Recycling Assistant

Identifying and Categorizing Objects based on Recyclability

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***Abstract*—Correctly identifying and categorizing Recyclables can be difficult at times. As such, the Recycling Assistant hopes to be able to both educate, as well as, assist in the matter of correctly identifying which category of recycling an item belongs to, as well as determine if an item cannot be recycled in its current state.**

***Index Terms*—identification, classification, opencv**

I. Introduction

The Recycling Assistant is a project hoping to identify, and categorize recyclable materials. In this form, we envision the Recycling Assistant to allow the user to hold up an item and display which category of recycling the item belongs in. In the event that the item is not recyclable, it will notify the user accordingly. OpenCV will be used in order to receive video stream input, as well as output a processed video stream, while waste-related datasets will be used to train the neural network, such as TACO, or WasteNet. A database may also be maintained in order to provide statistics on which types of objects are most frequently identified. As a stretch goal, we hope to be able to support the detection of different materials in a way such that the Assistant can differentiate between several types of material on the same object, and inform the user on why the object is not recyclable in its current state (ie. Plastic film on a paper box needs to be separated). We envision the final product to be largely focused on the real-time detection and classification of objects such that it can differentiate between recyclable categories, as well as differentiate between recyclables and non-recyclables.

II. Requirements Analysis

A. User Interface

The program should have a clear interface in which the user may hold up the object in question to the camera, and the program should be able to output what type of object it is, and which category of recycling it belongs in.

B. Output Feedback

The program should be able to draw bounding boxes, or correctly segment the object and output it on the display, to output appropriate feedback to the user on which item was identified, and how it came to the conclusion it did.

C. Real Time Analysis

The program should be able to handle real-time camera input, as well as real-time detection and output.

D. Database and Statistics

The program should store statistics on the types of objects that were displayed to a database.