Vedant Joshi

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EDUCATION

- **UC San Diego** — California, USA
  Masters in Computer Science — *September 2023 - Current*
- **Indian Institute of Information Technology** — Kottayam, India
  B.tech Honours in Computer Science; GPA: 3.94 (9.82/10.0 - Gold Medalist) — *Aug 2017 - May 2021*

SKILLS SUMMARY

- **Languages**: Python, Java, C, C++
- **Tools**: Tensorflow, PyTorch, OpenCV, SciKit, Nvidia TensorRT, Pandas, Numpy, Matplotlib, Onnx, Git, Google Colab, Arduino
- **Cloud Technologies**: AWS, Microsoft Azure congnitive services

EXPERIENCE

- **Tonbo Imaging** — Bangalore, India
  Vision & Imaging Engineer - I — *February 2023 - July 2023*
  - **Object Detection**: Worked on adapting **YOLO** for long wavelength IR images by extending **cross stage partial layers** , **selective kernel attention modules** & multi-scale predictions to promote weak features in IR data. This improved the object detection by **20%** mAP along with reduced false negatives for tiny objects.
  - **Artificial Data Synthesis**: Worked on the task of generating pseudo IR images from RGB counterparts through attention UNET from **diffusion models** & **sub-pixel convolutions**. Generated details in IR images were further improved by using **neural style-transfer** losses.

- **Vedantu Innovations** — Bangalore, India
  Data Scientist - I — *July 2021 - December 2022*
  - **Cluster Cleaner**: Developed a NLP based cleaning pipeline using a parametric, ensemble mechanism of **n-gram SimHashing** & **Levenstein distances**, whose goal was to robustly remove incorrect strings due to OCR misreads & improve the homogeneity of doubt clusters. This improved the search recall by **40%**.
  - **Self Supervised Search Engine**: Worked on building the image matching module of the doubt search engine using self-supervised frameworks such as **SimCLR** & **BYOL**, to create a compressed latent space that allows easy retrives similar looking doubts using approximate KNN algorithms. This was further improved by building a domain specific augmentation pipeline using **mutual information metrics**
  - **Profanity Filtering**: Developed a novel profanity detection module via **contrastive learning** to train a LSTM module that generated latent vectors which were invariant to the spectrum of ways in which an abuse can be posted. This approach massively reduced the size of our profanity vocabulary & improved the recall by **10%** over baseline regex.

- **TCS Rapid Labs** — Bangalore, India
  Research Intern — *September 2020 - March 2021*
  - **Vision based lip reading**: Worked on replicating as well as fine tuning DeepMind's lipNet architecture in Tensorflow2.0 for the LRW dataset, along with implementation of large scale dataset preprocessing, **custom edit distance metrics** & **CTC loss** to train the encoder-decoder network.
  - **Attention Innovation**: Worked on adding **attention mechanism** into the LipNet model which allowed it to dynamically shift its focus on appropriate lip movement video frames to achieve better video to character alignment.

- **Vedantu Innovations** — Bangalore, India
  Deep Learning Intern — *September 2020 - April 2021*
  - **Image Denoisers**: Developed image de-noising/skewing models using **UNET segmentation** & variational auto-encoders to create binarised images that improve the text extraction accuracy of Tesseract OCR.
  - **Subjects Classifier**: Developed a POS for doubt's subject classification using **BERT** & **bi-directional attention based LSTM** using custom text preprocessing pipelines in PyTorch.

ACADEMIC PROJECTS

- **Coco Layers**: Worked on curating a novel & small scale, annotated coconut images dataset using drones at multiple locations in Kerala. Researched on using quantized versions of SSD MobileNetV2, YoloV3 & tensorRT optimized tiny YoloV4 for inference on Nvidia Jetson Nano for coconut detection. The fastest tiny YoloV4 model was able to achieve **22 FPS detection rate** when tested in real conditions. (Jan '20)

- **IoT Dashboard**: Developed a real time, React based dashboard to display live IoT services data for the airport terminal manager & handled artificially generated data using MongoDB. Facbook's prophet model was used to adapt to the trend, periodicity & seasonality of artificial service demand data for getting accurate predictions. (Jul '20)**Project Link**