Abishek Karthik

Chennai, India abishek.sudhirkarthik@gmail.com +91 7338952367
AbishekKarthik Abishekkarthik07 abishekkarthik07.github.io

EDUCATION

Currently pursuing Bachelor of Technology in **Computer Science and Engineering with specialization in AI and ML**, at Vellore Institute of Technology (VIT), deemed university, Chennai; CGPA: 8.59 (until 6th semester), results expected in Jun'26

INTERNSHIPS

AI Intern, **ECSite, San Jose, CA** ***May - Jul'25***

- Designed automation workflows for unstructured enterprise data (SharePoint, MongoDB), doubling document processing efficiency for pilot customers
- Introduced lightweight agentic pipelines that reduced reporting errors by ~35%, improving reliability of enterprise workflows.
- Implemented resilience features (anomaly detection + dynamic adaptation), ensuring >90% robustness despite evolving input formats
- Automated structured data extraction from Microsoft Teams using Power Automate + Python (BeautifulSoup), centralizing records in SharePoint Excel with >90% accuracy
- Collaborated with cross-functional teams to deploy and test solutions with enterprise customers, showcasing scalability, latency optimization, and integration of trade-offs in real-world environments

AI Development Intern, **Rencata, Chennai** ***Jun - Jul'24***

- Built and optimized a GPT-4 powered SQL chatbot for enterprise databases using LangChain; designed/tested NLP prompts and automated prompt validation workflows with Python.
- Mapped database workflows with ER diagrams across 50+ MySQL tables, improving integration efficiency by ~20%.
- Reduced query response latency by ~30% and improved SQL generation accuracy, ensuring deployment readiness.
- Engineered a scalable QA framework with Python scripts simulating 1,000+ SQL queries, accelerating debugging cycles and boosting system reliability by ~40%.

Research Assistant — Deep Learning & Medical AI, **VIT Chennai** ***Dec'23 – Oct'25***

Supervisor: Dr. V. Pandiyaraju

CustNetGC: Acoustic Deep Learning for Early Parkinson's Detection

- Developed a hybrid CNN + CatBoost acoustic model leveraging spectral features and Grad-CAM visual explanations to enable clinically interpretable Parkinson's disease prediction from speech signals.
- Achieved 99.06% accuracy and 0.89 AUC-ROC, engineering spectrogram pipelines, optimizing feature extraction, and validating model robustness across diverse real-world datasets.

CNN with Pseudo-Newton Boosting for Lumbar Spine Degeneration

- Built a hybrid EfficientNet–VGG19 architecture integrating Pseudo-Newton Boosting and sparsity-driven feature selection for enhanced lumbar spine degeneration classification from MRI scans.
- Improved accuracy from 80% to 88.1%, implementing preprocessing, embedding integration, and precision-recall validation across benchmark datasets to ensure reliable diagnostic performance.

Multi-Head Attention Enhanced Inception-v3 for Cardiomegaly Detection

- Built a cardiomegaly detection model integrating Inception-v3 architecture with multi-head attention for adaptive regional focus, enhancing feature learning from chest X-ray images.
- Achieved 95.6% accuracy, 96.0 AUC, and high sensitivity-specificity balance, demonstrating clinically reliable screening performance validated through rigorous evaluation metrics and visualization analysis.

Explainable AI for Diabetic Retinopathy Detection Using Deep Learning with Attention & Fuzzy Interpretability

- Developed an explainable deep learning system for diabetic retinopathy using attention mechanisms and fuzzy logic, enabling interpretable lesion localization and clinically transparent diagnostic support from retinal fundus images.
- Achieved strong diagnostic performance across benchmark datasets using optimized preprocessing and hybrid feature extraction pipelines, improving classification reliability and interpretability for real-world clinical screening deployment.

ACADEMIC PROJECT

GeoExpert-QA: Zero-Shot Geospatial Question Answering System

- Developed a zero-shot geospatial reasoning agent capable of answering complex geographic queries through automated code generation, spatial computation, and retrieval-augmented mapping using PyTorch, GeoPandas, and Folium.

- Engineered a multi-expert architecture enabling dynamic spatiotemporal data extraction, environmental analytics, geometric reasoning, and real-time geospatial visualization for precise decision-making and explainable spatial intelligence.
- Implemented live map visualization and automated spatial reasoning for tasks like territory comparison, humidity prediction, and polygon validity checks.

Autonomous Research & Report Agent
- Developed an AI-powered autonomous research system that explores web sources, extracts relevant information, analyzes content, and generates structured research reports with verified citations and traceable reasoning.
- Implemented multi-agent workflow coordination, source ranking, and automated summarization pipelines using retrieval-augmented querying and LLM-based synthesis, reducing hallucinations and improving factual consistency of generated reports.

PUBLICATIONS

- Pandiyaraju V., **Abishek Karthik**, Sreya Mynampati, Poovarasan L. D., Saraswathi D. (2025). *"A Hybrid CNN–ViT–GNN Framework with GAN-Based Augmentation for Intelligent Weed Detection in Precision Agriculture."*
  Accepted for oral presentation at ICACRS 2025, to appear Dec 10–12, 2025.
- Pandiyaraju V., Sreya Mynampati, **Abishek Karthik**, Poovarasan L. D., Saraswathi D. (2025). *"Revolutionizing Glioma Segmentation and Grading Using 3D MRI-Guided Hybrid Deep Learning Models."*
  Accepted for oral presentation at ICACRS 2025, to appear Dec 10–12, 2025.
- **Abishek Karthik**, V. Pandiyaraju, Dominic Savio M., Rohit Swaminathan S. (2025). *"A Novel CustNetGC-Boosted Model with Spectral Features for Parkinson's Disease Prediction."*
  IEEE Journal of Biomedical and Health Informatics / Sensors (MDPI). **Under review**.
- V. Pandiyaraju, **Abishek Karthik**, Jaspin K., A. Kannan, Jaime Lloret (2025). *"Hybrid Convolution Neural Network Integrated with Pseudo-Newton Boosting for Lumbar Spine Degeneration Detection."*
  Biomedical Signal Processing and Control (Elsevier). **Under review**.
- **Abishek Karthik**, V. Pandiyaraju, Sreya Mynampati (2025). "Explainable AI for Diabetic Retinopathy Detection Using Deep Learning with Attention Mechanisms and Fuzzy Logic-Based Interpretability."
  IEEE International Conference on Biomedical Engineering & Healthcare. **Under review**.

TECHNICAL SKILLS

- **Programming Languages:** Python, Java, JavaScript, C, C++, HTML, CSS, R programming
- **Databases:** MySQL, Neo4j, SQL, MongoDB
- **AI/ML and Deep Learning:** PyTorch, TensorFlow, Keras, Scikit-learn, XGBoost, CatBoost, LightGBM, Optuna (HPO), ONNX
- **Web and Deployment:** Flask, Streamlit, ReactJS, NodeJS, AWS (EC2, S3, Lambda)
- **Computer Vision**: CNNs, ViT, GNNs, Inception-V3, EfficientNet, Grad-CAM, Image Augmentation, OpenCV
- **NLP and Generative AI**: LangChain, Prompt Engineering, Knowledge Graphs

CERTIFICATIONS

- Completed a 1.5-year Applied Machine Learning program, earning *Certified AI/ML Expert* and *Certified Data Analyst* certifications, conducted by WhiteHat Jr (Byju's Future School, Online), Jun '23
- Completed a 6-month AI/ML Blackbelt Program, conducted by Analytics Vidhya (Online Platform), Sep '24
- Currently pursuing a 12-month online GenAI Pinnacle Plus Program, conducted by Analytics Vidhya Feb '24 – Present

AWARDS AND ACHIEVEMENTS

- Secured second place among 54 teams at Codechef-VIT AI/ML hackathon organized at VIT Chennai, Jan'24
- Received recognition as outstanding intern from Rencata'24
- Led the VIT football team to 4th place at National Football Championships, Hyderabad, '23

LEADERSHIP & COMMUNITY ENGAGEMENT

- Captained, VIT University Football Team from '24 - present, coordinating a 15-member squad, leading training sessions and formulating match strategies for inter-university tournaments
- Organized a university-wide speech contest in '24 with 80+ participants, managing event logistics and member coordination as Secretary, Toastmasters International – VIT Chennai, Jun'23 – present
- Mentored juniors in open-source AI/ML projects, guided hands-on coding sessions, and supported hackathon teams as Mentor (AI/ML- Open-Source Track), Google Developer Student Club (GDSC), VIT Chennai, Nov'22 – present
- Assisted in organizing/running blood donation and health awareness camps as part of a 22-member team at NSS, VIT, Aug'24
- Co-led a group of 15+ volunteers in a Marina Beach Cleanup Drive, clearing a ~3 km stretch of plastic waste and debris, as part of a Chennai civic cleanliness campaign organized by the Greater Chennai Corporation, Mar '23