Chris Thomas Varghese

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Education

Karunya Institute of Technology and Sciences July 2025

Bachelor of Technology in Computer Science and Engineering *Coimbatore, Tamil Nadu*

- **Relevant Coursework:** Data Structures and Algorithms, Python Programming, Programming for Problem Solving (C),Object Oriented Programming (Java), IoT and Industry 4.0, Embedded Systems, Introduction to Data Science, Machine Learning Techniques, Database Management System, Distributed Computing

Experience

Healthflex

Software Development Engineer I - Algorithms and IoT Developer *June 2025 – Present*

- Built Clinician Agent for Stance Health using RAG pipelines, Redis, and Phoenix Tracer. Cut form-filling time by 40% to streamline physiotherapy workflows. Scaled to support 200+ concurrent users across 50+ clinics.
- Deployed Clinician Agent via Docker, AWS S3, and EC2. Reduced deployment time by 30% for healthcare applications. Has been used by
- Developed MCP server using ChromaDB and BGE embeddings. Enabled 95% accurate medical knowledge retrieval for health queries. Scaled to process 5,000+ queries daily with 99% API uptime.
- Created Flask-based MCP client with LangChain and RetrievalQA. Achieved 90% query response accuracy for medical applications. Scaled to handle 10,000+ daily requests.
- Enhanced MCP server with TTL caching, input validation, and structured logging. Improved query speed by 50% for efficient retrieval. Scaled to manage 1M+ embeddings.
- Developed OpenCV-based exercise monitoring system with pose estimation. Boosted form accuracy by 35% for fitness feedback. Scaled to process 500+ video frames per second for 20+ apps.
- Created DINO and SAM 2-based pipeline for clothing color detection. Improved detection accuracy by 25% for fitness analytics. Scaled to process 50+ hours of video daily.
- Built FastAPI WebSocket service for Healthflex One-View, integrating VALD data. Cut data latency by 50% for athlete analytics. Scaled to handle 2,000+ data points per minute for 100+ users.
- Implemented ETL pipeline with MongoDB caching and Plotly JSON outputs. Sped up data retrieval by 60% for visualizations. Scaled to manage 500,000+ records daily.
- Designed ”Plank and Jump” algorithm for exercise tracking. Raised accuracy by 20% for fitness analytics. Scaled to support 5,000+ daily sessions.
- Prototyped AI models in Jupyter Lab, Kaggle, and Colab Enterprise. Shortened development time by 30% for 30+ models. Scaled for 15+ global team members.
- Configured Google Cloud Workbench with GPU support. Sped up model training by 40% for AI workloads. Scaled for 8+ concurrent workflows with 50M+ parameters.
- Developed speaker diarization system with pre-trained models. Increased transcription accuracy by 25% for analytics. Scaled to process 200+ hours of audio monthly.

Algorithms and Backend Intern *November 2024 – June 2025*

- Created Florence-2 and SAM-based AI pipeline for image/video analysis. Improved tracking accuracy by 30% for media applications. Scaled to process 5,000+ images daily.
- Automated data extraction from VALD, Runscribe, and PhysioPlusTech using Puppeteer and Angular. Cut data acquisition time by 70% for decision-making. Scaled for 500+ daily API requests.
- Enhanced Athlete Dashboard with data pipelines. Reduced visualization load time by 50% for clinicians. Scaled to support 2,000+ unique user sessions monthly.

CISCO

Python Developer Intern *May 2022 – June 2022*

- Completed 80+ hours of programming coursework. Mastered Python for robust applications, impacting 50+ network systems.
- Developed IP validation tool, reducing vulnerabilities by 20%. Enhanced security for 500+ devices in enterprise networks.

Projects

Automated Traffic Violation Notification System (Tamil Nadu Police project) | *IoT, Raspberry Pi*

- Automated notification calls for traffic violations using a Raspberry Pi setup, allowing upto a 50% increase in fine collections.
- Ensured data accuracy by helping merge a Python script with the police database, decreasing error rates in offence tracking by 40%.

Centralized Control and Management System for Streetlights | *Arduino, LoRaWAN, Python, Firebase*

- Showcased this project at the Smart India Hackathon 24' reaching the semi finals.
- Used LoRa developement board and the LoRa Gateway to make communication effective and secure for long range communication.
- Developed an IoT solution for streetlight management using LoRaWAN, leading to a 20% reduction in maintenance response times.

Prosthetic Arm based on EEG Signals | *Python, Scikit-Learn, Raspberry Pi, 3D printing*

- Led the development of an EEG-controlled prosthetic arm, reaching an 85% action accuracy rate, poised to revolutionize assistive technology
- Involved in ongoing patenting efforts and commercial product development, promising significant assistive technology impact.

Advanced Driver Assistance and Accident Prevention System | *Python, Arduino, Raspberry Pi, Analog and Digital Sensor's*

- Desgined the prototype and Implemented real-time assessment of critical engine parameters such as temperature, oil pressure, and fuel consumption using onboard sensors.
- Contributed to enhancing vehicle safety and performance by detecting anomalies and potential issues in the engine's operation, enabling proactive maintenance and intervention.

3-axis mobile robotic arm utilizing Arduino microcontroller | *C++, Arduino, Em*bedded System's

- Engineered a 3-axis mobile robotic arm using Arduino microcontrollers, integrating gear motors for precise movement control along the X, Y, and Z axes.
- Designed and implemented Arduino programming for object manipulation, demonstrating proficiency in robotics engineering and embedded systems development.

Technical Skills

Languages : C++, Python, JavaScript, TypeScript, SQL (MySQL, MS-SQL), HTML, CSS

Frameworks & Libraries : Angular, React.js, Flask, FastAPI, Starlette, Node.js, Pandas, NumPy, Plotly, OpenCV, Scikit-Learn, TensorFlow, PyTorch, LangChain, sentence-transformers, Pydantic, PyMongo, DINO, SAM, SAM 2, Florence-2, Bootstrap

Cloud & DevOps : AWS (S3, EC2), Google Cloud Workbench, Docker, Redis, Git, Puppeteer, MongoDB, Phoenix Tracer

Tools & Platforms : JupyterLab, Kaggle, Colab Enterprise

Additional Skills : 3D Printing, Signal Processing, LoRa Communication

Courses and Certifications

- PCAP (Cisco Networking Academy)
- Technical English for Engineers (NPTEL)
- Getting Started with Enterprise Data Science (IBM)
- Machine Learning for Data Science (IBM)
- Cybersecurity Essentials (Cisco Networking Academy)
- Google Advanced Data Analytics Professional
- Google Data Analytics Professional
- Generic Online Training Course in Cyber Security (National Informatics Centre, MeitY)