Atmadeep Banerjee

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EXPERIENCE

MORPHLE LABS | ML Engineer | Sep 2021 - Present
- Built a **real time instance segmentation** pipeline for **detection, classification and sorting of blood cells**.
- **Integrated multiple AI models** into the existing slide scanning application, making **multi-stage slide scanning** possible.
- Built the world's first combined **BMA + PS blood scanner**. Currently in use at Fortis, New Delhi and Orange Health.
- Built **custom annotation tools** in react native for annotating blood slides for our **proprietary datasets**.
- Built an AI tool to detect **brain cancer metastasis** from whole slide scans.

AALTO UNIVERSITY, FINLAND | Research Assistant | Jun 2021 - May 2022 | Advisor: Dr. Rohit Babbar
- Worked on **extreme classification** of text and **information retrieval**.
- Achieved **SOTA** for **short text classification** using a very lightweight CNN based model, outperforming transformers like Bert [**Paper**].
- Worked on a **novel training technique** to further improve our model in presence of label features (paper under review).
- Achieved **SOTA** for **long text classification** using a novel **Tree-in-Transformer** model [**Paper**] (accepted, Neurips 2022).

VCG LAB, HARVARD UNIVERSITY | Research Intern | Jun 2020 - May 2021 | Advisor: Dr. Hanspeter Pfister
- Worked on a novel model for **Instance Segmentation** on COCO dataset, using metric learning.
- Worked on improving Flood-Filling Networks for **3D neuron segmentation** from electron microscopy data.
- Improved the state-of-the-art in **super-resolution of natural images** through better training techniques. [**Paper**][**Code**]

PIXXEL | AI Researcher | May 2018 - Aug 2020
- Trained a model to synthesize **multispectral** imagery using **radar satellite** data. Achieved a validation **PSNR of 28.9**
- Trained a model for **few-shot segmentation** of object classes in XView dataset from satellite imagery.
- Trained a novel model for segmenting buildings and roads from satellite imagery. Used a **Self-Attention LinkNet** model with **Perceptual Loss**. Our method led to **smooth** and **noise-free** segmentation.

PROJECTS

- **Generating Pokemon images using a GAN** Scraped pokemon images from the internet through DuckDuckGo image search. Generated new Pokemon images using a Wasserstein GAN. [**Code**] [**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**]
- **Q-Learning:** Implemented Q-Learning from **scratch in Java** for the board game DotsNBoxes. Experimented with several training scenarios, including **adversarial self-play**, and compared the performance of trained agents. [**Code**][**Report**]

PUBLICATIONS

- Kharbanda S., **Banerjee A.**, Schultheis E., Babbar R. (2022). **CascadeXML: End-to-end Multi-Resolution Learning for Extreme Multi-Label Text Classification**. *accepted, Neurips 2022* [**Paper**]
- Lin Z., Garg P., **Banerjee A.**, et al. (2022). **Revisiting RCAN: Improved Training for Image Super-Resolution**. *arXiv e-print 2201.11279* [**Paper**]
- Kharbanda S., **Banerjee A.**, Palrecha A., Gupta D., Babbar R. (2021). **InceptionXML : A Lightweight Framework with Synchronized Negative Sampling for Short Text Extreme Classification**. *accepted, ACL 2022, February ARR* [**Paper**]
- Banerjee, A., (2021). **Meta-DRN: Meta-Learning for 1-Shot Image Segmentation**. *IEEE India Council International Conference (Indicon)* [**Paper**]

EDUCATION

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
B.E. in Computer Science with Minor in Data Science | August 2017 - July 2021 | CGPA: 8.72/10
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

ACCOMPLISHMENTS

- **Kaggle Competitions Expert:** Ranked among top 1.7% of competitors on Kaggle. Have a silver medal in 2019 APTOS Blindness Detection (rank 131/2928) and in 2022 UW-Madison GI Tract Image Segmentation (rank 72/1548).
- **NTIRE 2020** Ranked 12/103 teams in NTIRE 2020 Spectral Reconstruction Challenge [Paper][Code for our submission]
- **2nd Runner's Up Philips Code2Care Hackathon, 2019:** Won 2nd place among over 7000 participating teams across India.

SKILLS

- **Expert:** Python, C, Pytorch, Numpy, Pandas, Scikit-Learn, Detectron2, Pytorch-Lightning
- **Moderate:** Tensorflow, Keras, OpenCV, Unity3D
- **Basic:** Unity3D ML Agents, SQL, HTML, CSS, GCP, AWS, Java, C#