Piyush Senwar

Junior Undergraduate | Major in Civil Engineering | Minor in Industrial and Management Engineering
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Academic Qualifications

Year	Degree/Certificate	Institute	CPI / %
2018 - 2022 (exp.)	B.Tech	Indian Institute of Technology, Kanpur	8.42/10.00
2018	CBSE - XII	Delhi Public School, Jodhpur	97.4 %
2016	CBSE - X	Delhi Public School, Jodhpur	10.0/10.0

Technical Skills

- **Programming Languages:** C++, C, Python, Python, R, Octave, MATLAB, MySQL, HTML(basic), LaTeX (basic),
- **Softwares, Tools and Libraries:** Git, Pandas, NumPy, Scikit-Learn, Keras, OpenCV Matplotlib, Seaborn, Autodesk Inventor, MS-Excel

Key Academic Projects

- **Emotion Recognition Using EEG Signals** *Dec'20-Present*
  Mentor: Professor Debasis Samanta, Dept. of Computer Science and Engineering, IIT Kharagpur *Github*
  - Aim:Analyzing Human Emotions based on **Electroencephalography** (EEG) signals using the **DEAP** dataset in which **32** subjects each were shown **40** videos and EEG signals were recorded through **40** channels placed on their brain scalp.
  - Read various research papers related to **features selection** and **channel optimisation** and then extract and select best features.
  - Proposed a **hybrid** feature selection method using the techniques like **MI**, **Boruta** and **RFE** to select best 10 features out of 52 and still achieving an accuracy of **75.56%(10 features)** as compared to the **73.42%(52 features)** using **Random Forest** algorithm.
  - Planning to move towards **Deep learning** based feature extraction and selection techniques and then testing on different DL and ML algorithms for **binary** as well as **multi-class** classification and finally **publish** a paper if possible.
- **Credit Card Fraud Detection** *July'20 - July'20*
  Self Project - Machine Learning *Github*
  - An **Anomaly Detection Analysis** on the credit card transactions dataset to identify for the fraudulent transactions prevailing.
  - Used various techniques for **feature selection** and **pre-processing** of a high-class **imbalanced** dataset containing transactions data.
  - Implemented anomaly detection techniques like the **Multivariate Anomaly Detection** and **Isolation Forest** for the given dataset.
  - Applied different Machine Learning and Deep Learning algorithms like **Logistic Regression** , **Random Forest**, **SVM** and **ANN** achieving an accuracy with upto **81%** for detecting a fraudulent transaction with **99.92%** as the overall classification accuracy.
  - Compared different models based on their **F1 score** and **Confusion matrix** and plotted their **ROC Curves**.
- **Fake News Classification** *Sept'20 - Sept'20*
  Self Project - Deep Learning *Github*
  - Compared the performances of different **RNN, ANN, and ML** models to predict the fake news by at first creating an **embedding matrix** for the text data and then initially used models like **ANN** and **Logistic regression** for the classification.
  - Used algorithms like **SimpleRNN, LSTM, Bidirectional LSTM and GRU** to increase the accuracy and make better predictions.
  - Achieved a best **98.56%** accuracy for the **Bidirectional LSTM model** followed by **LSTM > GRU > SimpleRNN > ANN > LR**.
- **Microscopic Traffic Data :Analysis and Extraction** *Dec'20-Present*
  Mentor: Professor Venkatesan Kanagraj, Dept. of Civil Engineering, IIT Kanpur *Github*
  - Aim:To Extract the traffic data using images captured through drones and then using the data to analyze their **trajectories** and predict for different features like **congestion, vehicle detection, etc**.
  - Used **OpenCv** to extract useful information out of the images captured by mapping 2D coordinates to find the 3D coordinates of vehicles by at first doing proper **camera calibration** using Zhang's method and known ground controlled points(**GCPs**)
  - Further work includes **video stabilisation**,**image stitching, vehicles detection** and then using **deep learning** techniques to predict

Relevant Coursework

(A-Excellent Performance, A - Very Good Performance)*

- **Algorithms and Mathematics**
  - Fundamentals of Computing – Data Structures* – Algorithmic Toolbox* – Introduction to Economics-A
  - Applied Probability and Statistics - A* – Computational Methods in Engineering - A – Linear Algebra and ODE
- **Data Science and Machine Learning**
  - Neural Networks and Deep Learning* – Machine Learning with Python* – Data Analysis with Python*
  - Introduction to Data Science in Python* – Introduction to Deep learning and neural networks with Keras* (*Coursera*)

Positions Of Responsibility

Captain, Institute Hockey Team (2020 - Present)	• Entrusted to be in charge for the post of Institute Hockey Team at the end of my **2nd year** itself for exhibiting excellent **performances** and **leadership** skills • Responsible for enhancement of hockey culture in the institute by attracting and nurturing the **juniors** • Responsible to lead the team for inter/intra college tournaments including **Inter IIT Sports meet**.
Student Guide, Counselling Service	• **Mentored 6 freshmen** students to acclimatize to campus environment and to ease up their transition • Coordinated with the **Counselling Service** in smooth organisation of the **Orientation Programme 2019** for an incoming batch of **900+** freshers.

Scholastic Achievements

- Secured an All India Rank of 7317 among the **200k** candidates in Joint Entrance Examination Advanced 2018
- Secured an Olympiad rank of **523** in International Informatics Olympiad, SilverZone Foundation 2014