

VISHNU THIRUMURUGAN

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WORK EXPERIENCE

Backend AI Developer, Data Science

Aug 2024 – Present

Air India

Kochi, India

- Pioneered novel speech emotion recognition algorithm processing 1,000+ monthly calls, improving customer service efficiency by 30% through innovative feature extraction and deep learning methodologies.
- Developed proprietary risk analysis framework achieving 85% accuracy for aviation safety compliance by designing custom transformer architectures and statistical validation protocols.
- Engineered end-to-end audio processing pipeline reducing cockpit transcription analysis time by 20% through comparative evaluation of Whisper, WaveNet, and custom acoustic models.
- Implemented robust statistical data quality framework achieving 100% pipeline reliability by designing novel anomaly detection algorithms and validation protocols for aviation data systems.

Junior Research Fellow

Jan 2024 – Jun 2024

Industrial Consultancy and Sponsored Research - IIT Madras

Chennai, India

- Enhanced maritime safety by 20% through novel TD3-based reinforcement learning algorithm for autonomous vessel navigation with custom reward function design and simulation environment.
- Reduced vessel collision incidents by 50% by developing AI-powered obstacle avoidance system using innovative state-space representation and policy gradient optimization techniques.
- Published peer-reviewed research at ASME International Conference demonstrating breakthrough AI navigation approach with significant contributions to maritime autonomous systems literature.

TECHNICAL SKILLS

Programming: Python, Java, SQL, MATLAB, JavaScript (Node.js), C++

Machine Learning: TensorFlow, PyTorch, Scikit-learn, Stable Baselines3, Reinforcement Learning

Data & Analytics: NumPy, Pandas, Matplotlib, OpenCV, Statistical Analysis

Backend Frameworks: Django, FastAPI, Flask, Node.js, Express

Databases: MySQL, PostgreSQL, MongoDB, Redis

Version Control: Git, GitHub, GitLab

PROJECTS

Maritime AI Navigation System

[GitHub Link](#) | 2021-2024

- Achieved 20% improvement in robotic navigation safety by developing novel TD3 deep reinforcement learning algorithm with custom simulation environment and reward function optimization.
- Reduced training convergence time by 40% through innovative experience replay mechanism and hierarchical learning approach enabling real-time autonomous decision making in robotic path planning.

Neural Network Training Framework

[GitHub Link](#) | 2022-2023

- Developed comprehensive deep learning training framework implementing multiple neural network architectures from scratch, enabling educational and research applications through modular design patterns.
- Built scalable training pipelines with advanced optimization techniques including custom backpropagation algorithms, learning rate scheduling, and regularization methods for improved model performance.

Customer Sentiment Analysis Engine

[GitHub Link](#) | 2024-2025

- Improved customer satisfaction tracking by 25% through real-time emotion detection system using custom BERT-based architecture for airline operations optimization.

EDUCATION

Indian Institute of Technology Madras

Chennai, India

M.S. by Research, GPA: 9.62/10.0

May 2024

- **Research Focus:** Deep Reinforcement Learning for autonomous systems in maritime applications with emphasis on safety-critical decision making and collision avoidance algorithms.

RESEARCH & PUBLICATIONS

Patent: "AI-based Autonomous Navigation System" – Complete specifications filed with novel collision avoidance methodology and safety validation framework (2024). First Examination Report (FER) received in April 2025

Publication: V. Thirumurugan et al. "Static obstacle avoidance with path following using twin delayed deep deterministic policy gradients." *ASME International Conference on Offshore Mechanics*, Vol. 87844, 2024.

CERTIFICATIONS AND TRAINING

In Progress: Agentic AI development (Microsoft), Deep Learning Specialization (Applied AI)

Completed: Retrieval Augmented Generation with Azure (Microsoft)