PROG5155 – Machine Learning
Project Proposal

Student:

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Project Title
Wildlife Detection Model for PIR-Triggered Roadside Warning System.

Project Overview
This project focuses on developing the machine learning component of an AI-powered wildlife warning system. A PIR sensor triggers image capture, and the ML model classifies wildlife such as deer or moose under both day and night (infrared) conditions. The system is designed so that in future deployments, detection events may be transmitted to a central server via MQTT for regional analytics, although this is outside the scope of the current project.

Objectives

- Train a lightweight wildlife classification/detection model.
- Optimize the model for low-power edge devices.
- Enhance robustness for nighttime and infrared images.
- Provide species identification and confidence scoring.
- Expose a Python-friendly inference module for the PROG5120 project system.

Machine Learning Tasks
- Dataset acquisition and preprocessing.
- Model training and hyperparameter tuning.
- Evaluate accuracy and false-positive rates.
- Convert model to an optimized format such.
- Document the full ML workflow.

Expected Deliverables
- Trained wildlife detection model.
- Inference script/API callable from Python.
- Evaluation results demonstrating detection reliability.
- Full documentation of training and model performance.

Future Enhancements
In future system versions, the ML model may be integrated into a distributed network of wildlife detection units, each capable of sending species, images, and timestamps to a central server using MQTT for large-scale analytics.