Vishal Agarwal

Email : vishalagarwal.jss@gmail.com

Education

- **Indian Institute of Technology Guwahati** — Guwahati, India
  B.Tech in Electronics and Electrical Engineering with minor in Computer Science — *2015 – 2019*
  GPA : 8.85/10

Publication/Technical Report

- **Unsupervised Representation Learning of DNA Sequences** — Accepted at ICML WCB '19
  arXiv : 1906.03087 : Vishal Agarwal, N. Jayanth Reddy, Ashish Anand
- **Deep Face Quality Assessment**
  arXiv : 1811.04346 : Vishal Agarwal
- **An Interval Type-2 Fuzzy Approach to Automatic PDF Generation for Histogram Specification**
  arXiv : 1805.02173 : Vishal Agarwal, Diwanshu Jain, Vamshi K. Reddy, Frank C.H. Rhee

Experience

- **Wadhwani Institute for Artificial Intelligence** — Mumbai, India
  Research Fellow — *June 2019 - Present*
  - Developed a deep learning based solution for Early Pest Management in cotton farming and provide effective recommendation to farmers.
  - Won the Google AI Impact Challenge and received $2 million grant for the AI-based solution in cotton farming.
- **Nvidia Graphics** — Bangalore, India
  GPU Architechture Intern — *May 2018 – July 2018*
  - Worked with **GPU Performance Verification Team** on improving latency and performance analysis in a performance simulation environment for GPUs.
- **Hanyang University, Computational Vision and Fuzzy System Lab** — Ansan, South Korea
  Research Intern — *May 2017 – July 2017*
  - Worked on image contrast enhancement using modified histogram specification to generate an appropriate probability density function (PDF) based on the histogram of input image.
  - Implemented the transformation using fuzzy type-I and type-II modelling and proposed 4 methods for generating the PDF based on type reduction.

Projects

- **Representational Learning Model for Learning Splicing Signals** — Bachelor Thesis
  Prof. Ashish Anand, Dept. of CSE, IIT Guwahati
  - Implemented sequence-to-sequence autoencoder model to learn fixed-length latent representation of DNA sequences in an unsupervised setting.
  - Evaluated the model quantitatively and qualitatively to infer meaningful representations and provide model attribution by identifying motifs which influence splicing.
  - Splicing is a highly regulated process in gene expression which leads to protein diversity and hence understanding its drives are important to understand human genome.
- **Deep Face Quality Assessment** — [report]
  Prof. Kannan Karthik, Dept. of EEE, IIT Guwahati
  - Worked on an automatic face image quality assessment system to evaluate a facial image for its utility in facial recognition system.
  - Trained a deep ConvNet for end-to-end score prediction, between 0 and 1, in a supervised and transfer learning setup using FaceNet and achieved Equal Error Rate of 23%.

- **Filter Bank Generation using Incremental Spherical K-Means Clustering** [report]
  - Explored various clustering algorithms and features or filter extraction techniques.
  - Designed an incremental spherical k-means clustering algorithm for clustering large datasets and extract meaningful filters from the clusters to form a filter bank which can be used in various computer vision and image processing tasks.

- **Deep Learning Approach to Bone Age Estimation** [report]
  - Implemented an end-to-end model for estimation of bone age using x-ray images of hand.
  - Used Inception v3 architecture in a transfer learning setup with a custom trainable regression layer for the output.
  - Achieved Mean Absolute Error of 8.578 years.

Programming Skills

- **Languages**: Python, C, C++, MATLAB
- **Packages**: PyTorch, Keras, LaTeX

Key Courses

- **Course Curriculum**
  - Pattern Recognition and Machine Learning
  - Probability and Random Process
  - Image Processing
  - Digital Signal Processing
  - Queueing Systems
  - Biometrics
  - Data Structures and Algorithms
  - Computer Architecture and Embedded Systems
  - Operating Systems
  - Linear Algebra
- **MOOCs**
  - Machine Learning (Andrew Ng, Coursera)
  - CS231n (Andrej Karpathy, Stanford)
  - Deep Learning Specialization (deeplearning.ai)
  - Introduction to RL (David Silver, DeepMind)

Achievements

- **Departmental Rank 2** for the discipline of Electronics and Electrical Engineering.
- Awarded **full scholarship** to attend 2018 Deep Learning Summer School at **Tsinghua University, China**.
- Awarded the **Indian Academy of Science Summer Research Fellowship** for the year 2018.
- Awarded **Change of Discipline** after completion of 1st year on merit basis.

Extracurriculars

- **Undergraduate Teaching Assistant** for course of Signals and Systems, taken by sophomores.
- **Mentor** for the 2017 and 2018 freshers under Peer Mentorship Program, IIT Guwahati.
- More than **40 hours of community service** under National Service Scheme, IIT Guwahati.
- **Class Representative**, Department of EEE, IIT Guwahati.
- **Project Manager**, Core Team Member of **Robotics Club**, IIT Guwahati.