# VIVEK M A

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## SUMMARY

Final-year CSE undergraduate and aspiring **ML Engineer / AI Systems Developer** with hands-on experience building production-grade AI systems in Python, including autonomous multi-agent LLM pipelines, deep learning medical imaging models, real-time computer vision systems, and safety-critical mobile applications. Skilled in **PyTorch, FastAPI, LangChain, REST APIs, and full-stack development**.

## EDUCATION

**B.E in Computer Science & Engineering** — **Sep 2023 – Sep 2027**
Cambridge Institute of Technology, Bangalore — **CGPA: 9.38 / 10**

**Pre-University Education** — **Sep 2021 – Mar 2023**
BGS PU College, Chikmagalur — **Percentage: 93%**

## PROJECTS

**Pneumonia Detection from Chest X-Ray Images** — **Jan 2026 – May 2026**
*Tech stack: Python, TensorFlow, DenseNet121, CBAM, Grad-CAM++, Streamlit, OpenCV*

- Built a **DenseNet121 + CBAM attention model** for chest X-ray pneumonia classification, achieving **0.97 AUROC, 91.4% accuracy, 0.93 F1-score, and 0.95 precision** on a 624-image held-out test set.
- Implemented patient-grouped **Stratified 5-Fold Cross-Validation** with Binary Focal Loss and label smoothing to eliminate data leakage and handle class imbalance.
- Applied **5-view Test-Time Augmentation** across 5 fold models for a 25-prediction ensemble with optimal threshold selection using Youden's J statistic (0.7984).
- Deployed a Streamlit web app with **Grad-CAM++ heatmap visualizations**, enabling radiologists to verify model attention on pathologically relevant lung regions.

**PersonalOS Agent** — **Mar 2025 – Apr 2026**
*Tech stack: Python, FastAPI, Redis, OpenRouter*

- Built an autonomous multi-agent AI system **(Observer, Planner, Executor)** for Gmail, Calendar, and filesystem automation using Redis queues and MCP protocol.
- Implemented **LLM-powered planning, confidence-based routing, vector memory with ChromaDB**, and a human-approval dashboard with real-time WebSocket updates.
- Integrated **Twilio voice approvals, Google APIs, and FastAPI backend services** for intelligent workflow execution and real-time task automation.

**HierAttn-NameNet — Indian State Region Identification from Names** — **Feb 2026 – present**
*Tech stack: Python, PyTorch, Transformers, BiLSTM, NLP, Hugging Face, Captum*

- Designed a hierarchical multi-task deep learning NLP model using **Transformer attention mechanisms and BiLSTM neural networks** to predict Indian state of origin from personal names using patrilineal context with a shared character-level transfer learning encoder.
- Developed **Ancestor Influence Attention and gated fusion** to dynamically weight generational signals, improving State Top-1 accuracy from ~65% to projected ~72–78% on ambiguous name inputs.
- Implemented **Masked Language Modeling pretraining** on 150K Indian names, Focal Loss with SMOTE for class imbalance, and Integrated Gradients-based model interpretability.

## EXPERIENCE

**Samsung PRISM** — **Dec 2025 – Mar 2026**
*Research Collaborator, Samsung R&D Institute India, Bangalore*

- Built **Attend Ease**, a web portal to digitise lab attendance, auto-calculate pro-rata salaries including half-days and LOP, and generate auditable monthly billing reports.

## TECHNICAL SKILLS

**Languages:** C, Python, Java, JavaScript
**Web Development:** HTML, CSS, REST APIs
**Databases:** PostgreSQL, MongoDB, SQLite, Redis, ChromaDB, FAISS
**Machine Learning:** Deep Learning, Transformers, CNNs, NLP, Computer Vision, RAG, Transfer Learning, Attention Mechanisms (CBAM)
**ML Libraries & Tools:** PyTorch, TensorFlow, Scikit-learn, NumPy, Pandas, Hugging Face, LangChain, MediaPipe, OpenCV, Streamlit, Captum
**Backend Frameworks:** FastAPI
**DevOps & Tools:** Git, GitHub, Docker, Linux, Postman, VS Code

## CERTIFICATES AND ACHIEVEMENTS

- **Samsung PRISM Virtual Internship Certificate** – Samsung R&D Institute India.
- **The Joy of Computing Using Python** – NPTEL.
- **Machine Learning Foundation Certificate** – Infosys Springboard.
- **Special Recognition**, ISL Translator – Mini Project Exhibition, Dept. of CSE, Cambridge Institute of Technology (2025).