VU NAM KHANH
AI INTERN - MATHS TEACHER

SUMMARY

Dedicated 2nd-year CS student proficient in Python and C++. Passionate about the intersection of AI and IoT, with a growing portfolio of projects demonstrating Machine Learning applications on edge devices.

CONTACT

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PROJECTS

ICNLAB PTIT - Student Researcher: 7/2025 - now

Project: Research on Forecasting Models for IoT Time-Series Data

Description: An AIoT system designed to monitor and forecast air quality parameters (PM2.5, CO, NH3, Temperature, Humidity). The project integrates an ESP32-based sensor node with a Deep Learning model (Hybrid TCN-GRU) to handle time-series data challenges, providing 24-hour trend forecasting and anomaly detection.

Responsibilities:

- Hardware & Firmware: Developed an ESP32 circuit with DHT22, MQ-7, MQ-135, and GP2Y sensors. Implemented data collection, noise filtering (moving average), and signal conversion.
- Python Backend & Web Integration:
  - Developed Python scripts to automate data retrieval from Firebase via REST API/HTTP.
  - Processed raw data (cleaning, normalization) and executed AI inference (Prophet/TCN-GRU) on the server.
  - Push to Web: Programmed Python to push prediction results and "High Pollution" alerts back to the Firebase Realtime Database to be visualized on the web dashboard or LCD.
- AI Modeling: Built and trained a TCN-GRU model for long-term dependency learning and used ECOD for multivariate anomaly detection.

Deployment:

- **Edge:** Continuous 24/7 data acquisition with local buffering and auto-reconnect mechanisms.
- **Cloud:** Google Firebase Realtime Database for centralized storage and synchronization.
- **Backend:** Python environment running scheduled tasks for data synchronization and model inference .

Tech stack: ESP32, Sensors (DHT22, MQ-7, MQ-135, GP2Y1010AU0F), TFT LCD ILI9341, Google Firebase, HTTP, JSON, C++ (Arduino Core), Python, TensorFlow/Keras (TCN-GRU), PyOD (ECOD), Pandas, Scikit-learn.

NITS-LAB (PTIT) - Student Researcher: 10/2025 - now

Project: Sports-Vision Toolkit

Description: Sports-Vision Toolkit is an open-source collection of models, datasets, and tools for computer vision in sports. It provides player and ball detection, jersey number OCR, field keypoint detection, player tracking, and re-identification. The toolkit supports building full analysis pipelines—from detection and tracking to movement and tactical analysis—and can be applied to multiple sports. Released under the MIT license, it is easy to integrate and extend.

Responsibilities:

- Computer Vision & Data Processing
  - Implemented player, ball, and field keypoint detection using Roboflow's pre-trained models and custom datasets.
  - Applied data cleaning, frame sampling, and preprocessing (resizing, normalization, augmentation) for consistent inference performance.
  - Built pipelines for multi-object tracking and player re-identification to maintain stable IDs across video frames.
- Modeling & AI Inference
  - Utilized object detection (YOLO-based), keypoint detection, and OCR (jersey number recognition) for player/team classification.
  - Integrated tracking algorithms (DeepSORT/ByteTrack) to generate trajectories, speed estimation, and positional analytics.
  - Applied field calibration techniques to convert pixel coordinates into real field coordinates for tactical analysis.
- Backend & Integration
  - Developed Python scripts to run inference on video streams or uploaded footage.
  - Processed detection outputs into structured data (JSON) for downstream analytics.
  - Provided endpoints and utilities for exporting analytics (heatmaps, trajectories, player stats) to dashboards or client applications.

Deployment:

- **Edge/Local:** Real-time inference pipeline for video streams with optimized model loading and frame-queue buffering.
- **Cloud:** Integrated with Roboflow API for dataset management, versioning, and model hosting.
- **Batch Processing:** Automated scripts for analyzing full-match videos and exporting results.

Tech stack: Roboflow, YOLO models, Keypoint Detection, OCR, DeepSORT / ByteTrack, Python, OpenCV, NumPy, Pandas, JSON, Matplotlib, Seaborn, custom dashboards, Roboflow Universe & API, Jupyter, REST API workflows, video preprocessing tools

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SKILLS AND CERTIFICATIONS

Technical Skills:

- **AI Skills:** Computer Vision, AIOT, Object Detection
- **Programming Languages:** Python, C++ (Proficient), Java (Basic) Web/Mobile: Flutter, HTML/CSS
- **Framework:** OpenCV, PyTorch, TensorFlow Lite, YOLO, FastAPI, PyOD

English Communication: Advanced

Certifications:

- IELTS 6.0   2024
- Google Data Analytics   2025
- Google IT Automation with Python   2025

ACADEMIC HISTORY

Posts and telecommunications Institute of technology

Engineer Degree in CS - Data and AI (2024 - now)

- GPA 3.3
- Reseracher Student at Intelligently Connected Networks Lab
- Researcher Student at Nurturing IT Student Talent Lab

Others

- Violympic Online Mathematics Competition: Got some Provincial-level Prize in Grade 4 and 5 at Bac Giang Province
- Grade 6 to Grade 12: GPA in Maths > 9.0