zant

October 4-5

TINY_HACK

Turin

The first Embedded AI Vision hackathon

Focus AI

BeezzaAnts

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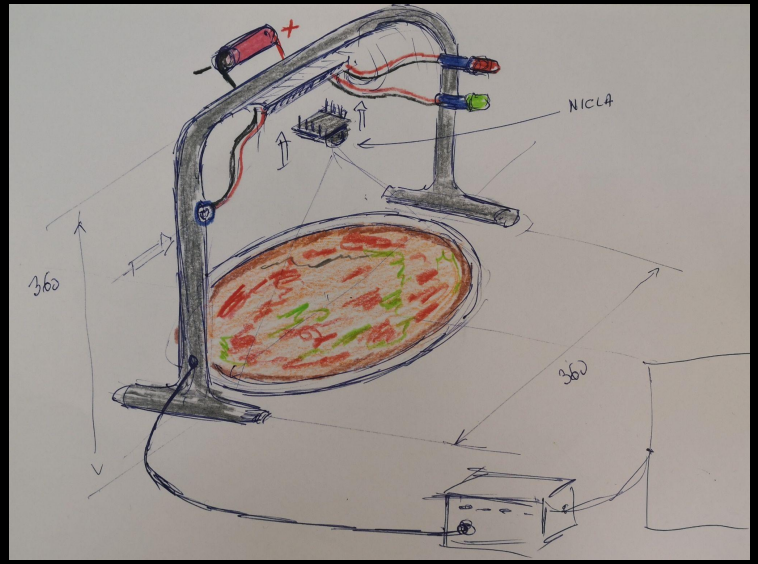
with the support of:

ARDUINO TOOLBOX Datapizza

1. Project Overview

👀 **Goal**: automatic pizza topping and cooking quality recognition for industrial/large production and giropizza stores

🎯 **Use case in brief**: out-of-the-oven burnt pizza detection for large pizzerias, grouping of similar pizzas in giropizza stores



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2. Dataset & Model

📊 **Dataset**: collections of pizzas with various toppings and cooking status, no augmentation (pizzas are easy to find)

🧠 **Model architecture**: two classification models - binary for burnt crust detection, multi-class for pizza topping

⚖️ **Trade-offs**: size matters (multiple models), so the number of toppings to be recognized is a concern

💡 **Reasoning**: inferences is performed on-device only, easily scalable across multiple ovens / stations

3. Deployment Pipeline

🔧 **Pipeline steps: spec. outlining -> model creation -> GUI -> board deployment -> refactoring**

⚡ **Performance**: (Intel CPU) 624 FPS, 1.602 ms latency (crust classification), 328 FPS, 3.047 ms latency(topping classification)

📦 **Submission files**: .ino, .onnx and model_info.json (2x), web app


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Benchmarking latency on Intel64 Family 6 Model 154 Stepping 4, GenuineIntel, size: (96, 96)..
FPS: 328 Mean latency: 3.047 ms
================================================================================
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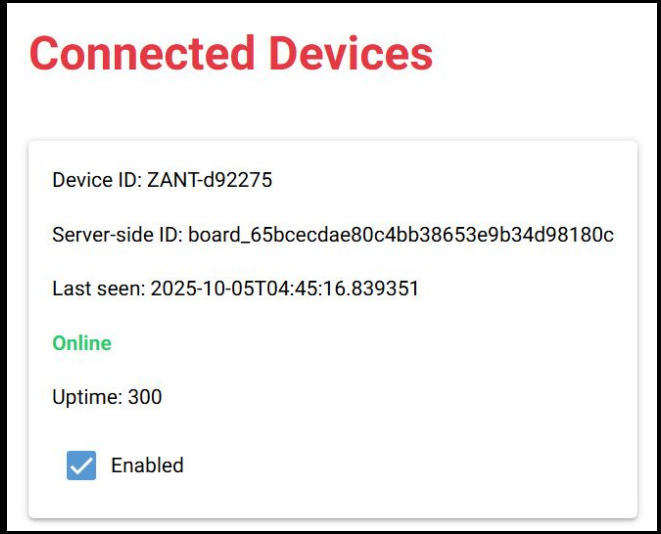
4. Demo & User Experience

🎥 **Demo flow**: pizza runs below the camera -> picture -> inference and classification -> feedback to end user (web app)

🌐 **Integration**: Wi-Fi for connection to the base station

👤 **UX**: web app that allows for device control and pizza stream monitoring



5. Impact & Next Steps

🌟 **Innovation** & **originality**: applies CV to the culinary domain and automates the tedious task of checking pizzas, allowing pizza makers to focus on making more pizzas

🚀 **Future potential**: scaling is easy and encouraged, additional sensors (temperature, …) may allow for oven control and more pizza analytics

That’s a wrap! 🌮

Thanks