

# SACHIN MAURYA

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## Skills

- **Programming Languages:** Python, C, C++
- **Libraries:** TensorFlow, PyTorch, NumPy, Pandas
- **Operating Systems:** Windows, Ubuntu
- **IDE Tools:** Google Colab, Docker, Jupyter Notebook, VS Code, GPU A/H100, NVIDIA Quadro RTX 5000 Cluster

## Education

### Indian Institute of Technology Dharwad

Aug 2024 – Present

MS by Research

Recommended Category - Teaching Assistantship

Department of Computer Science and Engineering

Areas of Research: Computer Vision, Time Series Modeling, Deep Learning and Machine Learning Optimization, Large Language Modeling, Multimodal Learning.

CGPA: 8.08

### Gurukula Kangri (Deemed to be University), Haridwar, UK, India

Jul 2019 – Jun 2023

Bachelor of Technology

Department of Computer Science and Engineering

CGPA: 8.48

## Projects

### Enhanced Spatial Feature Selective Vision State Space Model

Jan 2025 – May 2025

**Team Members :** Abhishek Sharma, Sachin Maurya

- Developed **EFSVMNet**, an improved VM-UNet variant with a lightweight **Spatial Feature Selective (SFS)** module to reduce feature redundancy and overfitting in medical image segmentation.
- Introduced a **feature importance mask** and **spatial feature selective loss**, enabling adaptive suppression of uninformative features and robust end-to-end optimization.
- Achieved superior or comparable results to state-of-the-art CNN, Transformer, and state-space models across six benchmark datasets (ISIC 2017/2018, Kvasir-SEG, CVC-ClinicDB, CVC-ColonDB, ETIS).
- Improved **Dice**, **IoU**, and boundary accuracy; ablation studies validated the effectiveness of the SFS module and loss for generalization across heterogeneous medical imaging.
- Tools: **Python, PyTorch, CUDA**

### Enhanced Skip Fusion Vision Mamba-Net

Mar 2025 – Jul 2025

**Team Members :** Abhishek Sharma, Sachin Maurya

- Designed **ESF-Net**, an improved VMUNet variant with a novel **Enhanced Skip Fusion (ESF)** block for robust semantic segmentation in dense urban environments.
- Integrated **dual-path attention** (ASPP + Inverted External Attention) to emphasize class-relevant spatial features while preserving structural detail, achieving a lightweight yet accurate model.
- Introduced a **composite loss function** (Dice, Focal Tversky, Lovasz-Softmax) with learnable dynamic weights for adaptive optimization.
- Outperformed state-of-the-art CNN, Transformer, and state-space models on the **Cityscapes dataset**, delivering sharper boundaries, higher per-class accuracy, and stronger generalization.
- Tools: **Python, PyTorch, CUDA**

### Brain Tumor Segmentation using Deep Learning

Apr 2025 – Jun 2025

**Team Members :** Abhishek Sharma, Sachin Maurya

- Implemented a 2D **U-Net** with skip connections; preprocessing included resizing MRI slices, handling class imbalance, and custom data generators for efficient training.
- Optimized with **Adam** and Dice loss; post-processing with argmax decoding reduced false positives, improving tumor boundary accuracy.
- Achieved **99.35% test accuracy**, **Dice coefficient 0.60**, and **specificity 99.79%** on the **BraTS2020 dataset**, demonstrating robustness and clinical relevance.

- Tools: **Python, TensorFlow/Keras, NumPy, Pandas, Matplotlib**

## A Vision-Language Hybrid Framework for Automated Radiology Report Generation

Jul 2025 – Sep 2025

**Team Members :** Abhishek Sharma, Sachin Maurya

- Designed a **generalized vision-language hybrid framework** for automated radiology report generation, integrating pretrained **state-space models** for image feature extraction and a **Transformer-based decoder** with an expert mechanism for textual report synthesis.
- Addressed the **computational inefficiency** of traditional Transformer decoders by proposing a lightweight, parameter-efficient architecture with reduced FLOPs and faster inference.
- Combined **dual pretrained visual encoders (ResNet101 and AdaMamba)** with an **MLP-Mixer** encoder to capture both global and local contextual information for enhanced multimodal understanding.
- Achieved improved performance over R2GeN baselines on the **IU X-ray dataset**, with notable gains in **BLEU-1 (0.505)**, **ROUGE-L (0.383)**, and **METEOR (0.190)** scores.
- Tools: **Python, PyTorch, CUDA, Transformers, Vision-Language Models**

## Crop Recommendation System Using Machine Learning

Jan 2023 – Jul 2023

- Developed a **machine learning-based crop advisory system** to assist farmers in selecting optimal crops by analyzing soil nutrients, weather, and environmental conditions for improved yield and profitability.
- Collected and preprocessed soil and climate data (**N, P, K, pH, temperature, humidity, rainfall**); performed normalization, missing value imputation, and outlier removal to enhance data quality.
- Implemented and compared multiple models — **Decision Tree, Random Forest, SVM, Gradient Boosting, and Gaussian Naive Bayes**; identified **GaussianNB** as the best-performing classifier.
- Achieved **93.26% training accuracy** and **92.53% validation accuracy**, demonstrating consistent model generalization and robustness.
- Tools: **Python, Scikit-learn, Pandas, NumPy**

## Research Publication

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- **Sachin Maurya\***, Abhishek Sharma\*, Achyut Mani Tripathi, Kedar Khandeparkar.  
“**MaHaWave-Net: A Lightweight Multi-Scale Model for Fine-Grained Medical Image Segmentation.**”  
*IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2026.* [**Accepted (CORE Rank=A\*, H-Index=137)**]

## Extracurricular Activities / Achievements

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- GATE 2025/2024 qualified in CS and Data Science and Artificial Intelligence. Also, GATE 2023 qualified in CS.
- Achieved First Prize in the “Srijan” Hindi writing competition at IIT Dharwad.
- Served as a Volunteer in the 3rd IEEE Conference on Engineering Informatics 2025 (ICEI 2025) conducted at Indian Institute Of Technology Dharwad, Karnataka.

## Recommendation

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- **Dr. Achyut Mani Tripathi**  
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- **Dr. Kedar Vithal Khandeparkar**  
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