Vipul Ghate

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EDUCATION

Indian Institute of Technology Roorkee — **Roorkee, India**
B.Tech in BioTech Engineering GPA: 8.7/10.0 — *Expected Graduation: June 2021*

Indian Institute of Technology Roorkee — **Roorkee, India**
Minor in Mathematics GPA — *Expected Graduation: June 2021*

KEY PROJECTS

Traffic Sign Classification using Deep learning *May 2020*
- Built a convoluted neural network (CNN) using Keras with Tensor flow 2.0 as a backend
- Performed image normalization and assessed the performance of CNN using various KPIs

Synthetic Images generation using DCGANs *May 2020*
- Utilised Generative Adversarial Network to generate images of fashionable clothes
- Employed minimax game theoretic formulation to train the generator and discriminator network of DCGAN

Image noise reduction with Auto-encoders using Tensor Flow *Apr 2020*
- Implemented auto-encoding algorithms on top of Neural networks for reducing image noises
- The auto-encoders trained on artificially introduced noise worked with 98% accuracy on the test data

COVID-19 data analysis using Python *Mar 2020*
- Merged two independent datasets to study the country specific relationship between the spread of the virus and happiness measures
- Applied Seaborn library for better visualisation of training and test data

Facial Expression Recognition using Keras *Mar 2020*
- Performed a real time facial expression recognition on video and image data served from web interfaces
- The model was built on a convoluted neural network and worked on six common facial expressions
- Developed CNN from the scratch in Keras and utilised various aiding libraries such as OpenCV

Dimensional reduction using PCA *Feb 2020*
- Utilised Principal Component analysis in machine learning for reducing dataset dimensions
- Performed operations such as data compression in jpg and mp3 files with minimum loss
- Utilised the famous iris dataset consisting of species setosa, vesicolor and virginica

Image Classification using Keras *Feb 2020*
- Classified images of CIFAR-10 dataset using CNN in Keras and TensorFlow

Data retrieval on single/multi-Tables *Dec 2019*
- Developed a program in SQL to retrieve data from relational tables
- Developed both the algorithms for single and multi-table retrieval and performed joining operations

EXPERIENCE

Indian Institute of Technology Bombay
Simulation of Additive manufacturing *28 May 19 - 10 Jul 19*
- Developed programs in MATLAB to solve heat transfer and fluid flow equations for laser based AM
- Employed algorithmic techniques like Finite volume method, SIMPLE to capture the physical phenomenon

Indian Institute of Technology Bombay
Fabrication of Titanium nanotubes *1 Dec 18 - 1 Jan 19*

- Fabricated self-sustaining titanium nanotubes using the anodization process in fluoridated environment
- Researched on the effects of different reagents and electrical parameters on the rate and length of nanotubes

KEY COURSES UNDERTAKEN

Natural Language Processing *Apr 2020 - May 2020*
- Performed sentiment analysis of tweets using logistic regression and then naive Bayes
- Used vector space models to discover relationships between words and used PCA to reduce the dimensionality of the vector space and visualize those relationships
- Developed a program for English to French translation algorithm using pre-computed word embeddings and locality sensitive hashing to relate words via approximate k-nearest neighbor search

Improving DNN: Hyperparameter tuning, Regularization and Optimization *Feb 2020 - Apr 2020*
- Explored the foundations of Neural networks and tricks such as regularization and batch normalization
- Implemented a variety of optimization algorithms, such as mini-batch gradient descent, Momentum, RMSprop and Adam and performed their convergence check
- Implemented DNN in Tensorflow and formulated critical thinking on setting up train/dev/test cases

CNN and sequence models *Feb 2020 - Apr 2020*
- Developed CNNs with recent variations such as residual networks and applied them on visual detection and recognition tasks
- Developed recurrent neural networks (RNN) with variants such as GRU and LSTM and applied sequence models on text synthesis
- Applied sequence models to audio applications, including speech recognition and music synthesis

POSITION OF RESPONSIBILITY AND EXTRA CURRICULARS

Under Graduate Teaching Assistant (UGTA)
IIT Roorkee *Jul 2018 - Mar 2019*
- Mentored 40 freshmen and taught them the basics of Mathematical Methods to enhance their command on the subject
- Assisted professor in conducting weekly quizzes and extra tutorial sections for the efficient time management

SANGRAM - Co-Coordinator
IIT Roorkee *Sept 2018 - Dec 2018*
- Responsible for managing facilities and conducting various events in our annual sports festival
- Planned and managed the itinerary accommodation of over 150 participants from all over the country

RFID Initiative Team
IIT Roorkee *Jan 2019 - Feb 2019*
- Worked on developing windows application and designed the embedded system that was critical in building up the database of UIDs of the RFID cards
- The application was used in the data collection of more than 8000 students of IIT Roorkee

National Sposts Organization (NSO)-Cricket
IIT Roorkee *2017-2018*
- Member of the cricket team to represent IIT Roorkee
- Managed and conducted various cricket events on the institute level as a sports-coordinator

ADDITIONAL

- Areas of interest: Natural language processing, image processing, deep learning in financial analysis
- Relevant Coursework: Data Structures and Algorithms, Natural Language Processing, Computer Systems, Databases, Machine Learning, Deep Learning
- Programming Languages / libraries: Python, C, C++, PHP, Java, HTML/CSS, Javascript, jQuery, NodeJS, Keras, TensorFlow
- Hobbies: coding, trekking, adventure sports, field games
- Secured AIR-6322 in CRL JEE Advanced 2017