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

Inverse problems in signal and image processing | Sparse modeling of signals and their deployment in signal processing | Machine learning algorithms | Deep Neural Network

RESEARCH PUBLICATION

Sreeja. S. R, **Himanshu**, Debasis Samanta "Weighted sparse representation for classification of motor imagery EEG signals," in *International conference*, 2018/12 (in process).

RESEARCH EXPERIENCE / PROJECTS

Sparse Representation Based Classification **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.
- Dimensional reduction of Dictionary to reduce number of atoms by feature selection using clustering and learning dictionary using label consistent ksvd.

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.

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 using various factors 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 and data pre-processing using SMOTE.

Sanskrit text segmentation using seq2seq models **IIT Kharagpur**
Guide*:- Prof. Pawan Goyal, Dept. of Computer Science Engineering* *August 2018*

- Implementation of a seq2seq model along with copynet mechanism that takes only the sandhied string as the input and predicts the unsandhied string.

WORK EXPERIENCE

GreyAtom EduTech Pvt Ltd **Mumbai**
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 Convolutional Neural Network: Convolutional layers, pooling, strides and Padding. Visualization of CNN. Discussions on classical networks of LENet-5, AlexNet, VGG16 and advanced networks, ResNets and Inception Networks.
- Worked on Convex Optimization: convex sets and functions, local and global optimum, saddle points, Mathematical optimization, Lagrange Multipliers, Least square problem and linear programming with simplex method and visulaization and Lagranges duality.
- Multivariate Calculus: Mutlivariable functions and visualizations, partial derivative, gradients as slope of maximum ascent, Directional Derivative, Jacobians and Hessian and multivariate chain rule.

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 | Measure theory and Integration | Basic Electronics | Transform Calculus | Partial Differential Equations | Linear Algebra | Real Analysis | Numerical Methods | Modern Algebra | Operation Research

Online : Convolutional Neural network (Coursera by Andrew Ng) | Sequence Models (Coursera by Andrew Ng) | Hyperparameter tuning, Regularization and Optimization (Coursera by Andrew Ng) | Machine Learning (Coursera by Andrew Ng) | Data Science, Deep Learning, Machine Learning with Python (Udemy)**

** denotes ongoing courses

TECHNICAL SKILLS

Programming Languages	C, Python, R, C++, Java
Specialized Libraries Environments	Scipy, Tensorflow, 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.
- Contextual Emotion Detection in Text for Emocontext online competition by Microsoft.
- 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.