MURTADHA NISYIF

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SUMMARY

Versatile Computer Engineer and Researcher specialized in Semantic Communications and Edge Computing. First author of two IEEE conference papers focused on optimizing edge-cloud communication through task-driven feature extraction, with expertise in developing high-efficiency AI pipelines. Proven track record of reducing bandwidth demand by **30**× while maintaining 96% task accuracy in congested network environments

EDUCATION

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

SKILLS & TECHSTACKS

Skills: AI; DevOps; Cloud Computing; IaC; Containerization; CI/CD; Monitoring; Data Engineering; ML Ops
Languages: Python; C++; C; JavaScript; Rust; HTML; Java; Bash
Tech Stacks: FastAPI; PyTorch; React; Flask; SQLite; PostgresSQL; NumPy; SciPy; Scikit-learn; Matplotlib; MongoDB; Docker; Git; Jenkins; Terraform; AWS; Kubernetes; Express JS; Node.js; Swagger

WORK EXPERIENCE

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

- Developed semantic communication pipelines using Swin Transformer models, achieving a 30× reduction in bandwidth usage and 29% lower latency while preserving atleast 96% task accuracy under variable network conditions
- Extended models with adaptive deterministic mechanisms to handle bandwidth fluctuations and anomalies, ensuring stable real-time performance
- Quantized encoder models to INT8 during edge–cloud simulations to emulate smartphone hardware constraints (6-core CPU, limited RAM), enabling realistic performance benchmarking
- Published a first-author paper in IEEE conference proceedings, detailing the novel integration of semantic communication with edge computing for real-time, near real-time and task-offloading applications

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

- Architected and containerized a multi-technology stack combining ROS2, Node.js, and Vue to enable seamless real-time control across distributed robotic systems
- Implemented automated AWS infrastructure provisioning with Terraform and integrated CI/CD pipelines via GitLab and Jenkins, reducing manual deployment steps by 80%
- Created a secure certificate management workflow that streamlined Let's Encrypt renewals and configured a Nginx reverse proxy to enforce HTTPS and granular CORS policies
- Led the design and implementation of an accessible smart door system using ESP32, PIR sensors, and React Native, achieving over 95% reliability in extensive field tests

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

- Deployed and tuned a centralized Samba file server, increasing file distribution efficiency by 40% across more than 20 staff and multiple departments
- Configured and maintained a FortiGate firewall and VPN solution for 60 users, integrating Prometheus-based monitoring for real-time diagnostics and rapid issue resolution

PROJECTS

Home lab Adminstration | *Docker, Terraform, Jenkins, Prometheus, Grafana, SSL/TLS*

- Orchestrate a comprehensive home lab environment managing 15+ Docker containers for media, web, and gaming services, configured auto-renewal SSL/TLS certification with Let's Encrypt, setup Prometheus/Grafana monitoring, and applied Fail2Ban for robust security achieving 99.9% uptime and detailed system analytics

Heart Disease Predictor | *Python, Flask, RESTful, HTML, CSS, JS*

- Developed a scalable Flask-RESTful API paired with an interactive HTML/JS frontend while leveraging the UCI dataset and implemented real-time feature scaling with hyperparameter tuning to deliver a 95% prediction accuracy, supporting timely clinical decision-making

Real-Time Noise Cancellation with RL | *Python, PyTorch, Gymnasium, SciPy, librosa*

- Created a bespoke OpenAI Gym environment incorporating FFT-based audio processing and trained a PPO agent to perform adaptive noise cancellation in real time, achieving processing speeds exceeding 5,200 FPS for high-fidelity audio performance

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)