

Vishal Agarwal

B.Tech, Electronics and Electrical Engineering
Minor in Computer Science
Indian Institute of Technology Guwahati, India

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EDUCATION

Indian Institute of Technology Guwahati

Guwahati, India

- *B.Tech in Electronics and Electrical Engineering with minor in Computer Science*
GPA : 8.87/10 (**Departmental Rank : 2**)

2015 – 2019

TECHNICAL REPORT/PUBLICATION

- **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
- **Deep Face Quality Assessment**
arXiv : 1811.04346 : Vishal Agarwal

EXPERIENCE

- **Nvidia Graphics** Bangalore, India
GPU Architecture 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.
 - Used Average Information Content (AIC) metric for comparing our proposed method with existing well known methods such as BBHE, RMSHE and BPFHE.

PROJECTS

- **Representational Learning Model for Learning Splicing Signals** Ongoing
Prof. Ashish Anand, Dept. of CS, IIT Guwahati
 - 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.
 - Implementing sequence-to-sequence models to learn important features or motifs of DNA sequences in both supervised and unsupervised setting and predict competitive nature of splicing.
 - Extending our analysis by proposing few visualization techniques to identify motifs or parts of sequences which induce competitive effect in splice sites and influence splicing.
- **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.
 - This can act as a pre-processing state for any critical facial recognition system which rejects face images below a certain threshold.
 - Trained a deep ConvNet for end-to-end score prediction, between 0 and 1, in a supervised and transfer learning setup.

- **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 transfer learning in the Inception V3 architecture with a custom trainable regression layer for the output.

PROGRAMMING SKILLS

- **Languages:** Python, C, C++, MATLAB, Bash
- **Packages:** Keras, Tensorflow, PyTorch, L^AT_EX

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.