Smart Waste Classifier

Students: San Chui(EE), Jingtian He(CPE), Freda Huang(CSE), Hanjie Yao(CPE)
Advisor: Professor Henry Lee
Department of Electrical Engineering and Computer Science

Background

People hesitate on which category their waste belongs to and inevitably make mistakes while recycling, which in turn leads to a reduction in the recycling rate. With our design, The waste disposal and recycling service can achieve higher resource efficiency.

Project Goal

The goal of this project is to design a waste bin that can accurately classify waste into glass, plastic, organic and battery through supervised learning, to increase recycling rate of various material.

Required Material

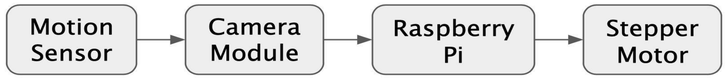
Hardware

- Raspberry Pi 4
- Motion Sensor
- Pi Camera
- Stepper Motor
- Micro Servo
- CPU/GPU cluster

Software

- Python 3.6
- PyCharm IDE
- TensorFlow
- Keras
- SkLearn
- Raspbian
- Ubuntu

Hardware Diagram



Progress

1.Replaced the DC motor with a stepper motor to increase the accuracy of slider transmission.
2. Collected more images for training.
3. Added micro servo which controls the opening and closing of the bin.

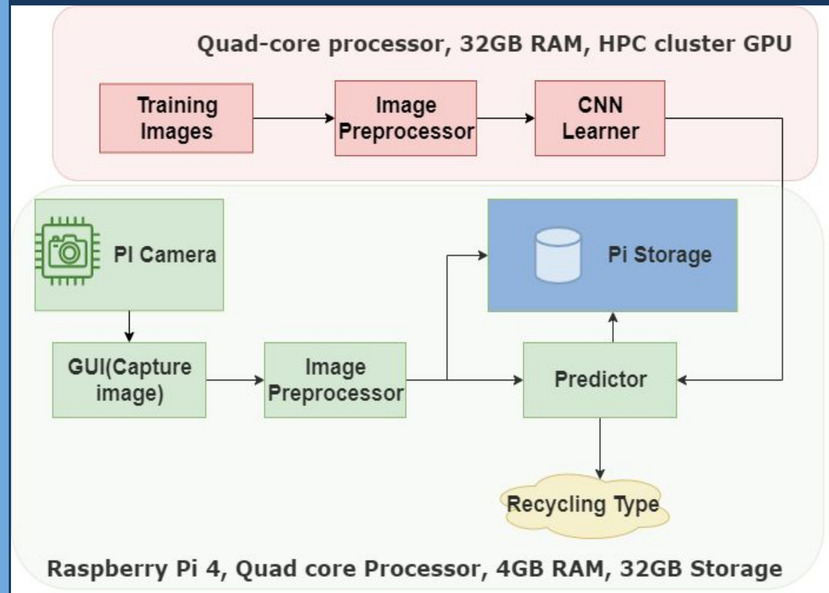
Future Challenges

1. Utilize HPC to retrain the learner with newly collected data.
2. Incorporate motion sensor into the design.

Milestones

Task/Week of	1/13	1/20	1/27	2/3	2/10	2/17	2/24
Redesign and build a slider							
Craft Waste Container							
Re-train image recognition model							
Test and assemble							

Software Diagram



References

[1] Russel, Md Mahmudul & Chowdhury, Mehdi & Shekh, Md & Uddin, Naim & Newaz, Ashif & Mehdi, Md & Talukder, Md. Mehdi Masud, Development of Automatic Smart Waste Sorter Machine, 2013.
[2] M. H. A. Wahab, A. A. Kadir, M. R. Tomari and M. H. Jabbar, "Smart Recycle Bin: A Conceptual Approach of Smart Waste Management with Integrated Web Based System," 2014 International Conference on IT Convergence and Security (ICITCS), Beijing, 2014, pp. 1-4.