SHUBHAM GAJJAR

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EDUCATION

Northeastern University, Portland, Maine — September 2025 – May 2027
Master of Science in Artificial Intelligence, Grade Point Average: 4.0/4.0

LDRP Institute of Technology and Research, Gandhinagar, India — September 2022 – May 2025
Bachelor of Engineering in Computer Engineering, Grade Point Average: 8.41/10.0

VPMP Polytechnic, Gandhinagar, India — September 2019 – May 2022
Diploma in Computer Engineering, Grade Point Average: 9.22/10.0

Relevant Coursework: Machine Learning, Deep Learning, Computer Vision, Data Structures and Algorithms, Image Processing

PUBLICATIONS

Extended ResNet50: Inverse Soft Mask Attention for Skin Cancer Classification

Submitted to Journal, 2025

Authors: Shubham Gajjar, Om Rathod, Deep Joshi, Harshal Joshi, Vishal Barot

Developed a two-stage deep learning pipeline integrating the U-Net++ hair segmentation model with the Extended ResNet50 classifier featuring the novel Inverse Soft Mask Attention mechanism. Implemented dense residual blocks and Squeeze-and-Excitation modules with learnable weighted feature aggregation combining hair-occluded and unoccluded image regions. Achieved 97.89% testing accuracy, 99.67% training accuracy, and 97.74% validation accuracy at epoch 22 on HAM10000 dataset containing 10,015 dermoscopic images across seven skin lesion classes. Applied Nadam optimizer with Cosine Decay Restarts learning rate scheduler and Sparse Categorical Crossentropy loss function. Conducted systematic experimentation through 21 architectural trials evaluating Vision Transformers, hybrid models, and custom attention mechanisms. Outperformed baseline methods including SCCNet (95.20%), VCCINet (93.18%), and SPCB-Net (97.10%).

A Hybrid ResNet-ViT Architecture for Skin Cancer Classification

IEEE World Conference, 2025

Authors: Shubham Gajjar, Om Rathod, Deep Joshi, Harshal Joshi, Vishal Barot

Developed hybrid architecture combining a frozen ResNet50 backbone as a feature extractor with Vision Transformer blocks incorporating a four-head multi-head self-attention mechanism. Integrated Global Average Pooling layer and transformer-based global dependency modeling for seven-class skin lesion classification. Achieved 96.3% testing accuracy and a macro F1 score of 0.961 on the HAM10000 dataset. Attained Area Under Curve of approximately 1.00 across all seven lesion classes, including melanoma, nevus, basal cell carcinoma, benign keratosis, dermatofibroma, actinic keratosis, and vascular lesions. Applied stratified data augmentation techniques, including rotation (plus or minus 20 degrees), horizontal flip, vertical flip, and brightness-contrast adjustments (plus or minus 10% contrast, plus or minus 25 brightness units), addressing severe class imbalance by scaling the dataset from 10,015 to approximately 74,353 images. Trained using the Nadam optimizer with an initial learning rate of 0.001 and the Sparse Categorical Crossentropy loss function. Dataset split: 70% training (7,010 images), 15% validation (1,503 images), and 15% testing (1,502 images) with stratified sampling. Published in IEEE 4th World Conference on Applied Intelligence and Computing (AIC), July 2025. DOI: 10.1109/AIC66080.2025.11212073.

VGG16-MCA UNet: A Hybrid Deep Learning Approach for Enhanced Brain Tumor Segmentation in FLAIR MRI

Under Review at Elsevier

Authors: Shubham Gajjar, Deep Joshi, Avi Poptani, Vishal Barot

Proposed hybrid segmentation framework integrating a pretrained VGG16 encoder with Multi-Channel Attention decoder for brain tumor segmentation in Fluid-Attenuated Inversion Recovery Magnetic Resonance Imaging scans. Applied Focal Tversky Loss addressing severe class imbalance where tumor regions represent only 2-5% of the total image area. Implemented an ensemble learning method combining predictions from multiple model checkpoints and architectural configurations. Incorporated skip connections, batch normalization, and dropout for regularization to prevent overfitting. Achieved 99.59% accuracy and 99.71% specificity on the LGG Brain MRI Segmentation dataset from 110 low-grade glioma patients from the TCGA collection. Trained using the Adam optimizer with an initial learning rate of 0.05, the ReduceLROnPlateau callback dynamically adjusting the learning rate, and the EarlyStopping mechanism.

Conducted 35 systematic experiments comparing against standard UNet, Attention UNet, and Scaler Attention UNet architectures. Applied a comprehensive preprocessing pipeline, including skull stripping, intensity normalization, and resizing to 256x256 pixels. Achieved superior Dice coefficient and Intersection over Union scores with enhanced boundary delineation.

PROFESSIONAL EXPERIENCE

BigCircle (UPSAAS Technologies LLP), Gandhinagar, India
Artificial Intelligence Engineer January 2025 – August 2025

Demonstrated problem-solving by architecting a multi-agent Application Programming Interface system using distributed computing, reducing report generation from 20 to 5 minutes for 10,000-plus queries. Exhibited creativity by engineering pagination and authentication systems for dashboards, accelerating page load times by 80%, and ensuring model deployment stability for 500-plus concurrent sessions. Applied continuous learning to deliver iOS applications using React Native. Collaborated with a 5-member team in Agile sprints, performing code reviews to improve quality.

TECHNICAL SKILLS & CERTIFICATION

Programming Languages: Python, JavaScript, TypeScript, Next.js, React
Deep Learning: TensorFlow, Keras, PyTorch, CUDA
Computer Vision: OpenCV, Matplotlib, Albumentations
Data Science: NumPy, Pandas, Jupyter, Scikit-learn
Tools: Git, Vercel, Framer Motion

CERTIFICATIONS

Python for Data Science, Indian Institute of Technology Madras, 2024
Python Data Structures, University of Michigan, Coursera, 2024