# BHUVANA NAGARAJ

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## Professional Summary

I'm a Senior Engineer with over five years at Samsung Research, developing AI and software systems that power more than 12 million Galaxy devices. My passion lies in turning complex machine learning and system challenges into elegant, scalable solutions that make everyday technology faster, smarter, and more reliable. I'm now focused on advancing intelligent system design and large-scale AI innovation that bridges research and real-world impact.

## Technical Skills

- **Programming:** Python, Java, C/C++, JavaScript (React, Node.js), SQL, Shell, REST APIs, WebSockets
- **Frameworks & Tools:** React.js, Flask, Django, FastAPI, Spring Boot, Docker, Kubernetes, Jenkins, GitHub Actions
- **AI/ML:** TensorFlow, PyTorch, Scikit-learn, OpenCV, Keras, XGBoost, CNN/FNN, NLP (Transformers, BERT, T5), XAI/SHAP
- **Data & Cloud:** AWS (EC2, S3, Lambda, SageMaker), GCP (BigQuery, Pub/Sub), Apache Kafka, Spark, ETL, Elasticsearch
- **Systems:** Linux/Unix, kernel programming, multithreaded systems, performance tuning, CI/CD automation
- **Collaboration:** Git, Jira, Perforce, Agile/Scrum
- **High Performance & Research Computing:** Linux/Unix Systems, Multithreading, Parallel Programming (MPI).

**Certifications: OCI Associate Architect, Oracle GenAI Professional, Oracle Cloud Professional**

## Experience

**Samsung Research** **Jul 2018 – Jan 2024**
*Senior Associate Engineer* *Bangalore, India*

***Camera Systems***
- Architected scalable camera frameworks for Galaxy S/Note/Tab/Foldables delivering 34% faster capture on 12M+ devices.
- Built TensorFlow/OpenCV ML modules for image defect detection and analysis, boosting accuracy 30% across devices.
- Developed C++/Python debugging suite for HAL/kernel layers cutting crash rate 40% and improving CI/CD stability.
- Calibrated sensor distortion and white-balance tuning with hardware teams ensuring global imaging consistency.

***Samsung Digital Ads***
- Engineered TensorFlow/OpenCV real-time ad validation pipeline using ACR data, improving detection precision 30%.
- Deployed Python/Java microservices automating ad-verification workflows reducing operational costs by 20%.
- Integrated ML inference pipelines into Jenkins CI/CD reducing manual QA 45% and doubling ad release velocity.
- Implemented Kafka/Redis-based streaming for ad-event ingestion enabling real-time fraud and anomaly detection.

***Multimedia & Cross-Functional Collaboration***
- Built C++/Python multimedia modules enabling TensorFlow Lite inference accelerating on-device ML performance 2x.
- Optimized encoder-decoder pipelines and co-developed APIs with global teams improving latency and throughput.
- Contributed multimedia SDKs enabling external ML model plug-ins enhancing extensibility for AI-driven features.
- Benchmarked Exynos/Snapdragon SoCs validating imaging throughput stability under multi-threaded workloads.

## Projects

**Explainable AI for Autonomous Cybersecurity Threat Detection & Mitigation** *(TensorFlow, SMOTE, SHAP)* **May 2025**
- Developed focal-loss FNN detecting 28 IoT cyberattacks with 76% accuracy using SMOTE-balanced IoT-23 dataset.
- Integrated SHAP explainability delivering real-time feature attribution for transparent cybersecurity decisions.

**Digital Advertisement Detection & Validation on Tizen Devices** *(CNN, TensorFlow, OpenCV, Docker)* **Nov 2023**
- Engineered CNN-based ad monitoring on Tizen using TensorFlow and OpenCV, achieving 40% faster detection speed.
- Containerized inference with Docker enabling scalable, cross-device deployment across embedded Tizen systems.

## Education

**Northern Arizona University** **Graduating (Dec 2025)**
*Master of Science (MS) in Computer Science* *GPA: 3.9/4.00*
- **Coursework:** Data Structures, Algorithms, High Performance Computing, Systems Software, Databases, Machine Learning, Deep Learning, Artificial Intelligence, Large Language Models

## Recognitions

- Samsung Spot Award (Apr 2021) — completed Galaxy S21 camera milestones ahead of schedule.
- Samsung Spot Award (Apr 2023) — integrated Ads tracking and analytics for U.S. Galaxy devices.
- Finalist — MCP and Anthropic AI hackathons in SFO, recognized for AI innovation and impact.
- Top team — advanced in SFO tech hackathons for AI-driven projects and rapid prototyping.