zant

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TINY_HACK

Turin

Foc s AI

The first Embedded AI Vision hackathon

Smart Trash Collection

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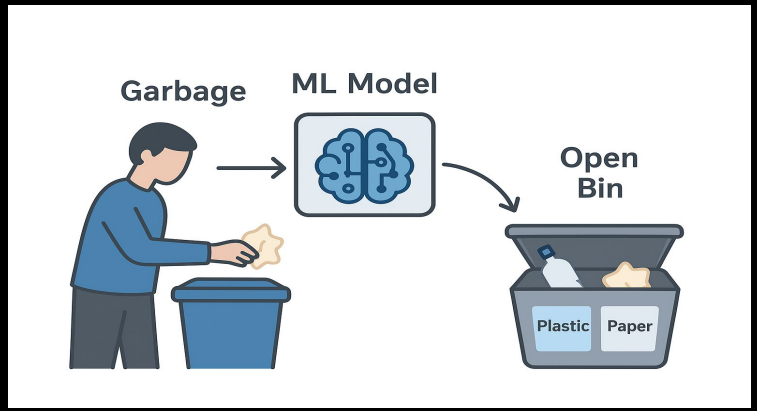
with the support of:

ARDUINO TOOLBOX Datapizza

1. Project Overview

👀 Goal: Build a smart bin that automatically detects the material of an item and routes it correctly.

🎯 Use case: Helps people sort waste easily (e.g. paper item → paper bin), reducing errors and improving recycling efficiency.



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2. Dataset & Model

📊 **Dataset**: merge of existing/created datasets + pov/color augmentations

Plastic  Glass  Paper  Organic  General 





🧠 **Model architecture**: fai-cls-n-coco (ConvX + CLS Head)

💡 **Reasoning**: low-memory, fast inference (a must in our case)

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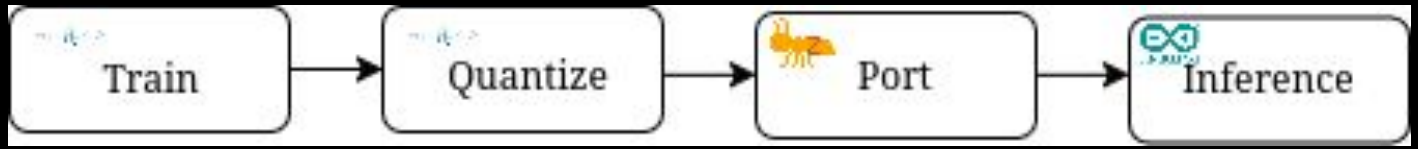
3. Deployment Pipeline

🔧 **Pipeline steps:**



⚡ **Performance**: ~300 kB, latency: 0.27 ms, F1: 54.5

📦 **Submission files**:

- model: model_info.json (res 96), model_int8.onnx
- .ino: file arduino with features and config
- web app...

4. Demo & User Experience

📷 Screenshot of UI

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5. Impact & Next Steps

🌟 **Social Relevance**: In UE only 40.8%[1] of the trash is recycled

🚀 **Future potential**:

- scale up the dataset and refine it (now only 2k images)
- test slightly larger models
- use Wifi to send (images, preds) to a server with a larger model to enhance performance monitoring and create new data for re-training

[1]: Il Sole 24 Ore

That’s a wrap!🌮

Thanks

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