MILAN VARGHESE

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EDUCATION

Drexel University — **Philadelphia, PA, USA**
Master of Science in Artificial Intelligence and Machine Learning (GPA: 4.00) — *Expected Graduation: May 2026*

Mahatma Gandhi University — **Kochi, Kerala, India**
Master of Science in Computer Science (Data Analytics) (GPA: 3.77) — Graduated March 2022

University of Kerala — **Thiruvananthapuram, Kerala, India**
Bachelor of Science in Physics (GPA: 3.39) — Graduated June 2020

SKILLS

Hardware: Arduino, Raspberry Pi.
Databases & Cloud Services: PostgreSQL, Oracle SQL**,** Azure, AWS, GCP.
Data Analytics Tools: Power BI, Tableau, Qlik
Programming Languages: Python, Java (Basic), C++ (Basic), R (Basic)
Frameworks/Libraries: PyTorch, TensorFlow, Keras, Scikit-learn, LangChain
API & Dev Tools: Docker, FastAPI, Flask, Postman, DBeaver, WinSCP, PuTTY

EXPERIENCE

Drexel University — **Philadelphia, Pennsylvania, USA**
Academic Roles — *June 2025 – Present*

- **Course Assistant: CS 613 (Summer ’25); CS 501 & CS 503 (Fall ’25):** Reviewed and prepared quizzes, graded assignments, and provided academic guidance to students during office hours.
- **Lab Assistant: CI 101 (Summer ’25); CS 164 (Fall ’25):** Assisted students in hands-on lab work, answered queries, and encouraged independent problem-solving skills.
- **Graduate Dean’s Ambassador:** Conducted one-on-one meetings with prospective students via Zoom/Discord, monitored weekly discussion channels, and represented the College of Computing & Informatics at virtual events by sharing student experiences and resources.

Drexel University (COOPS) — **Philadelphia, Pennsylvania, USA**
Researcher (Prof. Rezvaneh “Shadi” Rezapour) — *October 2025 – Present*

- Collaborating with PhD candidate Layla Bouzoubaa on a longitudinal analysis of internalized self-stigma among Reddit users; contributing to open-coding in Dedoose and literature reviews on self-stigma/social media analytics.
- Prompt-engineering and GPT API pipelines to flag internalized-stigma language in social media posts; iterating prompts and thresholds for precision/recall trade-offs.
- Fine-tuning BioBERT to detect semantic shift in medical text (PubMed, 1975–2025), including corpus prep, vocabulary drift checks, and evaluation on shift-sensitive examples.

Drexel University — **Philadelphia, Pennsylvania, USA**
Research Assistant (Dr. Jake R. Williams) — *October 2024 - Present*

- Bayesian Initialization Research: Developed a novel neural network initialization algorithm (Bayesian Initialization) using co-occurrence statistics and product quantization to improve early training performance. Expanded and reimplemented the lab’s sequential layer-wise Bayesian initialization framework for vision tasks, achieving 81% accuracy on MNIST with only 20% of the data and 65% on CIFAR-10 without gradient descent. Validated the method by analyzing weight evolution, showing 75% cosine similarity between BI-initialized and fully trained kernels, confirming its strength as a warm-start strategy.
- Optimizing a 1.5 billion parameter foundational Large Language Model (LLM) with a custom attention mechanism; Self-Attentive Feed-Forward Unit SAFFU with Bayesian Parameter Initialization, including ablation studies for hyperparameter tuning. (ongoing).
- Configured compute servers and coordinated with system administrators to ensure stable, high-throughput training environments; actively participated in research paper discussions and presentations, driving brainstorming and project planning.

Neuflo Solutions Pvt Ltd — **Thiruvananthapuram, Kerala, India**
Associate - *Backend Developer* — *August 2023 - August 2024*

- Built the backend infrastructure for the development of Neuflo Learn NEET MVP using Azure, PostgreSQL, Python FastAPI, and Docker, creating a stable and efficient foundation for student exam preparation.
- Led intern training programs, providing hands-on technical guidance and enhancing collaboration for project delivery.
- Implemented client acquisition and outreach strategies aligned with business goals, directly supporting revenue growth by improving customer engagement.

Ernst & Young — **Kochi, Kerala, India**
AI/ML Automation Engineer - Associate — *July 2022 - Aug 2023*

- Metaverse & Deepfake Research: Built LLM-driven digital-twin modules, refactored audio-processing pipelines, and implemented deepfake lips-sync and image-motion techniques to enhance virtual experiences in the metaverse for employee digital onboarding.
- Enterprise Document Intelligence: Designed and deployed Retrieval-Augmented Generation pipelines on Azure (Blob Storage, Form Recognizer, Elastic Search, Cognitive Search) with GPT-3.5 to enable conversational querying of corporate documents, exposed via FastAPI/Flask and integrated with SharePoint to standardize text cleansing and accelerate information access.
- Developed Stable Diffusion text-to-image POCs; created an LLM-powered chatbot for automated proposal generation; and prototyped a photo-ID verification system for employee badge images.

Zoho Technologies Pvt. Ltd. **Tenkasi, Tamil Nadu, India**
AI/ML Research - Intern *November 2021 - May 2022*

- Contributed to experimental form-field detection project, prototyping YOLOv3-based models to identify text boxes and checkboxes on scanned documents.
- Researched and presented on transformer-based document understanding (LayoutLM), evaluating its potential for receipt data extraction and informing next-phase experiments.
- Received comprehensive training in shell scripting, image processing, and core machine-learning concepts.

ACADEMIC PROJECTS

- **Agentic AI for Information Collection (2025):** Developed a chain-of-thought–enabled LLM agent leveraging OpenAI's function- calling to orchestrate Wikipedia API tools (suggest, search, fetch, geosearch) and deliver consolidated, citation-backed responses.
- **Adversarial Attacks on Vision Models (2025):** Conducted comprehensive white-box (PGD) and black-box (FGSM, patch, noise, structured-pattern, frequency-domain) adversarial attacks on ResNet-18 and YOLOv5 vision models to quantify vulnerabilities and guide defense strategies
- **Stock Market Trading Bot using Hierarchical Reinforcement Learning**: Developed reinforcement learning based stock trading bot using Proximal Policy Optimization (PPO) for various market conditions over one month data.
- **Song Lyrics Generation using LSTM using Numpy (2025):** Implemented Long Short-Term Memory Algorithm from Scratch using python and Numpy for the purpose of Lyrics Generation.
- **Classical Machine Learning in C++ from Scratch (2024):** Traditional Machine Learning Algorithms including Logistic Regression, Support Vector Machines were Implemented in C++ using Eigan Linear Algebra Library for Image Classification task using CIFAR-10.
- **Dry Beans Classification (R + Power BI, 2021)**: Using R Programming Language Machine Learning models were built for classifying various species of dry beans along with Exploratory Data Analysis using PowerBI.
- **LAN-Based Communication System using Java Swing & Oracle SQL(2021):** Developed a multi-client chat application using Java Swing for UI, TCP socket programming for LAN communication, and Oracle SQL for user authentication and message storage.
- **Implemented RSA Encryption in C (2020):** Implemented the standard RSA (Rivest-Shamir-Adleman) in C language for encrypting and decrypting information.
- **UAV Payload Delivery System (2020):** Built a quadcopter using Ardupilot along with a small payload system that can airdrop small packages based on signals operated using a servo motor and Arduino microcontroller which was programmed using C++.

PUBLICATIONS:

"Deep Learning-based Sentiment Analysis on COVID-19 News Videos", Milan Varghese and Anoop V. S., 15th International Conference on Information Technology and Applications (ICITA-2021)

CERTIFICATIONS

- **Microsoft Certified: Azure AI Fundamentals (AI-900)**
- **Microsoft Certified: Azure Fundamentals (AZ-900)**
- **Neural Networks and Deep Learning** – DeepLearning.ai
- **Machine Learning** – Stanford University (Andrew Ng, via Coursera)
- **Introduction to Git and GitHub** – Google (via Coursera)

AWARDS & HONORS

- **Drexel CCI Merit Scholarship Award** – Drexel University (Fall 2024–2026)
- **EY Spot Award –** Ernst & Young, for performance in GDS Digital Products and Services, Q4 FY23 (2023)
- **Best Outgoing Student** – Rajagiri College of Social Sciences (2022)

WORKSHOPS, TRAINING & VOLUNTEERING

Seminars & Workshops:

- Delivered hands-on workshops and seminars on Python and Machine Learning to high school students across multiple institutions.
- Invited speaker at NIT Calicut's Tathva 2022 college fest; conducted a full-day workshop on Machine Learning with 200+ student attendees.
- Trained students from both India and the UK in Python programming and foundational Machine Learning concepts through remote mentorship and guided sessions.
- Organized a tech session titled "Digital Convergence" at my undergraduate college, covering emerging technologies such as Machine Learning, Quantum Computing, Blockchain, and IoT.