

VEDANT JOSHI

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EDUCATION

University Of California San Diego

Master of Science in Computer Science

Sep. 2023 – Current

La Jolla, California

Indian Institute Of Information Technology Kottayam

Bachelor of Technology (Hons.) in Computer Science; GPA: 3.94 (9.82/10.0 - Gold Medalist)

Aug. 2017 – April 2021

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 cognitive services, Google Cloud Platform

EXPERIENCE

Tonbo Imaging

Computer Vision & Imaging Engineer - I

February 2023 – July 2023

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

Data Scientist - I

July 2021 – December 2022

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 behaviour cohorts that improved the productivity of marketing teams by **25%**.

TCS Rapid Labs

Research Intern

September 2020 – March 2021

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

Deep Learning Intern

September 2020 – April 2021

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 annotated 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.

PUBLICATIONS

1. **Vedant Sandeep Joshi**, Sivanagaraja Tatinati, Yubo Wang, *Looking For A Match: Self-supervised Clustering For Automatic Doubt Matching In e-learning Platforms* preprint : arXiv:2208.09600, <https://doi.org/10.48550/arXiv.2208.09600>
2. **Vedant Sandeep Joshi**, Sivanagaraja Tatinati, Yubo Wang, *YZR-net : Self-supervised Hidden representations Invariant to Transformations for profanity detection* preprint : arXiv:2211.15532, <https://doi.org/10.48550/arXiv.2211.15532>
3. **Vedant Sandeep Joshi**, Ebin Deni Raj, *FYEO : A Character Level Model For Lip Reading*, IEEE/8th International conference on Smart Computing and Communications, Accepted Sep 6 2021, <https://doi.org/10.1109/ICSCC51209.2021.9528104>
4. **Vedant Sandeep Joshi**, Ebin Deni Raj, Jeena Thomas, *Quantized Coconut Detection Models with Edge Devices*, *Journal of Interconnection Networks* [Scopus Indexed Journal], Accepted November 2 2021, <https://doi.org/10.1142/S0219265921440102>