Adnan Ahmad

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Education

Carnegie Mellon University, School of Computer Science **Dec 2022**
Masters of Science in Computer Vision - GPA: 3.9/4 *Pittsburgh, PA*

Pune Institute of Computer Technology **June 2018**
Bachelor of Engineering in Computer Engineering - GPA: 9.7/10 *Pune, India*

Experience

Allen Institute for AI (AI2) **May 2022 – Aug 2022**
AI Research Intern *Seattle, WA*

- Worked on unsupervised detection of illegal fishing vessels from NASA VIIRS Nighttime satellite imagery.
- Created a 7 step CV heuristic method to generate accurate pseudo-annotations. Modified the FPN module in RetinaNet to detect really small objects (2px, 2px) in high-res images. The trained model outperformed previous state of the art.
- Implemented a complex image processing module that accounted for moonlight, cloud cover and lightning to remove FPs
- Worked independently on all aspects of project including modules for Real-Time data sync from 2 NASA JPSS satellites, data processing, ML detection algorithm, correlations with AIS radio positions, model serving
- Project successfully integrated in the Skylight product. It saved the company $60k in annual licensing fees and was an important part of a $2 million US military DIU contract
- Nominated for Outstanding Intern Award

Meta **Jan 2022 – Dec 2022**
Team Member (Capstone) (Advisors: Sam Pepose (Meta) and Prof Kris Kitani (CMU)) *Pittsburgh, PA*

- Developing a novel unsupervised and online Multi Object Tracking (MOT) algorithm with the Portal team at Meta.
- Implemented multiple state of the art MOT methods like ByteTrack and OC-SORT. Devised a new Optical Flow matching pipeline for unsupervised candidate generation
- Added a noise filtered appearance Re-ID model in OC-SORT and a selective temporal attention mechanism for candidate matching achieving new state of the performance of MOTA 74.8 on MOT17 half-val

Diciphr Lab, University of Pennsylvania **Jan 2020 – Aug 2021**
Research Analyst - Machine Learning *Philadelphia, PA*

- Developed a novel Multi-task learning based Sequential method using a group of Transformer encoders-decoders to detect 33 anatomical clusters in brain fiber tract maps. 20% more accurate, 7x faster than previous state of the art.
- Developed state of the art automated artifact detection method for 3D diffusion images that utilized a custom 3D DenseNet based model. Model achieved 94% accuracy on diverse 2000 test scans
- Packaged library integrated in diffusion imaging pipelines at multiple labs across UPenn Hospital. Consequently awarded intra-Penn grant of $30,000 for developing clinically applicable research.

DeepTek Inc **Sep 2018 – Jan 2020**
Machine Learning Engineer *Pune, India*

- Joined as second employee of the company and founding member of the ML team. Instrumental in researching and implementing from scratch multiple critical ML algorithms and infrastructure projects
- Developed a complex hierarchical ensemble of 8 image classification models that identified 22 diseases from chest-Xrays for our flagship product. Created disease localization modules by adapting GradCAM, RetinaNet, Mask-RCNN
- Implemented a semantic search functionality for 200,000 radiology reports that combined a Seq2Seq language model with Doc2Vec style embedding technique to generate contextual search results.
- Independently designed and built ML infrastructure that hosted all our 25 AI models through 9 Flask based asynchronous microservices running on Kubernetes and Spinnaker clusters, ensuring minimal downtime and prediction latencies.

Research Projects

Min-max Attention Sampled NeRF **CMU - 16-889 (Learning for 3D-Vision) | Mar 2022 – May 2022**

- Developed a novel soft min-max and attention map sampling strategy for pixels within a NeRF model that bias it towards regions informed by the loss function. We showed our model outperforms standard NeRF in reconstruction quality and converges up to 3x faster

Technical Skills

Languages: Python, Java, C++, HTML/CSS, SQL
Tools and Frameworks PyTorch, Tensorflow, Keras, OpenCV, Flask, Docker, Kubernetes