
COSE474-2021F: Final Project Proposal

Trash Classification for Recycling with Object Detection

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1. Introduction

Currently, garbage emissions are increasing in our society. The government is trying several methods to encourage recycling and improving the recycling system. However, it is not easy to solve because people have to classify garbage themselves. The biggest reason for not properly separating trash is that they do not know how to do well. Therefore, We are going to try to develop a trash classification model. For developing model, object detection is necessarily required to distinguish garbage in image. After that, image classification should be learned to distribute which material these detected objects are.

2. Problem definition & challenges

For sustainable society, recycling trash is inevitable for human being. According to Ministry of Environment of Republic of Korea, each Korean citizen produces 55 tons of garbage over his lifetime. Although there are only 5 years left until current landfill is available, in capital area, it is hard to find new site for creating landfill. Also garbage made of materials such as plastic do not rot easily and generate environmental hormones during incineration. For solving those problems, separating trash for recycling is necessary.

3. Related Works

Object Detection. Object detection is still one of the fields actively studied. Since it is a difficult task to satisfy two tasks, object localization and classification, various models have been proposed so far. For example, various models have been developed, ranging from faster-rcnn(Ren et al., 2015), which built a two-stage detection pipeline using Region Proposal Network (RPN) and pre-trained convolution network, to DETR(Carion et al., 2020), which enables open vocational detection using the recently talked transformer architecture. Among these detection models, we plan to construct a garbage object detection model by fine-tuning YOLOv5(Zhu et al., 2021), a one-stage model using CNN backbone, to the following dataset. .

4. Datasets

The data acquisition process is simple. We found a dataset includes garbage images from Kaggle. The dataset contains images of 6 types of trash, types are cardboard, glass, metal, paper, plastic and trash. It contains total 2,467 images.

5. State-of-the-art methods and baselines

Many studies have been conducted on object detection since the past, and state of the art method is a FD-SwinV2-G model(Wei et al., 2022). Even if surpassing this model, Our baseline model, YOLO also shows great performance.

6. Schedule

- *Datapreprocessing*
- *Developmodel*
- *Trainingdata*
- *Testingdata*
- Analyzing result

References

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