# MURTADHA NISYIF

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## SUMMARY

AI Systems Engineer with expertise intersecting machine learning optimization, real-time distributed software design, and automated deployment infrastructure. Proven track record designing custom simulation environments, benchmarking edge-hardware bottlenecks, and orchestrating containerized continuous integration pipelines to optimize system constraints

## EDUCATION

**University of Guelph** | ***MASc. - Computer Engineering*** **Dec 2025**
**University of Guelph** | ***B.Eng. - Computer Engineering*** **Apr 2023**

## SKILLS & TECHSTACKS

**Skills:** AI Systems; DevOps; Cloud Infrastructure; IaC; Containerization; CI/CD Pipelines; Telemetry Monitoring; Agile/Scrum
**Languages:** Python; C++; C; JavaScript; Rust; HTML; Java; Bash
**Tech Stacks:** PyTorch; Stable-Baselines3; ROS2; Arduino IDE; React; FastAPI; Flask; Jest; PyTest; Docker; Jenkins; Terraform; AWS (EC2, S3); Nginx Proxy Manager; Cloudflare; Prometheus; Grafana; SQLite; PostgreSQL

## WORK EXPERIENCE

**Researcher - Machine Learning & Semantic Communications** **Jan 2024 – Dec 2025**
*University of Guelph* *Guelph, Ontario*

- Isolated and analyzed system bottlenecks across edge-cloud optical fiber networks, identifying a transition from transmission latency constraints to algorithmic compute bottlenecks during model execution
- Optimized end-to-end latency pipelines utilizing Swin Transformer architectures in PyTorch, establishing benchmarking frameworks to compare transmission times across unquantized, quantized (INT8), and baseline non-transformer data states
- Programmed an adaptive channel-selection algorithm utilizing logarithmic logic to dynamically scale the number of transmitted image channels based on real-time bandwidth and latency metrics
- Authored and published peer-reviewed research in IEEE conference proceedings focusing on task-driven feature extraction to mitigate computational and network overhead in edge-cloud architectures

**Software Developer** **Oct 2022 – Oct 2023**
*University of Guelph - Robotics Institute* *Guelph, Ontario*

- Developed distributed node architectures for an automated feeding assistant robot within ROS2, writing native C++ and Python nodes to manage core services, topics, and real-time depth-sensor camera data feeds
- Designed and programmed firmware for an ESP32-based smart mechatronic door system within the Arduino environment, implementing Bluetooth Low Energy (BLE) for local smartphone authentication and Wi-Fi synchronization for backend logging
- Implemented power-management states within microcontroller firmware to alternate between low-power and normal-power operational modes during continuous field deployments
- Orchestrated cloud infrastructure provisioning via Terraform, automating the deployment of EC2 instances for application backends/frontends and S3 buckets for media asset management

**Information Technology Analyst** **Jul 2020 – Dec 2020**
*Kitchener Downtown Community Health Center - SRHC* *Kitchener, Ontario*

- Configured distributed file architectures using a centralized Samba server, increasing secure data access and distribution efficiency by 40% across multi-department teams
- Secured network topography via FortiGate firewall and VPN implementations, supporting 60 active remote users
- Deployed Prometheus and Grafana monitoring pipelines across a multi-container Docker environment to track system downtime, monitor SSH traffic, and isolate anomalous network activity

## PROJECTS

**Real-Time Audio Filtering RL Environment** | *Python, PyTorch, OpenAI Gym, Stable-Baselines3, SciPy, librosa*

- Constructed a custom OpenAI Gym audio environment (NoiseReductionEnv) running a frequency-domain control loop via Fast Fourier Transforms (scipy.fft.rfft) to manipulate harmonic scaling coefficients
- Trained a PPO agent over 10,000 timesteps using an MlpPolicy, minimizing Mean Squared Error (MSE) against clean baseline signals to synthesize sequential 44.1 kHz time-domain outputs

**DevOps Server Infrastructure & CI/CD Pipeline** | *Docker, Jenkins, Nginx Proxy Manager, Cloudflare, PyTest, Jest*

- Self-hosted a containerized Jenkins automation server to manage continuous integration pipelines across 15+ microservices, executing automated validation via PyTest and Jest
- Architected a multi-layered proxy topography using Nginx Proxy Manager and Cloudflare to securely route web traffic, isolate runtime endpoints, and automate Let's Encrypt SSL/TLS renewals

## PUBLICATIONS

**Network-Aware Adaptive Semantic Image Transmission in Edge-Cloud Communications** **MECOM 2025**

- Proposed an adaptive JSCC framework that couples Swin-Transformers with real-time network telemetry to optimize image transmission over dynamic 5G/6G core networks (Published, IEEE Xplore)

**Boosting Edge-to-Cloud Data Transmission Efficiency with Semantic Transcoding** **CCECE 2024**

- Utilized transformer-based edge-to-cloud models to achieve a 30× bandwidth reduction and 30% improvement in end-to-end latency for high-speed data systems (Published, IEEE Xplore)