HIMANSHU

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EDUCATION

Indian Institute of Technology, Kharagpur — **Current CGPA: 8.53/10**
MSc in Mathematics and Computing — July 2016 - ongoing

Central Academy, Kota, Rajasthan — **Aggregate 92%**
Higher Secondary Certificate Examination (CBSE) — April 2015

Ramakrishna Mission Vidyapith, Deoghar, Jharkhand — **Aggregate 10/10**
Secondary School Certificate Examination (CBSE) — March 2013

RESEARCH INTERESTS

Image Classification using Deep Convolutional Networks | Text Classification and generation using CNN and RNN | Machine learning algorithms | Inverse problems in signal and image processing | Sparse modeling of signals and their deployment in signal processing

RESEARCH PUBLICATION

Sreeja. S. R, **Himanshu**, Debasis Samanta "Weighted sparse representation for classification of motor imagery EEG signals," in *41st Engineering in Medicine and Biology (EMB) Conference*, Berlin, IEEE, July 2019

WORK EXPERIENCE

GreyAtom EduTech Pvt Ltd — **Mumbai, India**
Position:- *Data Science Winter Fellow* — *December 2018*

- Created content on Language model which included: N-grams, Noisy Channel Model, evaluation of language models i.e. perplexity, Spell check, Smoothing with Laplace, Add-K and Backoff and Interpolation methods.
- Worked on assignments and contents of Convolutional Neural networks course. Visualization of CNN. Discussions on classical networks of AlexNet, VGG16 and advanced networks, ResNets and Inception Networks.
- Worked on Convex Optimization: Mathematical optimization, Lagrange Multipliers, Least square problem and linear programming with simplex method and visulization and Lagranges duality.

RESEARCH EXPERIENCE / PROJECTS

Sparse Representation Based Classification of EEG signal — **IIT Kharagpur**
Guide:- *Prof. Debasis Samanta Dept. of Computer Science Engineering* — *Dec 2017 - present*

- Construction of Dissimilarity-Weighted Sparse Representation for multi-class classification of motor imagery EEG signals using its wavelet and bandpower features and a weighted Dictionary.
- Implementation in python and experiment with various Dissimilarity measures and number of sparse coefficients to determine best possible combination for speed and accuracy of classification.
- Dictionary size reduction by reducing the number of atoms in the dictionary by redundancy removal and by learning new dictionary using label consistent ksvd and discriminant ksvd.

Prediction of Accident severity of a region — **IIT Kharagpur**
Course*: Soft Computing tools in Engineering* ***Guide****:- Prof. S K Barai* — *March 2018*

- Made a prediction model in keras with resampled data using SMOTE and with features like road conditions, weather and lightning conditions, time, day of week and few other factors.
- Made a Flask app, which marks regions of a city based on accident severity on three levels as low, high and very high integrated with the trained prediction model in real time.

PROJECTS

Assignments during Deep Learning Course **IIT Kharagpur**
***Guide**:- Prof. Sudeshna Sarkar, Dept. of Computer Science Engineering* *January 2019 - April 2019*

- Text classification using CNN on skewed dataset comprising of tweets pertaining to common causes of cancer with the objective to classify the tweets as medically relevant or not. Used fasttext on corpus to get embeddings and resampling to remove skewness. *link to codes*
- RNN for language modelling and use the trained model for the following tasks: 1. Predicting the last word of a sentence 2. Generating a sequence of words. Experiment with one-hot encodings and pre-trained embeddings and using SGD optimizer and softmax for classification.

Kharagpur Data Analytics Group **IIT Kharagpur**
***Guide**:- Prof.Debdoot Sheet, Dept. of Electrical Engineering* *July 2017 - Present*

- Tensorflow implementation of ten way classification of images in CIFAR10 dataset using deep convolutional network along with pooling and regularization with relu activation function.
  Github link to the repository containing related codes
- Implemented deep neural network for handwritten digit classification and analysis of titanic dataset using decision trees and linear SVM.

Kaggle and other competitions **IIT Kharagpur**
***Codes**:- Github Link* *July 2017 - Present*

- Dog Breed classification using transfer learning with VGG19. Using a dense layer and softmax with pre-trained model for classification.
- Contextual Emotion Detection in Text for Emocontext online competition by Microsoft. Used attention mechanism for classification using pre-trained embedding and bidirectional LSTM with softmax for classification.

TERM PAPERS

ImageNet Classification with Deep Convolutional Neural Networks. **IIT Kharagpur**
***Course**: Soft Computing tools in Engineering **Guide**:- Prof. S K Barai* *February 2018*

Fuzzy Logic in Content Based Image Retrieval using Color Feature. **IIT Kharagpur**
***Course**: Soft Computing tools in Engineering **Guide**:- Prof. S K Barai* *April 2018*

COURSEWORK

University Courses : Design and Analysis of Algorithms | Soft Computing tools in Engineering | Programming and Data Structure | Probability and Statistics | Numerical solution of ordinary and pde | Computer Organisation and Architecture | Object Oriented System Design | Machine Learning | Deep Learning** | Measure theory and Integration** | Basic Electronics | Transform Calculus | Partial Differential Equations | Linear Algebra | Real Analysis | Numerical Methods | Modern Algebra** | Operation Research**

** denotes ongoing courses

TECHNICAL SKILLS

Programming Languages	Python, R, C++, Java
Specialized Libraries Environments	Tensorflow, Keras, Scikit-learn, Git, OpenCV, Matplotlib
Other tools	Adobe Photoshop, Lightroom, Visual Studio, Linux

OTHER ACHIEVEMENTS

- Made a web app g-attach for organizing email attachments separately in Microsoft Code.fun.do competition held at IIT Kharagpur.
- Added features and tests in sunpy an open source repository in Github in python.
- Implemented strategies in C++ for bots to play football in code-o-soccer held in Kshitij IIT Kharagpur.