Jaiminkumar Ashokbhai Bhoi

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Education

Master's in Computer Science *(Specialized in Computer Vision)* **FL, USA** *2023-2025*
University of Central Florida

Skills & Interests

- **Skills:** Python, Computer Vision, Tensorflow, Karas, Pytorch, OpenCV, Javascript, HTML, CSS, Java, C++, Flutter, Android NDK, CMake, Cuda, Docker, Jupyter notebooks, Git, Data Structures, Algorithms, Containerization, Linux/Unix, MySQL, Kubernetes, Azure, AzureML, Custom Vision, Azure functions, Azure Storage, Azure Kubernetes Cluster
- **Interests:** Applied Research, Computer Vision, AI/ML Systems, Self Supervised Learning, Software Engineering, Platform Engineering, Efficient model training, Electroencephalography(EEG) and Visually Evoked Potentials

Professional Experience

Individual Contributor *University of Central Florida* **FL, USA** *12/2023 - present*
- Developed a custom DICOM annotation extraction tool using PyDICOM, enabling precise angle measurements. This solution eliminated manual efforts for medical students and experts.
- Leveraged the Segment Anything model (SAM) to automatically extract femur and tibia bone segments from medical images. Additionally, I fine-tuned masks using lightweight classifiers for accurate classification.
- Utilized OpenCV to calculate angles between the femur and tibia, aiding in the detection of potential misalignments.

Research Associate *Tata Consultancy Services - TCS* **Bangalore, India** *04/2020 - 06/2023*
- Led Intellectual Property (IP) code development, including patent filings and research paper publications.
- Designed and deployed an innovative crowd anomaly detection system using optical flow analysis. This solution accurately identifies sudden changes in movement direction, velocity variations, and digital boundary anomalies.
- Developed a COVID-19 face mask and Safety Gear Compliance solution.

Systems Engineer *Tata Consultancy Services - TCS* **Bangalore, India** *06/2018 - 06/2023*
- Collaborated with Scrum Master, product owners, and senior business stakeholders to understand and address critical business requirements.
- Led an Agile project, successfully delivering over 100 bi-weekly sprints while adhering to Agile best practices.
- Championed a cross-functional team of three, driving the development of high-quality solutions and providing mentorship to foster continuous learning and growth.
- Contributed to production code and systems, delivering real-time solutions that positively impacted business outcomes.

Patents & Publications

- An Efficient Ensemble-Based Deep Learning Model for the Diagnosis of Cervical Cancer: 97% accuracy (ISCAI)
- Aerial Video Analytics based dynamic Non-linear distance measurement between on-ground objects (Patent: Filed)
- Method and system to detect a text from multimedia content captured at a scene (Patent: Filed)

Projects & Research

EEGVis (Understanding Visually Evoked Potentials of EEG signals) *Github* *01/2024 - present*
- Researching EEG signals for better understanding the Human brain for visual stimuli.
- Performed Temporal and Spatial Analysis of the EEG with supervised, unsupervised, and self-supervised techniques.
- Trained DINO model considering EEG as one of the augmentations of the image, achieving almost the same accuracy as Vanilla DINO, probing into EEG's capabilities for Visual understanding of the models.

Self-Supervised Distillation with No Labels on X-ray Images *Github* *02/2024 - 03/2024*
- Trained DINO model from scratch as well as fine-tuned on top of ViT-s model for Chest X-ray images and Achieved 95.5% accuracy on test data.

Human Activity Recognition on Static Images (HAR) *Github* *08/2023 - 12/2023*

- Fine-tuned CLIP model for classification of different human activities from a single static image.
- Used prompt engineering with CLIP's text encoder for identifying multiple activities in a single image.
- Visualized Self-attention maps for model explanation and reasonable AI purposes.

Self Checkout Theft Prevention (RetailEye) *Github* *08/2023 - 12/2023*

- Designed an innovative solution for tracking customer self-checkout experience to prevent theft.
- Used pose estimation & classification to track the sequence of activities performed by customers to find anomalies.
- Ported the solution to NVIDIA Jetson device for on-edge device computation.

Container Image Analytics (CIA) *02/2021 - 06/2023*

- Fine-tuned deep learning models including VGG16, MobileNetV2, and RCNN, achieving over 90% accuracy on production data.
- Designed and implemented a Continuous Learning Framework (CLF) using AzureML, significantly reducing manual training efforts by 80%.
- Developed REST APIs for deep learning models, leveraging AzureML, Docker, Flask/RestX, and Azure Kubernetes. These APIs efficiently handle 10,000+ requests per hour with auto-scaling capabilities, resulting in optimized cloud resource usage and a 60% reduction in cloud service costs.
- Engineered and delivered multiple user interfaces for data collection and validation purposes, utilizing C# Blazor, HTML/CSS, and jQuery-based web pages reducing customers' efforts and providing AI-aided judgment.
- Quantized models for ARM-based processors and developed a Flutter app for edge inference, utilizing Method channels for cross-device code development.

Computer Vision on Qualcomm RB500 Development Board *06/2020 - 02/2021*

- Spearheaded the design and development of various computer vision solutions including face detection (utilizing Dlib), self-checkout theft detection (employing PosNet), barcode-switching detection (leveraging YoloV3), queue counting, and person tracking heatmap generation, all implemented in C++.
- Optimized performance on ARM64 devices by compiling custom Android libraries for OpenCV, Qualcomm Snappy, and Tensorflow, and integrating OpenBLAS for compiling DLIB, resulting in a notable performance enhancement of up to 4x.
- Successfully quantized deep learning models to enable their deployment on Android edge devices with minimal loss of accuracy.
- Engineered Java Native Interfaces (JNI) to facilitate seamless communication between C++ and Java components for Android applications.
- Demonstrated expertise in leveraging various Android delegates including DSP, CPU, GPU, and NNAPI to concurrently execute four computer vision solutions on edge devices, showcasing adept multi-threading capabilities.