Vedant Joshi

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Education

University Of California San Diego — **Sep. 2023 – Current**
Master of Science in Computer Science — *La Jolla, California*

Indian Institute Of Information Technology Kottayam — **Aug. 2017 – April 2021**
Bachelor of Technology (Hons.) in Computer Science; GPA: 3.94 (9.82/10.0 - Gold Medalist) — *Valavoor, Kerala*

Technical Skills

Languages: Python, Java, C, C++, SQL
Developer Tools: Tensorflow, PyTorch, OpenCV, SciKit, TensorRT, Pandas, Numpy, Matplotlib, Onnx, Git, Google Colab, VS Code
Cloud Technologies: AWS, Microsoft Azure congnitive services, Google Cloud Platform

Experience

Tonbo Imaging — **February 2023 – July 2023**
Computer Vision & Imaging Engineer - I — *Bangalore, Karnataka*

- Enhanced YOLOv5 for infra-red image object detection by implementing thicker **CSP** layers & **SK attention**, to capture weak signals in the image. All these modifications yielded an improvement of **20%** in mean average precision.
- Solved the problem of data shortage by building an IR image generator from RGB data, by utilising **diffusion** based attention UNETs along with **neural style transfer** losses. The quality of generated images was further enhanced using SubPixel convolutions.

Vedantu Innovations — **July 2021 – December 2022**
Data Scientist - I — *Bangalore, Karnataka*

- Engineered a text matching pipeline using **n-gram SimHashing** & **Levenstein distances**, to remove OCR misread strings present in search clusters. This module improved the overall match rate of elastic search engine by **40%**.
- Architected the image search engine by creating a searchable embedding space through the SSL framework **BYOL**. Quality of matches was further enhanced through domain specific augmentations, which reduced the search redundancy by **72%**.
- Created a novel solution for profanity detection using **contrastive learning** on LSTMs to learn embeddings that are invariant to word variations. Along with a reduction in profane vocabulary size, a **10%** improvement in recall over baseline regex was achieved.
- Leveraged the SSL framework **SCARF** & **TabTransformers** to capture intricate patterns in click-stream & user interaction data. The results were clustered to build user behviour cohorts that improved the productivity of marketing teams by **25%**.

TCS Rapid Labs — **September 2020 – March 2021**
Research Intern — *Online*

- For the task of lip reading, repurposed the decoder of the LipNet model from word to character level in order to train it on single word LRW dataset. Implementing **custom edit distance** metrics & **CTC loss**, allowed us to achieve a **25%** character error rate.
- Proposed FYEO, that involved the addition of **attention mechanism** into the LipNet model which allowed it to dynamically shift its focus on appropriate frame combination for character prediction.

Vedantu Innovations — **September 2020 – April 2021**
Deep Learning Intern — *Online*

- Experimented with image de-noising/skewing models using **UNET segmentation** & **VAEs** to create binarised images that reduced the character error rate by **5%** during text extraction by Tesseract OCR.
- Enhanced the effectiveness of bi-directional embedding vectors from fine tuned **BERT** for the task of doubt subject classification on imbalanced datasets. Text normalisation & **LDA topic modelling** was used to reduce the overfitting on dominant classes.

Projects

Coco Layers | *B.tech Hons. Project* — **January 2020**

- Curated a novel, small scale annoted coconut images dataset using drones at multiple locations in Kerala.
- Conducted a comparative study on model quantization & weight pruning for **SSDs** & **YOLOs** for edge based object detection.
- Developed a deployment pipeline with efficient frame buffer handling mechanisms to achieve a frame rate of **22 FPS** detection rate.

IoT Dashboard | *SIH Hackathon Finals (Machine Learning)* — **July 2020**

- Developed a real time, React based dashboard to display live IoT services data for the terminal manager.
- Implemented **Facebook's prophet model** to capture the periodicity in resource consumption for service demand prediction.