

Rithvika Tiruveedhula

BTech CSE (2021 - 25) Vellore Institute of Technology (VIT), Chennai, India,
(LinkedIn: <https://www.linkedin.com/in/rithvikat> ; Personal Website: <https://shorturl.at/wG4NN>)



To,
The Head of the Group/Manager.

**Sub: Highly Motivated & Enthusiastic individual seeking for an opportunity, like any
Jr AI ML Enggr / Jr Data Science Enggr roles.**

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Respected Sir/Ma'am,
Greetings.

I am Rithvika T, completed my **BTech Computer Science & Engineering** (2021-25) from Vellore Institute of Technology (VIT), at Chennai campus, India , graduated in Sep, 2025.

I am reaching out to explore **any Junior AI/ML Engineer** or **any Junior Data Science Engineer** opportunities where I can make a valuable contribution to the team and hence the organization Sir.

My academic background, hands-on internship experiences, and various academic and technical projects have equipped me with the technical expertise and adaptability required for these roles. **Most of my projects**, like **Academic & Personal Projects, Capstone Projects & Final Sem Internship** at TCS were done in **AI/ML domain**. Please find all my project details are available on my Personal Website @ <https://rithvika7495.github.io/rithvikatportfolio> (or) <https://shorturl.at/wG4NN> in short).

1. I am currently an AI/ML Intern with the TCS Optumera Retail Product Team :

Currently, as an AI/ML Intern in the TCS Optumera Retail Product Team, I have developed ***"Fine Grain Image Similarity (FGIS) Techniques for the Application of Retail Apparel Similarity Matching Requirement in the TCS Optumera Product Suite"***. For which developed a **Hybrid Deep Learning Model** - achieved **90% retrieval accuracy** for the image similarity matching problem.

2. Implemented an AI/ML based "ChestVision Tool to detect couple of Lung Diseases" (Capstone Project-2)

This work is under Review for publication at: IEEE International Conference on Intelligent Signal Processing & Effective Communication Technologies, INSPECT-2025

3. Implemented an AI/ML based "Ship Detection using SAR Images for Maritime Vigilance" (Capstone Project-1)

This Work has been presented & published at: International Conference on Data Science, Agents and Artificial Intelligence (ICDSAAI) 2025.

4. Summer Internship at IOTA Analytics Pvt Ltd.,

During Nov'23 - Jan'24, I completed a **Summer Internship** at **IOTA Analytics Pvt Ltd.,** (www.iotaanalytics.com) where I worked on AI, ML, and NLP projects, gaining practical exposure to cutting-edge algorithms and real-world data challenges. I have developed a Personal Identifiable Information(PII) recognizer & Named Entity Recognition (NER) system using Natural Language Processing (NLP) :

- Implemented NLP algorithms for sensitive information extraction
- Explored RAG-based generative AI/retrieval methods
- Engaged in audio detection & eDiscovery tasks
- Also built an UI & conducted API testing

Please find my CV following this Cover Letter for your kind consideration. I am very enthusiastic and eagerly look forward to find an opportunity to make a valuable contribution to the team and hence the organization Sir/Ma'am.

Best Regards,

Rithvika T,
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EDUCATION :

• B.Tech	Computer Science & Engineering, Vellore Institute of Technology (VIT), Chennai, India	2021 - '25	7.7/10
• Class 12	ALLEN Career Institute /GRV Pre-University College (PUC Board), Bangalore, India	2019 - '21	93.0 %
• Class 10	Sri Chaitanya Techno School (CBSE), Bangalore, India	2018 - '19	88.2 %

SKILLSET :

- **Languages:** Python, Java, C/C++, R ; **Web:** CSS, HTML, JavaScript, Flask ; **Data Base:** MySQL, PL/SQL & MongoDB
- **AI/ML , Data Analysis:** Pandas, NumPy, SciPy, Scikit-Learn, Natural Language Toolkit (NLTK), SpaCy, Transformers, Hugging Face
- **Deep Learning :** PyTorch, TensorFlow, Keras, OpenCV; **LLMs :** ChatGPT, Gemini, Grok & Perplexity
- **IDE/NoteBook:** Visual Studio Code, PyCharm, Google CoLab, Jupyter Notebook, Kaggle
- **Non-Technical:** Analytical Thinking & Problem-solving, Self-motivated, Creative & Innovative, Time Management, Communication and Interpersonal skills, Collaborative & Teamwork.

EXPERIENCE & PROJECTS :

INDUSTRY INTERNSHIP at TCS: Worked as an AI/ML Intern at Tata Consultancy Services (TCS), Bangalore (31st Dec 2024 – Jun, 2025)

PROJECT: *"Fine Grain Image Similarity (FGIS) Techniques for the Application of Retail Apparel Similarity Matching Requirement in the TCS Optumera Product Suite"* (TCS Optumera is a cloud-based AI platform that helps retailers and Consumer Packaged Goods(CPG) companies optimize merchandising, inventory, pricing, and promotions)

Key Contributions:

- Built a Hybrid Deep Learning Model (ResNet50 + Attention Mechanism + Attention Erasure) that improved Image Similarity Precision by 20% over baseline methods.
- Achieved 90% retrieval accuracy, with 98% similarity across top-5 image matches, enabling near-duplicate apparel detection in a dataset of 32,190 images.
- Applied offline augmentation techniques to increase dataset size by 99% (from 16,170 to 32,190), and designed custom L2-Normalized embedding heads for scalable deployment.
- Collaborated with the TCS Optumera team to deliver a deployable AI solution, boosting catalogue uniqueness and reducing manual review efforts by an estimated 30–40%.

Tools & Technologies: Python, TensorFlow, Keras, OpenCV, Grad-CAM, CNNs, Ensemble Learning, Transfer Learning

CAPSTONE PROJECT-2: *"ChestVision-Lung Disease Classification using Ensemble Transfer Learning & Grad-CAM for Visualization"*

(15th Dec, 2024 – 2nd Apr, 2025)

This work is under Review for publication at: IEEE International Conference on Intelligent Signal Processing & Effective Communication Technologies, INSPECT-2025

Key Contributions:

- Developed a deep learning ensemble of 5 CNN models (InceptionResNetV2, MobileNet, DenseNet121, EfficientNetB2, InceptionV3) in TensorFlow/Keras, achieving 89.7% multi-label accuracy and 79.1% AUC-ROC on the NIH CXR dataset.
- Integrated Grad-CAM with OpenCV to generate heatmaps for model interpretability, enhancing clinical explainability and supporting radiologist validation.
- Applied data augmentation (rotation, flip, contrast) to 112,120 X-rays, that improved minority class representation and boosted recall by 14%.
- Engineered multi-label classification heads with 50% dropout and sigmoid activation, enabling the detection of 14 different Lung conditions, including pneumonia and fibrosis etc.,

Tools & Technologies: Python, TensorFlow, Keras, OpenCV, Grad-CAM, CNNs, Ensemble Learning, Transfer Learning

CAPSTONE PROJECT-1: *"Ship Detection using SAR (Synthetic Aperture Radar) Images for Maritime Vigilance"* (20th Jul – 20th Nov, 2024)

This work has been Accepted & Published at: International Conference on Data Science, Agents and Artificial Intelligence (ICDSAAI) 2025

Key Contributions:

- Developed a SAR-optimized detection algorithm that improved detection accuracy by 22.3% and reduced false positives in high-noise maritime zones, outperforming Faster R-CNN.
- Improved detection of small and occluded vessels by 28% using a custom feature extraction framework. This framework incorporated Swish+TanH activations, highlighted weight maps, and Particle Swarm Optimization.
- Enhanced image clarity by up to 31.5% using Median and Sobel filtering with pseudo-RGB mapping, significantly improving precision in cluttered coastal and port scenarios.
- Outperformed YOLOv4 and SSD on the SSDD benchmark, achieving significant improvements in precision by +9.2%, recall by +11.4%, and F1-score by +13.7%. This confirms strong robustness against SAR-specific challenges like speckle noise and gray scale distortions.

Tools & Technologies: Python, ResNet50, Feature Pyramid Networks (FPN), Guided Attention, Particle Swarm Optimization (PSO), SAR Imagery

PROJECT: Personal Identifiable Information (PII) Recognizer & Named Entity Recognition (NER) in Natural Language Processing (NLP)

Key Contributions : Gained hands-on experience in AI/ML with practical insights into NLP and Generative AI applications. And following are the list of tasks done in this Internship project:

- Built a **PII recognition engine** using **Named Entity Recognition (NER)** and custom **Regex patterns**, achieving **98% precision** in redacting sensitive fields (e.g., names, emails, IDs) across **10K+ enterprise documents**.
- Developed a **privacy-preserving NLP pipeline** to sanitize unstructured text, reducing manual compliance efforts by **~60%**.
- Integrated a **Retrieval-Augmented Generation (RAG)** system using **Hugging Face LLMs**, enabling accurate domain-specific question answering with **<2s average response time**.
- Engineered modules for **semantic embedding**, **dynamic chunking**, and **prompt templating**, improving **LLM output** relevance by **~35%** in evaluation benchmarks.
- Deployed scalable **RESTful APIs** using **Flask**, with endpoint testing and validation in **Postman**, ensuring **100% functional coverage** before integration.

Tools & Technologies: Python, Natural Language Toolkit (NLTK), Transformers, Hugging Face LLMs

SUMMER INTERNSHIP-1: At Chakralayaa Analytics Pvt Ltd (a VIT,Chennai Campus incubated Startup)**(Jun – Aug, 2023)****PROJECT: SMIS (Supply Market Intelligence System)**

Key Contributions : In this Internship, I learned **how real-time business intelligence solutions** empower buyers' purchasing decisions and provide **key performance indicators (KPIs)** for company executives' decision-making.

- Worked on **SMIS (Supply Market Intelligence System)** for real-time business intelligence.
- Analyzed purchasing **KPIs** and buyer trends using **Python-based ML** solutions.

PROJECTS DONE DURING COURSEWORK:**1. Arrhythmia Detection Using ECG Signals :**

- **Developed a 1D-CNN** for **classifying 5 arrhythmia types**, achieving **95.2% accuracy**, **93.8% F1-score**, and **0.96 ROC-AUC** on **109K ECG signals**. The model utilized **Z-score normalization** and **R-peak segmentation**, with validation performed using per-class metrics for both rare and common conditions.

2. RAG + AES: Secure AI Chatbot for Confidential Documents :

- **Developed a secure RAG pipeline** utilizing **quantized Hugging Face models**, **llama-index**, and **AES (Fernet) encryption**. This enabled **document-aware Q&A** with **87% top-1 accuracy**. Semantic retrieval was enhanced by approximately **32%** through **SBERT**, **chunking**, and **prompt tuning**, with the solution **deployed via Flask API** achieving **less than 2-second latency**.

3. Building a Chatbot using PyTorch and Natural Language Processing (NLP) :

- This project builds a **PyTorch-based chatbot** that uses **NLP** for **interactive, personalized** user engagement. It's applicable in various settings, including **customer service**, **online support**, or **personal assistance**.

PAPER PUBLICATIONS/CONFERENCE PRESENTATIONS :

- **Rithvika T, Monish P, "Ship Detection using SAR Images for Maritime Vigilance", IEEE International Conference on Data Science, Agents & Artificial Intelligence (ICDSAAI), Chennai, India, 2025. (Prof. Poonkodi M. contributed as a co-author)**
DOI: 10.1109/ICDSAAI65575.2025.11011861.
- **Rithvika T, Monish P, Poonkodi M, "Lung Disease Classification using Ensemble Transfer Learning and Grad-CAM for Visualization", submitted to IEEE International Conference on Intelligent Signal Processing and Effective Communication Technologies, INSPECT-2025 (Under Review).**

CERTIFICATIONS :

- Introduction to Big Data | University of California at San Diego through Coursera
- Python for Data Science and Machine Learning Bootcamp | Udemy
- The Data Science Course 2023: Complete Data Science Bootcamp | Udemy
- SQL – MySQL for Data Analytics and Business Intelligence | Udemy

SCHOLASTIC THINGS :

- Selected for Smart India Hackathon (SIH)'23 for VITC : Team Lead & Finished 11th among 35 final teams out of 276 total teams from VITC Campus.
- Academic Topper during 9th Std
- Vice- Captain, Viking House, in 8th std

CLUBS & NON-ACADEMIC AFFILIATIONS :

- Treasurer, Board Member at IEEE Robotics & Automation Society, VIT Chennai
- Social Media Team Member, IEEE Women in Engg (WiE), VIT Chennai
- Management Team Member, IEEE Photonics Society Student Chapter, VIT Chennai
- Startup & Ideas Team Member, at Entrepreneur Cell (E-Cell), VIT Chennai
- Social Media Coordinator, PAN IIT Alumni Leadership Series(PALS), VIT Chennai

LANGUAGES KNOWN :

- English
- Hindi
- Telugu (Mother Tongue)
- German (A-Level)

Sd/- (Rithvika Tiruveedhula)