

DEBASISH TRIPATHY

AI & ML Engineer | Technical Leader | Researcher

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PROFILE SUMMARY

Innovative and results-driven AI & ML Engineer with extensive experience in developing cutting-edge solutions across computer vision, natural language processing, and reinforcement learning. Proven expertise in leading technical teams, securing funding, and delivering scalable AI solutions that drive business value. Founder of AI FOOD PANTRY, a startup revolutionizing food management through AI-powered ingredient recognition, recipe recommendations, and personalized nutrition tracking. Published researcher with collaborations in computer vision, federated learning, and generative AI. Skilled in the complete machine learning lifecycle, from data preparation to model deployment, with a focus on creating production-ready systems. Passionate about leveraging AI to solve real-world problems while maintaining ethical considerations and privacy standards.

EDUCATION

Bachelor of Technology in Computer Science & Engineering

Manipal Institute of Technology, Bengaluru

📅 August 2022 – May 2026 (Expected)

📍 CGPA: 8.11/10.0

- **Key Coursework:** Advanced Algorithms, Deep Learning Systems, Computer Vision, Natural Language Processing, Reinforcement Learning, Distributed Systems, Cloud Computing Architecture, Quantum Computing Fundamentals, System Design, Information Security & Cryptography
- **Research Focus:** Computer Vision Applications, Large Language Model (LLM) Fine-tuning, Federated Learning Privacy

PROFESSIONAL EXPERIENCE

Founder & Chief Executive Officer

AI FOOD PANTRY

📅 May 2024 – Present

📍 Bengaluru, India

- Founded an AI-powered food management platform revolutionizing home cooking through ingredient recognition, recipe recommendation, and personalized nutrition tracking.
- **Leadership & Business Development:**
 - Secured \$1,000 in cloud credits from AWS Activate and Microsoft for Startups.
 - Established partnerships with major grocery chains, expanding potential user base by 1.2k customers.
- **Technical Leadership:**
 - Architected scalable cloud infrastructure supporting 500+ concurrent users with 99.9% uptime.
 - Developed proprietary food recognition system achieving 95% accuracy across 1,500+ ingredient types.
 - Implemented personalized recommendation engine, increasing user meal preparation by 37%.
- **Technologies:** PyTorch, TensorFlow, AWS SageMaker, React Native, MongoDB, Docker, Kubernetes, FastAPI, Redis

Machine Learning Engineer

GENIE AI, INC.

📅 April 2024 – January 2025

📍 Ontario, CA

- Developed AI Digital Twin framework for City of Brampton and medical bot for Dubai ruling family utilizing transformer-based architectures, achieving 92% user satisfaction and reducing operational costs by 35%.
- Created Agentic AI framework for Amazon warehouse managing organization PAC Canada, reducing operations costs by 36%.
- Engineered AI-powered fire safety detection system combining thermal imaging and computer vision, achieving 87.62% accuracy in low-visibility conditions.

- Built domain-specific AI chatbots with custom LLM fine-tuning, reducing response latency by 60% while maintaining 89% accuracy.
 - **Technologies:** PyTorch, Hugging Face Transformers, AWS Lambda, NVIDIA CUDA, Docker, Kubernetes
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Trusted Tester

Google Labs

📅 August 2024 – Present

📍 Remote

- Tested ImageFX powered by Imagen 3, Google's latest text-to-image diffusion model, providing structured feedback on capabilities, limitations, and potential applications.
 - Identified 12 critical bugs and suggested 8 feature enhancements incorporated into the final release.
 - Conducted comparative analysis between Imagen 3 and competing models, identifying key differentiators.
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Software Engineering Intern

Adobe Inc.

📅 November 2023 – December 2023

📍 Bengaluru, India

- Designed and curated multimodal datasets for Adobe Firefly, increasing model precision by 36% for specialized design use cases.
 - Enhanced content alignment mechanisms through improved CLIP embedding techniques, improving text-to-image accuracy by 20%.
 - **Technologies:** Adobe Firefly, PyTorch, NumPy, Pandas, Tableau, Google Cloud AutoML
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Business Analyst Intern

Internshala

📅 May 2023 – September 2023

📍 Remote

- Conducted customer segmentation analysis using clustering algorithms, improving marketing effectiveness by 12%.
 - Developed predictive models for student enrollment trends, achieving 85% accuracy in forecasting.
 - **Technologies:** Power BI, Tableau, SQL, Python, Scikit-learn
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TECHNICAL EXPERTISE

Artificial Intelligence & Machine Learning

- **Deep Learning:** Model architecture design (CNNs, RNNs, Transformers, Vision Transformers, DINO), Custom loss functions, transfer learning, hyperparameter tuning, model compression
- **Computer Vision:** Object detection (YOLO, Faster R-CNN, Mask R-CNN, DETR), Image segmentation, feature extraction, 3D reconstruction, synthetic data creation
- **NLP:** Fine-tuning LLMs, RAG pipelines, sentiment analysis, NER, text classification
- **Generative AI:** Diffusion models, GANs (CycleGAN, StyleGAN), transformer-based text generation, multimodal systems
- **Reinforcement Learning:** Policy optimization (SAC, PPO, DDPG), multi-agent systems, environment simulation
- **MLOps:** ML pipeline design, model versioning, experiment tracking, automated testing, deployment

Software Engineering

- **Programming:** Python (NumPy, Pandas, SciPy, Scikit-learn), Java (Spring Boot, JUnit), C++ (STL, Boost), SQL, Bash, TypeScript
- **Frameworks:** PyTorch, TensorFlow, JAX, ONNX, TensorRT, Keras, Hugging Face, LangChain
- **Data/Viz:** Pandas, NumPy, Matplotlib, Seaborn, Plotly, Tableau, Power BI, Grafana
- **Databases:** MongoDB, PostgreSQL, MySQL, Firebase, Neo4j, Redis, Cassandra
- **Web Dev:** React, Next.js, Flask, FastAPI, Node.js, GraphQL, Django
- **Cloud/DevOps:** GCP, Azure, AWS (SageMaker, Lambda, S3), Terraform, Docker, Kubernetes, CI/CD (GitHub Actions, Jenkins)

Cybersecurity & Blockchain

- **AI Security:** Adversarial attack defense, model robustness evaluation, privacy-preserving ML
- **Cryptography:** Encryption algorithms, zero-knowledge proofs, quantum-resistant methods
- **Blockchain:** Smart contract development, distributed ledger architectures, consensus mechanisms

PROJECTS

AI Food Pantry

📅 2024

- Developed AI-based ingredient detection system using ResNet50 with custom attention mechanisms, achieving 95% accuracy across 1,500+ ingredient types
 - Implemented custom RAG pipeline with LangChain & Pinecone for recipe retrieval, reducing retrieval time by 40%
 - Designed personalized meal recommendation engine, achieving 85% success rate in user satisfaction surveys
 - **Technologies:** PyTorch, TensorFlow, LangChain, Pinecone, ResNet50, AWS, React Native, FastAPI
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Comprehensive Cybersecurity Defense System in association with Intel

📅 2025

- Engineered proactive threat detection system utilizing ensemble machine learning models, identifying 98.7% of zero-day vulnerabilities
 - Developed autonomous patching recommendation system using transformer-based models
 - **Technologies:** PyTorch, Scikit-learn, Transformer models, TensorFlow, Flask, Docker, NVIDIA CUDA
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Centralized Healthcare Management System in association with Deloitte

📅 2025

- Architected blockchain-based secure medical records system utilizing Hyperledger Fabric, achieving 99.9% uptime and HIPAA compliance
 - Implemented federated learning for privacy-preserving patient data analysis, improving diagnostic model accuracy by 32%
 - **Technologies:** Hyperledger Fabric, TensorFlow Federated, React, Node.js, MongoDB, Docker, Kubernetes
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RESEARCH PUBLICATIONS

Pet Emotion Detection Using Vision Transformers

Under review IEEE ACCESS (IF: 4.3)

📅 2025

📍 with Dr. Saleen

- Developed novel vision transformer architecture achieving 94.8% accuracy in classifying 8 distinct pet emotional states
 - **Technologies:** Computer Vision, Vision Transformers (ViT), Deep Learning, PyTorch, TensorFlow
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Model Evaluation Parameter Behavior Across Different Datasets

Under review in Nature Machine Intelligence

📅 2025

📍 with Dr. Deepti Sisodia

- Conducted comparative analysis of 12 evaluation metrics across 8 diverse ML domains, revealing domain-specific biases
 - **Technologies:** Statistical Analysis, Machine Learning, Cross-validation Methods, Evaluation Metrics, Python
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Privacy Detection and Amendment Maker Using LLM and GenAI

Under review in Journal of Privacy Technology

📅 2025

📍 with Dr. Gururaj and Dr. Shreyas

- Designed autonomous system for detecting PII/sensitive data leakage with 99.2% accuracy
 - **Technologies:** Large Language Models, Generative AI, Natural Language Processing, Data Privacy
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From Signals to Emotions: A Hybrid Model Approach

Under review in Journal of Privacy Technology

📅 2025

📍 with Dr. Dayananda

- Developed multi-modal approach integrating biosignals and contextual data for human emotion recognition
 - **Technologies:** Signal Processing, Multi-modal Learning, Biosensors, Neural Networks
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Harmful Brain Wave Detection

Under review in Journal of Privacy Technology

📅 2025

📍 with Dr. Gopalakrishnan

- Pioneered techniques for identifying abnormal neural patterns associated with cognitive distress and neurological disorders
 - **Technologies:** EEG Analysis, Signal Processing, Neural Pattern Recognition, Machine Learning
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Satellite Image Analysis for Environmental Monitoring

Under review in Journal of Privacy Technology

📅 2025

📍 with Dr. Tusar

- Created deep learning frameworks for automated classification of environmental changes from satellite imagery
 - **Technologies:** Remote Sensing, Computer Vision, CNN, Geospatial Analysis, Change Detection
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Vastu-Based Architectural Assessment Using Computer Vision and Signals

Under review in Journal of Privacy Technology

📅 2025

📍 with Dr. Tusar

- Engineered a computer vision system that analyzes architectural designs according to traditional Vastu principles
 - **Technologies:** Computer Vision, Signal Processing, Feature Extraction, Pattern Recognition
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PATENTS & INNOVATIONS

- **Paranormal Detection Mechanism with Improved Power Protection** (Patent Pending)
 - **Smart Neck Accessory for Women and Kids Protection** (Patent Pending)
 - **VastuMeter: Comprehensive Vastu Measurement Device** (Patent Pending)
 - **System and Method for Fashion Assessment and Recommendation** (Patent Pending)
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ACHIEVEMENTS & ACTIVITIES

Competitions

- Winner, Schneider Electric Cybersecurity Capture The Flag (CTF)
- Winner, AutoDesk EduHack
- Winner, Microsoft AI Odyssey India

Certifications

- Google Professional Machine Learning Engineer (2024)
- AWS Certified Solutions Architect – Associate (2023)
- Microsoft Certified: Azure AI Engineer Associate (2024)

Leadership & Community Involvement

- President, Sustainable Development Club, MITBLR
- Vice Chair, Papers We Love (PWL) Research Group, MITBLR