 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.