Ashmit Khandelwal

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Pre-Final year Computer Science student at BITS Pilani. I'm a machine learning developer and researcher, with experience in implementing deep learning models for computer vision tasks including visual question answering, and semantic segmentation. Currently exploring Generative Models and Reinforcement learning.

Education

Birla Institute of Technology and Science, Pilani

Goa, India

B.E. Computer Science, with Minor in Data Science — *2020 - 2024 (expected)*

Current CGPA: **9.41/10**

Relevant Coursework: Foundations of Data Science*, Applied Statistical Methods*, Operating Systems*, Object Oriented Programming, Data Structures and Algorithms, Discrete Structures in Computer Science, Database Systems

* = *ongoing*

Projects

Efficient Segmentation and VQA on Aerial Flood Images

BITS Pilani

Supervisor: Sravan Danda, BITS Pilani — *Sep 2022 - Ongoing*

- This project is related to the *EarthVision 2021 - FloodNet Challenge*, which involves Semi-Supervised **Semantic Segmentation of aerial images of flood hit regions**, and **Visual Question Answering (VQA)** of the flood conditions based on the segmentation.
- Existing semantic segmentation models for such aerial datasets are **computationally intensive**. The project aims to obtain **near-real time** high quality results on such VQA tasks, and develop a Neural Network that can run on **computationally constrained devices** such as drones.

Semantic Segmentation with U-Net

Code and Results — *Jul 2022*

- **PyTorch implementation** of the U-Net from the *U-Net: Convolutional Networks for Biomedical Image Segmentation* paper, trained on the **Carvana Dataset** from Kaggle.
- Improved on the model's architecture by applying **batchnorm**, tested the effectiveness of the **copy-crop connections**, and visualized what the **model is looking for**.

Image Super Resolution

Code and Report — *Feb 2022*

- Developed a **Convolutional Neural Network** to **upscale low resolution images**, by a factor of 2.
- **Contrasted model architecture** designs, such as **CNNs, ResNets, Transposed Convolution, and SubPixel Convolution**. Prepared a detailed report for the same.

Bayesian Multi Layered Perceptron

Code and Report — *Feb 2022*

- A **Bayesian MLP** to classify a simple XOR dataset. The model can easily be extended to work with more complex datasets.
- Defined **posterior and likelihood functions**, and used Markov Chain Monte Carlo Sampling. Specifically used the **Metropolis-Hastings algorithm**, for **optimal weight sampling**. Produced a brief report of the results.

Work Experience

National Centre for Polar and Ocean Research

Remote

Research Intern — *Jun - Jul 2022*

- Worked on **Forecasting** of Antarctic weather, using **Deep Learning** models on **time-series** data gathered from Indian Antarctic research stations.
- **Implemented and compared** various Deep Learning models, such as **1D CNNs, LSTMs, and Seq2Seq** models.
- Used **trend, seasonality, and auto-correlation** for deciding model architecture and tuning parameters.

Courses and Schools

2022 **CS231n: Deep Learning for Computer Vision**, Stanford — *Online*

2022 **Amazon ML Summer School 2022**, Amazon — *Online*

Teaching Experience

QSTP 2022: Introduction to Deep Learning

Instructor | Quark, BITS Pilani - Goa *Jul - Aug 2022*

- Co-instructing for the Introduction to Deep Learning course.
- The course provides introductory knowledge and assignments on Deep Learning, Computer Vision, Natural Language Processing, and Generative Models.

Skills

Programming Languages: Python, Javascript, Java, C/C++, SQL, HTML/CSS

Frameworks and Libraries: PyTorch, Tensorflow/Keras, Numpy, Pandas, Scikit-Learn, MongoDB, ExpressJS, ReactJS

Committees

2022 **Member,** Society for Artificial Intelligence and Deep Learning *BITS Pilani, Goa*

2021 **Core Member,** Developer's Society, BITS Goa *BITS Pilani, Goa*