TRASH-E

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Application and Hardware Platforms

Applications:

“Every year we trash 79% of recyclables but we don’t need to” (The Recycling Partnership).

Our team wants to create a object identification for waste management, which is relevant to smart cities and waste management. We want to improve the current waste management system as the population mistakenly throws it away in the wrong bins.

Hardware Platforms:

To do so, we will be utilizing a **Kria KV260 Vision AI Kit** and **Edge AI** to process image inputs and outputs in order to classify objects as trash or not. Accuracy and latency of these platforms will be measured and compared across different models based on existing ones from the Vitis AI Model Zoo.

Project Road Map

Objective

1. Deploy and run an object detection model that can classify different waste categories
2. Measure the processing speed for the waste classification tasks
3. Quantify the speedup factor of the DPU over the CPU for the waste classification tasks

Methodology

A trained object detection model will be optimized, compiled, and deployed on the Kria KV260 platform using the Vitis AI toolchain. The system will then run inference on waste images to detect and classify different waste categories.

The processing speed will be measured by running the deployed model on a set of test images and recording the time taken for inference. Average latency per image and overall throughput will be calculated to evaluate the system's performance.

The speedup factor will be determined by comparing the model's inference time on the CPU with that on the DPU. The ratio of CPU latency to DPU latency will be calculated to quantify the performance improvement achieved through hardware acceleration.

Thank you