MANI SANKAR THIRUGNANA MUTHUVELAN

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EDUCATION

University of Colorado, Boulder — **Boulder, CO**
Master of Science in Computer Science — **Aug 2025 - May 2027**

- Current Coursework: Datacenter Scale Computing, Intro to Robotics

PSG College of Technology, Anna University — **Coimbatore, India**
Bachelor of Engineering in Computer Science — **Aug 2018 - May 2022**

- CGPA: 8.55/10, First Class with Distinction
- Relevant Coursework: Advanced Data Structures, Machine Learning, Artificial Intelligence, Operating Systems, Cloud Computing

WORK EXPERIENCE

IBM India Systems Development Lab (IBM ISDL) — **Bangalore, India**
Senior Systems Software Engineer - z/OS on IBM Z — **July 2022 - May 2025**

- Optimized IBM Cloud Data Access (CDA) I/O throughput by implementing zEDC/gzip compression, achieving a 40% increase in data transfer speeds and a 33% reduction in memory footprint for large-scale workloads.
- Prototyped an ML - based anomaly detection system using CDA telemetry to identify potential malware and data exfiltration patterns in z/OS network traffic through statistical feature extraction and lightweight classification models.
- Architected and implemented the GDKGEN API, a modular HTTP request construction framework within CDA, enabling fine-grained, configurable operations for cloud object store interactions and streamlining custom data transfer workflows across IBM Z enterprise applications.
- Engineered a Flask-based lightweight proxy server to emulate cloud endpoints for API validation, eliminating dependency on Azure/GCP provisioning and reducing infrastructure costs and validation cycle time by 50%
- Integrated five S3-compatible / OpenStack authentication methods (SharedKey, SharedKeyLite, BASIC, TempAuth, Keystone v2/v3) into CDA, enabling interoperability with Azure, OpenStack, and other cloud platforms, driving a 30% increase in customer adoption.
- Resolved 35+ critical bugs and improved performance by 25% through targeted code optimizations and rigorous regression testing.
- Led a 5-member hackathon team to build a Low-Code/No-Code PL/X platform (TypeScript), reducing development effort by 35%.

PROJECTS [Github]

Crop Disease Detection using GANs — Python, GAN, PyTorch, OpenCV, Flask | [Springer Pub]

- Built custom GAN with OpenCV-based leaf segmentation + synthetic augmentation for robust training. Optimized with LeakyReLU, SoftMax, balanced loss, reducing mode collapse & improving stability.
- Reached 97% training / 96% validation accuracy, surpassing baseline CNNs. Deployed as Flask REST API + UI, enabling edge-device diagnostics (smartphones & Raspberry Pi).

Diabetic Retinopathy Detection (ResNet50) — Python, CNN, TensorFlow/Keras [Springer Pub]

- Applied transfer learning with ResNet50, achieving 91% training / 80% validation accuracy. Used augmentation (rotation, contrast, zoom) + learning-rate scheduling to reduce overfitting.
- Performed Hyperparameter tuning (batch size, dropout, optimizer) and validated with k-fold CV. Delivered portable inference module, ready for cloud or device-level deployment.

Real-Time Help Desk — Python, Flask, WebSockets, PostgreSQL, HTML, CSS, JS

- Developed multi-client real-time chat system with Flask + SocketIO and PostgreSQL + SQLAlchemy. Added zero-data logging, private chats, auto agent routing via server-side scheduling. Backend scaled for concurrent sessions, stress-tested for throughput & low-latency delivery. Built responsive frontend (HTML/CSS/JS) integrated with APIs + WebSocket events.

SKILLS

Languages: Python, C, C++, HTML, CSS, JavaScript, Java, SQL (PostgreSQL, MySQL), PL/X, TypeScript, JSON, YAML
Frameworks: Keras, PyTorch, TensorFlow, Flask, Django, OpenCV, REST APIs, Apache Hadoop, Docker, Apache Spark, Kubernetes
Tools: Git, Github, Jenkins, AWS S3, Azure, IBM Cloud, Linux

PUBLICATIONS

- IBM Cloud Data Access Enhancements - **Azure Blob and File Service on DFSMSdfp CDA** - IBM Z and LinuxONE Community
- Image Classification using CNN to Diagnose Diabetic Retinopathy - **Springer Book series "Lecture Notes on Data Engineering and Communications Technologies"** [Paper Link]

ACHIEVEMENTS

- **First Prize - "Most Compelling Prototype and Business Value Presentation" - National Level OpenCBR Hackathon 2019,** hosted by Leeds Social Sciences Institute, **University of Leeds, London;** selected on merit as one of 32 participants from across India. [Media]
- Awarded **"Star of the Month"** at IBM ISDL - **Dec 2022, June 2024, Dec 2024** for being the **Best Performer**.
- **Leadership:** Elected **Student Representative for two semesters** at PSG Tech and served as **Team Leader across all semester projects**
- **Design Lead** for **English Literary Society (ELS)** Club at PSG Tech.