Jay Sawant

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Education

University of California, San Diego San Diego, CA
- Incoming MS in Data Science student at Halıcıoğlu Data Science Institute (HDSI) [Expected Sep '24 - Mar '26]

Indian Institute of Technology Bombay Mumbai, India
- Graduated with a Bachelor's and Master's Degree in Electrical Engineering | CGPA - 8.9/10 [Jul '18 - Jun '23]
- Relevant courses: Machine Learning, Generative AI with LLMs (Coursera), Automatic Speech Recognition, Probability and Random Process, Linear Algebra, Medical Image Computing, Advanced Image Processing, Data Structures and Algorithms
- Achieved a percentile score of 98.6 in the JEE Advanced Examination of 2018 among 163K candidates

Technical Skills and Extracurricular

Programming & Tools Python, C++, SQL, Bash, MATLAB, PyTorch, CUDA, Tensorflow, HuggingFace, Pandas, OpenCV, Git
Teaching Assistantship Introduction to Machine Learning (EE769), Introduction to Digital Image processing (EE610)

Publications

- Patil, A.; Diwakar, H.; **Sawant, J.**; Kurian, N.C.; Yadav, S.; Rane, S.; Bameta, T.; Sethi, A. Efficient Quality Control of Whole Slide Pathology Images with Human in-the-Loop Training. *J. Pathol. Inform.* **2023**, *14*, 100306

Work, Research and Internship Experience

- **Cardiac arrhythmia detection and classification** | *Probeplus Innovative Solutions Pvt. Ltd.* | *AI Consultant* [May '24 - Jul '24]
  - Trained a baseline CNN and multi-head attention based model as a part of a remote-health monitoring system to achieve a multi-label classification of 26 arrhythmias using a diverse dataset of 12-lead ECG recordings from Physionet 2021 challenge
  - Improved the model performance by integrating an RNN branch for temporal context and by calculating cross-attention features between CNN and RNN outputs, achieving 2% increase in the challenge score on external test datasets

- **Software Development Engineer in Test** | *Enphase Energy, Bangalore, India* [Jul '23 - May '24]
  - Collaborated with a 7-member Test Automation team to develop and maintain a Python-based test framework
  - Utilized Object-Oriented Programming (OOP) techniques to create comprehensive test suites for the hardware test automation
  - Developed a Python library leveraging the Jama REST API to connect to Jama, fetch test cases, execute them on a local PC, and update results in Jama, providing end-to-end automation support for the Design-Verification-Test team

- **Improving Histopathology and Medical Image Analysis with Deep Learning** | *M.Tech Thesis* [May '22 - Jun '23]
  - Employed active learning method to train a classifier, achieving efficient segmentation of WSIs into six tissue regions and outperforming the popular HistoQC tool with higher dice scores on 70% of the WSIs
  - Utilized DeepLabV3 architecture for cell detection and classification using segmentation method in the OCELOT Challenge 2023, securing a global ranking of 16th place with an F1-score of 0.67

- **Opacity Detection in Chest Xrays using Contrastive Learning** | *Qure.ai* | *AI Scientist Intern* [May '22 - Aug '22]
  - Trained a vanilla classification model of ResNet50 on 1.2M chest x-rays using the conventional supervised training method for opacity classification and achieved an AUC score of 0.80 on the test dataset of 280K chest x-rays
  - Outperformed the vanilla baseline by utilizing a model backbone trained using the Supervised Contrastive Learning method

- **Timing Path delay prediction using Machine Learning** | *Qualcomm, India* | *ML Intern* [May '21 - Jul '21]
  - Predicted the Timing Path delays given a netlist design of a chip using linear regression, XGBoost along with feature engineering
  - Generalized a linear model across several netlist designs to achieve an MAE less than 10% of the 1.8 ns clock period

Key Technical Projects

- **The Vital Extraction Challenge** | *Inter-IIT Tech Meet 11.0* | *Gold Medal among 20+ IITs* [Jan'23 - Mar'23]
  - Employed a YOLOv8 object detection model to extract the bounding boxes of the vitals in the ECG monitor images
  - Innovatively devised a classification-based segmentation approach to detect the corners of the screen of ECG monitors
  - Conducted in-depth exploration of OCR techniques, including parseq, ABINet, and PaddleOCR for text recognition of vitals

- **Brain MRI Tumour Segmentation** | *CS736: Medical Image Computing* | *Guide: Prof. Suyash Awate* [Feb'22 - April'22]
  - Trained a U-Net architecture for segmentation of the tumor region in MRI slices using the soft dice loss and used a dataset consisting of around 4K MRI slices from 110 patients from The Cancer Imaging Archive
  - Achieved a mean IOU of 0.77 on the validation set between the predicted and the true segmentation masks of tumor-positive MRI slices and an accuracy of 96.8% on the binary classification of the presence of tumor

- **Identity Aware Portrait Generation** | *CS726: Advanced Machine Learning* | *Guide: Prof. Sunita Sarawagi* [Feb'22 - April'22]
  - Utilized the CycleGAN model in the Image translation to generate portraits preserving the human facial features
  - Proposed a perceptual loss to preserve facial features that uses FaceNet embeddings to guide the generators
  - Achieved an average SSIM of 0.98 using our approach between the human faces and their respective portraits

- **Adversarial Attacks on ASR Systems** | *CS753: Automatic Speech Recognition* | *Guide: Prof. Preethi Jyothi* [Feb'21 - May'21]
  - Trained a Bi-RNN CTC-based network on the SpeechCommands dataset with a WER of 16% for command classification
  - Implemented Gradient-descent based targeted adversarial attack achieving a 0% classification accuracy along with a Signal-to-Noise Ratio (SNR) of 30dB in the perturbed audio examples