Vishal Agarwal

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Experience

- **Machine Learning Engineer, Wadhwani AI** — Mumbai, India
  Wadhwani Institute for Artificial Intelligence — *June 2019 - Present*
  - Developed and deployed a deep learning solution to identify harmful pests, alert farmers about infestation and reduce crop loss in cotton farming. Used object detection model and applied model compression on it to do efficient on-device inference. Currently used by over 18,000 farmers.
  - Only project from Asia and among top 3 teams worldwide to receive $2 million grant and win the Google AI Impact Challenge for the AI-based solution in cotton farming.
  - Developed a machine learning model to classify high risk malaria cases using symptoms and location data. Simulated real world scenario with time-ordered and location dependent cases. Achieved higher sensitivity and positive predictive value compared to expert diagnosis. Potential deployment in Nigeria.
  - Working on a point-of-care screening tool to classify tuberculosis patients based on ultrasonography videos. Preliminary results showed a 17% lift in accuracy compared to the radiologist's diagnosis.
  - Leading ML engineering efforts for efficient end-to-end development. Developed a backend framework using PyTorch and TorchServe to easily deploy, serve and monitor models in production.

- **Summer Intern, NVIDIA** — Bangalore, India
  GPU Performance Verification Team — *May 2018 – July 2018*
  - Improved latency profiling and performance analysis for tensor workloads and optimized GPU performance 3x in a perf simulated environment.

- **Summer Research Intern, Hanyang University** — Ansan, South Korea
  Computational Vision and Fuzzy System Lab — *May 2017 – July 2017*
  - Developed an algorithm for image contrast enhancement based on histogram specification to dynamically generate the probability density function (PDF) depending upon the input image.
  - Proposed four different transformation using fuzzy type-I and type-II modelling for generating the PDF based on type reduction.

Publications/Manuscripts

- **Pest management in cotton farms: an AI-system case study from the global South** [paper]
  Aman Dalmia, Jerome White, Ankit Chaurasia, ***Vishal Agarwal****, Rajesh Jain, et al.*
  ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2020

- **Unsupervised Representation Learning of DNA Sequences** [paper]
  Vishal Agarwal*, N. Jayanth Reddy, Ashish Anand*
  International Conference on Machine Learning (ICML) Workshop on Computational Biology 2019

- **Deep Face Quality Assessment** [paper]
  Vishal Agarwal

- **An Interval Type-2 Fuzzy Approach to PDF Generation for Histogram Specification** [paper]
  Vishal Agarwal*, Diwanshu Jain, Vamshi K. Reddy, Frank Chung-Hoon Rhee*

Education

- **Indian Institute of Technology Guwahati** — Guwahati, India
  Bachelor of Technology (B.Tech) — *2015 – 2019*
  - Pursued a major in Electronics and Electrical Engineering and a minor in Computer Science.
  - Achieved a GPA of 8.84 on a scale of 10 and secured a departmental rank 3.
  - Undergraduate Teaching Assistant for the course of Signals and Systems.

Achievements

- Departmental Rank 3 for the discipline of Electronics and Electrical Engineering.
- Received full tuition fee waiver in undergraduate on merit basis.
- Awarded full scholarship to attend 2018 Deep Learning Summer School at Tsinghua University, China.
- Awarded the 2018 Indian Academy of Science Summer Research Fellowship.
- Awarded Change of Discipline after completion of 1st year on merit basis.

Projects

- **Unsupervised Representational Learning of DNA Sequences** [report]
  Prof. Ashish Anand, Dept. of CSE, IIT Guwahati
  - Using unsupervised learning in sequence-to-sequence autoencoder models, proposed an approach to learn fixed-length smaller dimensional representation of DNA sequences.
  - Showed the efficacy of learnt representations using quantitative and qualitative evaluation in a downstream task of splice site prediction, matching state-of-the-art accuracy.
  - This work was accepted at the 2019 ICML Workshop on Computational Biology.

- **Multichannel Heart Sound Signal Acquisition and Segmentation** [report]
  - Designed a hardware based two channel heart sound signal acquisition circuit which simultaneously reads heard sound signals from two auscultation areas.
  - The signal acquired was fed to a computer and a GUI application was developed which shows information about the heart sound such as frequency domain analysis and heart sound rate in beats per minute.

- **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.

Skills

- **Skills**: Machine Learning, Deep Learning, ML Engineering, MLOps
- **Languages**: Python, C, C++, MATLAB, Java, LaTeX
- **Framework**: PyTorch, Keras, TorchServe, AWS Sagemaker, Django
- **Miscellaneous**: Git, GitHub, Docker, AWS

Extracurriculars

- Mentor for the 2016, 2017 and 2018 freshers under Peer Mentorship Program, IIT Guwahati.
- More than 60 hours of teaching community service in local underrepresented schools.
- Class Representative, Department of Electronics and Electrical Engineering, IIT Guwahati.
- Project Manager, Core Team Member of Robotics Club, IIT Guwahati.