

California State University of San Marcos

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CIS490 : Dr. Shaun-inn Wu

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## 

To: Jared Macshane, Machine Learning Supervisor

CC: Dr. Shaun-inn Wu, Director of Projects

The Sushi Team is grateful to be able to be part of this for Keep America Beautiful. Thank you Jared, as well as Dr. Wesley Schultz, for not only this opportunity to work in the Machine Learning field for this project, but also to work on something that helps build and maintain clean, green, and beautiful spaces in America. We look forward to working and learning from you this Spring semester of 2022, in order to assist in the making of this project.

In this first phase, the team went over documentation and code from TACO, a growing image dataset of waste in the wild, in which the images are labeled and segmented according to a hierarchical taxonomy to train and evaluate object detection algorithms. We are doing so in order to see if we can utilize a pre-trained model, and adapt it to our needs to categorize litter, rather than just indicating if it’s present. We have also connected to a Google Cloud server, in a Anaconda/Miniconda environment, to progress together in the creation of code necessary for this new machine algorithm. In the next coming phase, we will strive to develop a Python program that will run the TACO model on a raw single image, in order to get familiar with how the TACO model/code works, as we move towards a functional and usable Machine Learning algorithm that the Web App team can utilize, under Jared’s supervision.

Regarding costs…

By signing below, you hereby approve Sushi Team to continue working on the following project: Keeping America Beautiful: Litter Detective and agree to the aforementioned estimated costs.

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Jared Macshane, Machine Learning Supervisor

### Sushi Team - Team Norms

● **On time:** Team members will arrive on time. If team members are unable to arrive on time, they will make an effort to notify the team. Absences for emergencies will be excused so long as the team and Professor Wu are made aware of them.

● **Respectful:** Team members will act respectfully towards each other and bullying, harassment, and similar forms of disrespect are prohibited.

● **Willing to learn:** Each team member will be asked to learn new information and skills to complete their work on this project. This learning will both be inside and outside of the classroom.

● **Open to help:** If a teammate is struggling with an aspect of their work, they are expected to ask for help. Similarly when asked for help, team members are expected to assist their teammate so long as they are reasonably able.

● **Communication:** General team communication will be done via the group’s Discord channel.

● **Quality:** Team members are expected to finish their tasks at the best quality possible, satisfying the client. If work is considered poor quality by the rest of the team, it will be redone.

### 1. Application Development

#### **1.1 Statement of Business Context**

Keep America Beautiful is a leading national nonprofit organization that inspires and educates people to take action every day to improve and beautify their community environment. They envision a country in which every community is a clean, green, and beautiful place to live.

#### 1.2 Statement of Customer’s Business Problem

* Need a new Machine Learning algorithm to produce data on images containing litter.
* Needs the data to not only detect if there is litter, but also categorize them.
* Make the data available and usable for the Web App team.

#### 1.3 Statement of Project Proposal

* 1. Process images through a pre-trained model.
* 2. Adapt model to our specific needs of litter detection.
* 3. Collect output data.
* 4. Sync up input/output format with the Web App team.
* 5. Make data accessible to the Web App team.

#### 1.4 Statement of Deliverables

We will strive to deliver a new Machine Learning algorithm for Keep America Beautiful, developed through Python in a Anaconda/Miniconda environment, that will output usable and available data for the Web App team.

#### 1.5 Measures of Success

### 2. Team Information

### 3. Appendix