CSE 421 – Embedded Machine Learning

Homework 5 – Embedded Deployment Summary

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Q1 – Human Activity Recognition (Section 12.7)

A multilayer perceptron trained on accelerometer-based handcrafted features is deployed on an STM32 platform. Offline feature vectors are passed to the model, and activity classes are predicted using embedded C inference code.

Q2 – Keyword Spotting (Section 12.8)

A lightweight keyword spotting system based on MFCC audio features and logistic regression is implemented. Model parameters are exported to C and evaluated on the embedded platform using precomputed feature vectors.

Q3 – Handwritten Digit Recognition (Section 12.9)

Hu invariant moments are extracted from handwritten digit images and used for binary classification of the digit zero. The trained model is deployed on an STM32 microcontroller and tested using offline Hu feature inputs.

Q4 – Temperature Prediction (Section 12.10)

A linear regression model predicts future temperature values from past measurements. The model parameters and normalization statistics are embedded in C code and evaluated using offline temperature samples.

Conclusion

This homework demonstrates end-to-end deployment of machine learning models on embedded systems. All models are implemented with minimal computational complexity and validated using offline test inputs.