Atmadeep Banerjee

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EDUCATION

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
B.E. in Computer Science with Minor in Data Science | August 2017 - Present | CGPA: 8.58/10
Relevant Coursework: • Neural Networks and Fuzzy Logic • Machine Learning • Design and Analysis of Algorithms • Data Structures and Algorithms • Database Management Systems • Object Oriented Programming • Applied Statistical Methods

EXPERIENCE

PIXXEL | AI Researcher | May 2018 - Present
- Trained a model to synthesize **multispectral** imagery using **radar satellite** data. Achieved a **PSNR of 28.9** on the validation set.
- Trained a model for segmenting buildings and roads from satellite imagery. Used a **Self-Attention LinkNet** model with **Perceptual Loss** adapted for semantic segmentation. Our training technique led to the generation of **smooth and connected** segmentation masks.
- Created a labelled dataset for road segmentation in Indian cities, using Pixxel's proprietary satellite imagery.
- Worked with **multispectral** (MODIS) data. Contributed to the data pipeline using Google Earth Engine python API.

VCG LAB, HARVARD UNIVERSITY | Research Intern | June 2020 - December 2020 | Advisor: Dr. Hanspeter Pfister
- Currently working as a research intern at Visual Computing Group, Harvard University.
- Working on a novel model for **Instance Segmentation** on COCO dataset, using metric learning.

BITS PILANI | Research Assistant | August 2019 - April 2020 | Advisor: Dr. Pratik Narang
- Worked on **1-shot** image segmentation. Achieved a **dice score of 76.6 on FSS-1000** dataset (**3% higher than baseline**) using a novel model with **70% lesser parameters**. [Paper]
- Implemented meta learning algorithms **Meta-SGD, MAML and Reptile** for Few Shot Classification on Omniglot dataset.
- Built a **generalised library for meta learning** tasks by extending the fastai library. [**Code**].

MAPMYINDIA/BITS PILANI | Research Assistant | August 2018 - November 2018 | Advisor: Dr. Kamlesh Tiwari
- Worked on a project for **detecting and classifying various Indian road signs**.
- Studied the performance of various region based and single-shot object detection algorithms.
- Trained a **network based on YOLO v3** algorithm. Achieved a **mAP score of 89.71** and **F1-score of 0.94**

PROJECTS

- **Diabetic Retinopathy Diagnosis:** Trained a CNN model to detect the occurence of Diabetic Retinopathy from fundus photography. Achieved a quadratic **Kappa score of 0.922** on a Kaggle private **test set** (13,000 images). [**Code**]
- **Generating Pokemon images using a GAN** Scrape pokemon images from the internet through DuckDuckGo image search. Generate new Pokemon images using a Wasserstein GAN. [**Code**]
- **NumpyML:** A **modular CNN library**, focusing on simplicity. Shows how various layers of a neural network work. Written completely in **Python and Numpy**. Python performance issues dealt with using **Numba**. [**Code**]
- **Twitter Sentiment Analysis Stream tweets** relevant to user query in **real-time**, using Twitter's API. Read streamed text corpuses using a **CNN model** and **word2vec** embeddings, and calculate mean sentiment on a scale of 0 to 1. [**Code**]

PUBLICATIONS

- **Banerjee A.**, (2020). **Combinets v2: Improving Conceptual Expansion using SGD**. *ACM India Joint International Conference on Data Science Management of Data (**CODS COMAD**), Young Researcher's Symposium (accepted)*
- **Banerjee, A.**, Palrecha, A., (2020). **MXR-U-Nets for Real Time Hyperspectral Reconstruction**. *arXiv e-print 2004.07003* [**Paper**] [**Code**]
- Arad, B., Timofte, R., Ben-Shahar, O., Lin, Y., Finlayson, G., Givati, S., **Banerjee, A.**, Palrecha, A., et al. (2020). **NTIRE 2020 Challenge on Spectral Reconstruction from an RGB Image**. *The **IEEE** Conference on Computer Vision and Pattern Recognition (**CVPR**) Workshops* [**Paper**]
- **Banerjee A.**, (2020). **Meta-DRN: Meta-Learning for 1-Shot Image Segmentation**. *arXiv e-print 2008.00247* [**Paper**]

ACCOMPLISHMENTS

- **Kaggle Silver Medal:** Won a silver medal(rank 131 in private leaderboard) in APTOS 2019 Blindness Detection competition.
- **Runner's Up Philips Code2Care Hackathon, 2019:** Won 2nd place among over 7000 participating teams across India.
- **Finalist Philips Data Science Hackathon, 2018:** Was among the top 14 teams across India to qualify for the final round.
- **NTIRE 2020** Ranked 12/103 teams in NTIRE 2020 Spectral Reconstruction Research Challenge

SKILLS

- **Fluent:** Python, C, Fastai, Pytorch, Numpy, Pandas
- **Moderate:** Java, C#, Tensorflow, Keras, OpenCV, Scikit-Learn, Unity3D
- **Basic:** Unity3D ML Agents, SQL, HTML, CSS, GCP, AWS