Smart Waste Management System

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Motivation and Objectives

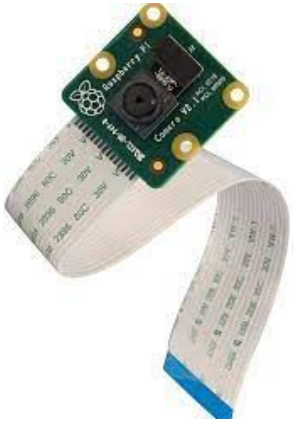
- Objectives:
  - Develop an embedded system for real-time waste classification (compost, landfill, and recycle).
- Who Cares?
  - Addresses global waste management challenges (reduce pollution).
  - Educates and assists in proper waste disposal.
- Goals and Deliverables:
  - Efficient, low-cost waste sorting system.
  - High-accuracy classification using deep learning.

Technical Approach and Novelty

- Current Practices and Limits:
  - Manual sorting in recycling facilities.
  - Prone to errors and high costs.
  - Some companies have deep learning classification in recycling facilities. (high production cost)
- New Approach:
  - Low-cost, public-use system.
  - Real-time waste classification.
- Novelty:
  - Personal/public use orientation.
  - Custom feedback for effective recycling.

Methods

- Algorithms:
  - Deep learning with MobileNetV3.
- Dataset:
  - Kaggle: Garbage Classification (12 classes).
  - Waste Classification data.
- Platform:
  - Raspberry Pi 4, Pi Camera V2, iPhone interface.



Evaluation and Metrics

- Metrics for Success:
  - Accuracy target: ~90%.
  - User-friendly interface and experience.
  - Power consumption for extended operation.

Current Status and Next Steps

- Current Status:
  - Successfully integrated the camera module
  - Implemented pretrained MobileNetV3 to classify objects with high FPS
- Next Steps:
  - Finetune the model on the waste dataset
  - Install other peripherals like Iphone interface, and audio devices for feedback
  - Real-world testing and adjustments