

TO: PROFESSOR AHMED SALEM, ON BEHALF OF THE CSC190 TEACHING TEAM

FROM: TEAM NAME: BIG DATA ENERGY  
CLIENT NAME: PROFESSOR CLARK FITZGERALD

DATE: SPRING SEMESTER 2022

SUBJECT: SENIOR PROJECT PROPOSAL (DRAFT)

### **1. A brief description of the client's "business"**

Dr Fitzgerald is a professor in the department of Statistics in the College of Natural Sciences and Mathematics. His goals include furthering the study of computer vision with regard to litter detection and cleanup. Our project will build on previous technology that he's advised for and could enable faster methods for plastic monitoring, and automated waste management. He also sees potential to help educate Sacramento residents on what belongs in the trash, recycling, and compost bins.

### **2. A brief description of the value the client expects to derive from the project**

The value that can be expected from this project is that separating garbage properly means having more space available at a landfill, so that governments won't have to spend more money on land for a new landfill. Apart from being beneficial to the environment, it can help to reduce risks to public health if garbage is disposed of properly, including risks associated with exposure to biological hazards and pest infestations. A part of this involves making it easier for people to quickly identify how to correctly dispose of trash that they're unsure of.

### **3. A general description of the features to be provided by the software**

Upload a picture of trash, the web app scans it, and returns which trash can that it belongs in. The final version of the software will allow the user to upload a picture from a mobile device to a web application, which will process a scan and output the most fitting category.

- Image uploading
  - Front end app
  - File sending over the internet
  - Display which trash can for each item in the scene
- Server program
  - Take image as input from multiple devices
  - Run the trained algorithm
  - Send results to waste wizard parser
  - Receive results and send to the app

- Waste Wizard parser
  - Take results from the algorithm
  - Plug them into the website
  - Parse results and return them to the server
- Model training
  - Outline specifics about total amount of categories, confidence levels, multiple detections, data preprocessing to remove personally identifiable information
  - Collect images, annotate them, and upload them to TACO
  - Train one or more algorithms to detect trash using these images
  - Save weights file to the server so it can be used for detection

#### **4. A brief description of the expected uses of the software**

People can use it as a sort of tool to help themselves develop better disposal, recycling, and composting habits. Even if it is not perfect, what matters is that it does a better job than humans at sorting garbage to help improve recycling and compost rates.

It can be used to sort and classify different types of trash. People can use it to ask for recommendations on how to deal with differing types of garbage. Someone can use it to determine what is or isn't safe to touch.

#### **5. A brief description of the expected users of the software**

Some expected users could include city public works departments that want to quantify the effectiveness of awareness and clean up programs.

People enthusiastic about trash removal, or organizations interested in maintaining a trash free environment.

Anyone with a smartphone or camera with internet access who wants to identify trash type and properly dispose of it.

#### **6. Contact information: name, phone number and email address**

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