SAIRA

PREPARED FOR

Dr. Wesley Schultz

Keep America Beautiful

PREPARED BY SAIRA

Ray Thomas Cruz

Angelica Olmedo

Stephen Palumbo

Isaiah Martin

Andre Castillo

i. Cover Letter

To: Dr. Wesley Schultz, Advisor to Keep America Beautiful

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

In this prototype phase, we had focused on the implementation and design of the various connections of the project. For the user interface, the app can read user input and send the data to Google Cloud using AJAX, when received, it is converted to a usable JSON file via flask. This is so it can be used by the Image Retrieval Tool which has been reconfigured to accept input from a JSON file rather than from direct user input. After images have been pulled by the image retrieval tool, the implemented TCP connection code will pull images from the folder and is able to send them to another computer, which would be the ML team's server for processing. We have also provided the ML team a third dataset of five thousand images as their older dataset had been bricked.

For the next phase of the project, we will be working on the implementation of the data visualization using flask. We will also adjust the TCP connection code to store the data of previously requested areas, rather than deleting the results. As for the interface of the web application we will adjust the html form to ask for user email and allow for a custom number of images to be pulled. A disclaimer will also be added to tell the user how much it will cost to pull a certain amount of images.

The time and cost of the third phase split between the five members of the SAIRA team has totaled 125 hours at a rate of $25.00 an hour, yielding a total amount of $3,125. The remaining phase is projected to cost about $1,750. As of now the total accumulated cost of the project is $13,110.00 and is subject to change as we continue to work on this project which we expect to cost $16,725.

Best Regards,

Ray Thomas Cruz

A copy of this report will be submitted to both Dr. Schultz and Dr. Wu

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

Dr. Wesley Schultz, Advisor to Keep America Beautiful

1. Application Development

1.1 Statement of Business Context

Keep America Beautiful is a nonprofit organization with the mission to improve and clean the environment so we can have a beautiful and green country. One major goal to achieve this mission is to end littering. Littering is a major environmental issue that destroys the environment by polluting areas. There have been many ways that Keep America Beautiful have expressed their efforts to help end littering. They've done this through events and programs like Great American Cleanup and America Recycles Day.

1.2 Statement of Customer's Business Problems

- Keep America Beautiful needs a web based application with a user interface that detects litter in an area.
- Must be able to select geo-coordinates based on user-defined regions.
- Make litter scores accessible within the user-interface from the Machine Learning algorithm.
- Make images and data accessible to the Machine Learning Algorithm

1.3 Statement of Project Proposal

- Create a fully functional user interface that gives the user the ability to select geo-coordinates for a defined region.
- The ability to pull images and data from Google Streets.
- Record data of location and date of images pulled.
- Make a UI that works with the ML team algorithm.
- Display a data visualization of scored litter.
- Make it accessible on google cloud.

1.4 Measures of Success

- JAD 1 - Define the requirements of the project.
- JAD 2 - Make any final adjustments or changes to the requirements.
- Prototype 1 - UI development, gives the user the ability to search for a geo-region.
- Prototype 2 -Implement Data Visualization
- Final Phase - Have a fully functional and complete UI that works with the ML teams algorithm.

1.5 Deliverables

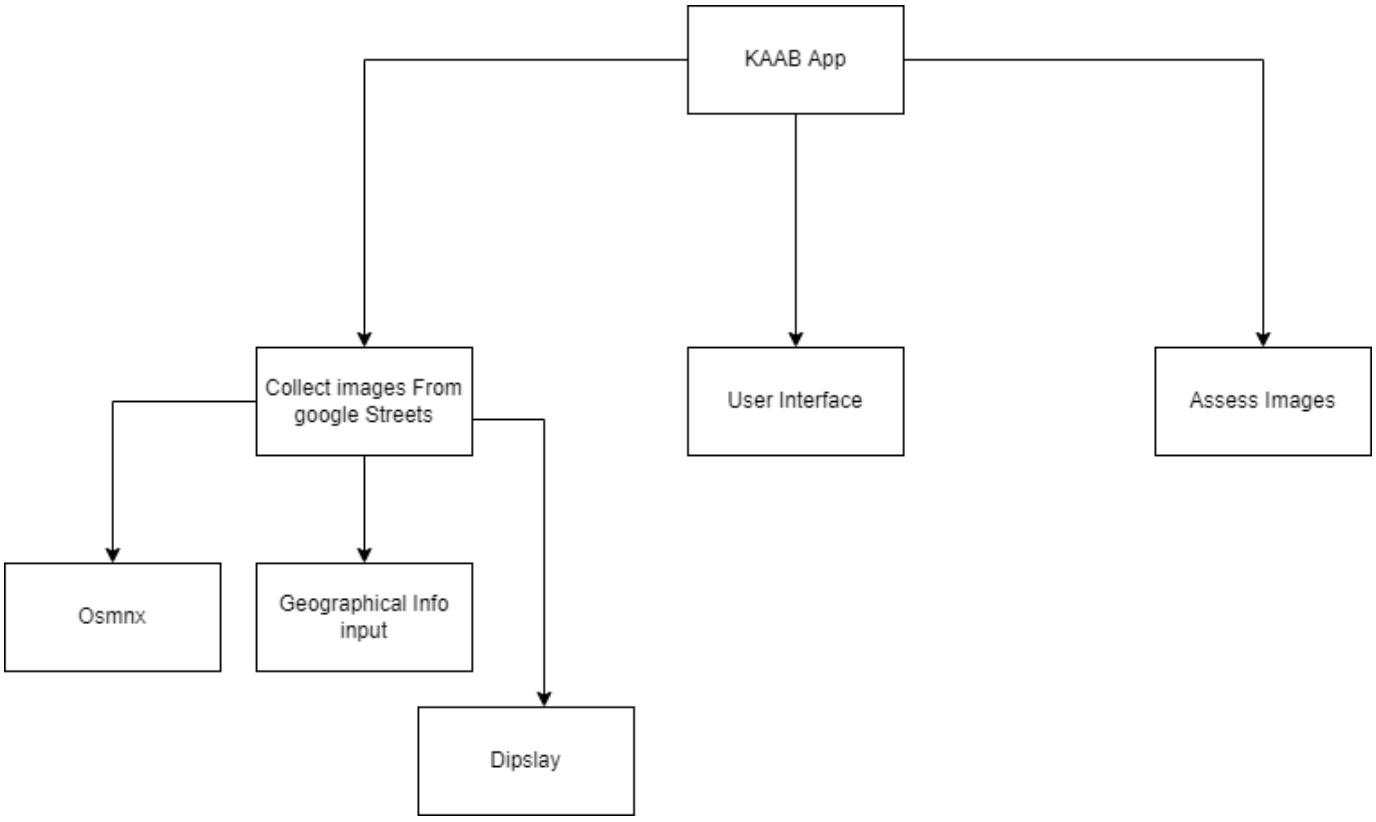
- List of any necessary links of materials used by the project.
- User guide
- Functional UI that takes user input and displays scored litter of location searched with the ability to filter number of pictures, cost, or confidence level.
- The ability to store KAB score, location, date, etc. of images pulled.

2. Requirements Matrix

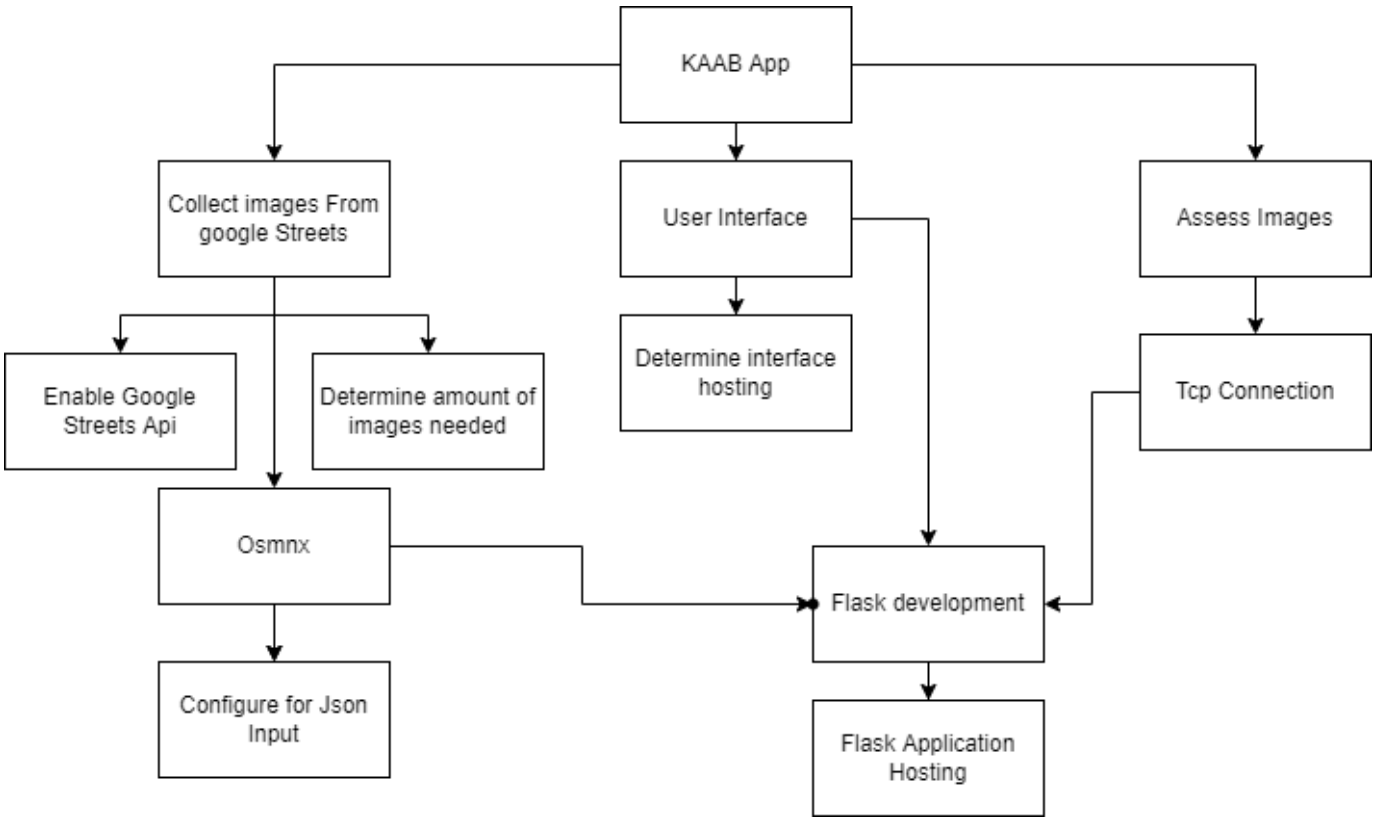
Req. #	Requirement	Description	Implemented [Y/N]	Task
1	Image pulling	-Implement OSMnx to draw streets of selected Cities	y	3.1.3
2	Image Storage/Database	-Decide where to store images pulled with OSmnx -Integrate with ML team -Database storing KAB score, location, date, etc. to be retrieved before applying the ML to obtain a new score.	N	3.1., 5.2
3	User Interface	-Design User Interface -Implement Filters -Retrieve Information from ML algorithm -Search Function -Allow users to adjust the number of pictures, the cost, or confidence level before applying OsMnx	N	3.2.1,3.2.2, 3.2.3
4	Visual Representation	-Data visualization of the scored litter in the form of a numbered scale based on the average amount of litter and will be coordinated by color	N	5.1.2

3. Project Management

3.1 Product Breakdown Structure



3.2 Work Breakdown Structure



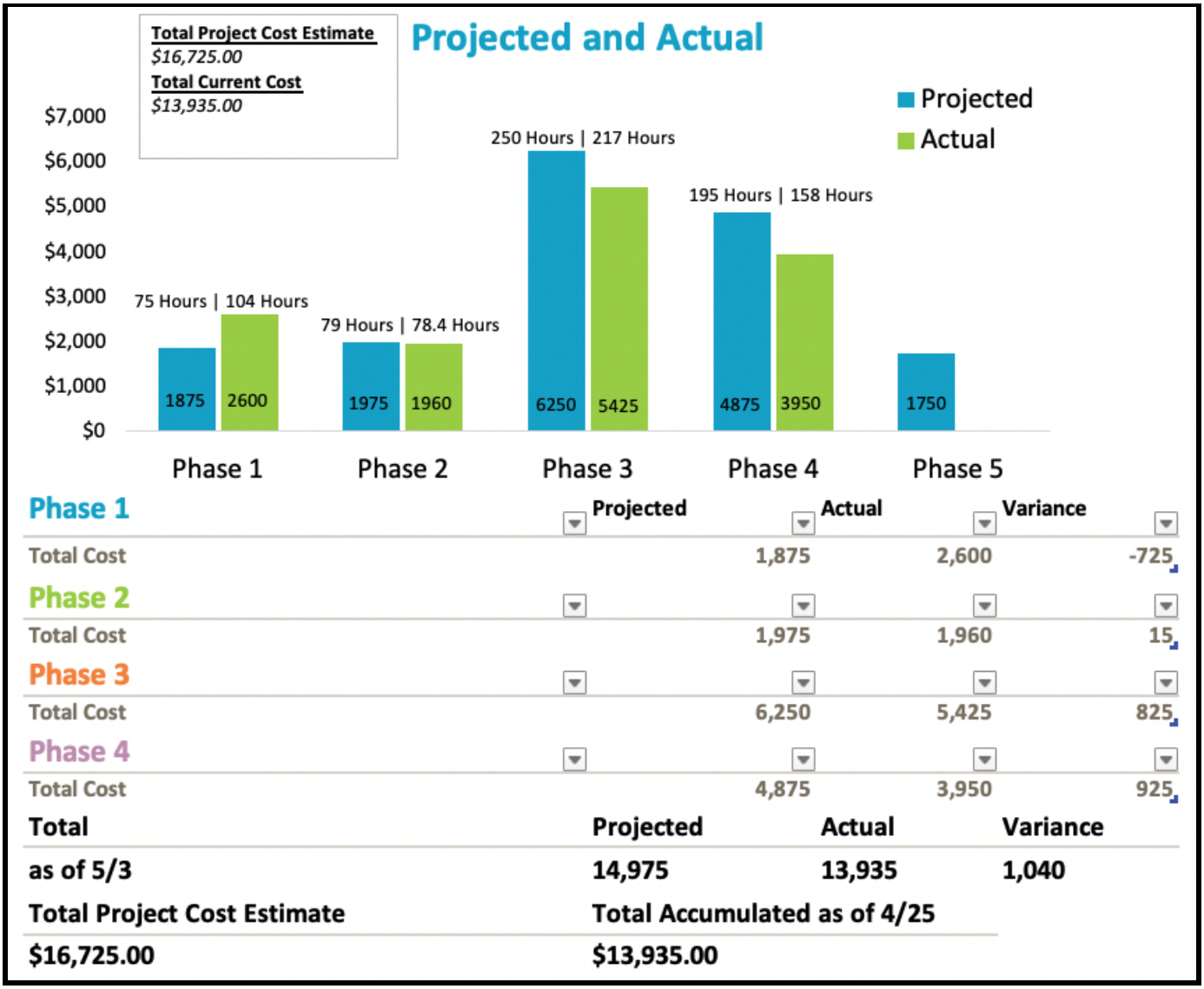
3.3 List of Tasks

ID	Task Name	Duration	Start	Finish	Resource Names	% Complete
1.0	***Team Saira - Phase 1***	27 days	1/26/2022	2/22/2022		100.00%
1.1.0	**Project Proposal**	7 days	1/26/2022	2/1/2022		100.00%
1.1.1	Team Formation	2 days	1/27/2022	1/29/2022	All	100.00%
1.1.2	Team Roles & Meeting	2 days	1/30/2022	1/30/2022	All	100.00%
1.1.3	Report 0	1 day	1/31/2022	2/1/2022	All	100.00%
1.1.4	Interview with Customer	1 day	2/1/2022	2/1/2022	All	100.00%
1.2.0	**Project Research**	6 days	2/2/2022	2/7/2022		100.00%
1.2.1	Previous Group Research	2 days	2/2/2022	2/3/2022	All	100.00%
1.2.2	Requirements Overview	2 days	2/3/2022	2/4/2022	All	100.00%
1.2.3	Prepare for JAD 1	2 days	2/5/2022	2/7/2022	All	100.00%
1.2.4	Team Meeting	1 day	2/7/2022	2/7/2022	All	100.00%
1.3.0	**JAD 1**	2 days	2/8/2022	2/9/2022		100.00%
1.3.1	JAD 1 Meeting	1 day	2/8/2022	2/8/2022	All	100.00%
1.3.2	Team Meeting Discussing JAD1	1 day	2/9/2022	2/9/2022	All	100.00%
1.4.0	**Report 1**	12 days	2/10/2022	2/10/2022		100.00%
1.4.1	Set-up Report & Tasks	1 day	2/10/2022	2/22/2022	All	100.00%
1.4.2	Report 1 Draft	5 days	2/10/2022	2/15/2022	All	100.00%
1.4.3	Sprint Meeting with Customer	1 day	2/13/2022	2/13/2022	All	100.00%
1.4.4	Report 1 Final	5 days	2/15/2022	2/22/2022	All	100.00%
2	***Team Saira - Phase 2***	12 days	2/22/2022	3/5/2022		100.00%
2.1.0	**JAD 2**					100.00%
2.1.1	Prepare For JAD 2	2 days	2/22/2022	2/23/2022		100.00%
2.1.2	JAD 2 Meeting	1 day	2/24/2022	2/24/2022		100.00%
2.1.3	Team Meeting	1 day	2/24/2022	2/24/2022		100.00%
2.1.4	Finalize Requirements	1 day	2/25/2022	2/25/2022		100.00%

2.2.0	**Report 2**	11 days	2/25/2022	3/8/2022		100.00%
2.2.1	Set-up Report & Tasks	1 day	2/25/2022	2/25/2022		100.00%
2.2.2	Report 2 Draft	4 days	2/26/2022	3/1/2022		100.00%
2.2.3	Report 2 Final	7 days	3/2/2022	3/8/2022		
2.3.0	**Image Development**		3/1/2022	3/5/2022		100%
2.3.1	Study Previous Group Code	3 days	3/1/2022	3/3/2022		100%
2.3.2	Test Image Pulling	2 days	3/2/2022	3/3/2022		100%
2.3.3	Test JSON for Sending Images	2 day	3/4/2022	3/5/2022		100%
3.0	***Team Saira - Phase 3***	22 days	3/22/2022	4/12/2022		100.00%
3.1.0	**Cloud Development**	6 days	3/22/2022	3/27/2022		100.00%
3.1.1	Set-up Google Cloud	1 day	3/22/2022	3/22/2022		100.00%
3.1.2	Test OSmnx	4 days	3/23/2022	3/26/2022		100.00%
3.1.3	Give ML Team Images to Test	1 day	3/27/2022	3/27/2022		100.00%
3.2.0	**UI Development**	4 days	3/27/2022	3/31/2022		100.00%
3.2.1	Develop Search Bar	2 day	3/27/2022	3/28/2022		100.00%
3.2.2	Implement Filters	1 day	3/29/2022	3/29/2022		100.00%
3.2.3	Establish a Confidence Interval	1 day	3/30/2022	3/30/2022		100%
3.3.0	**Prototype 1**	5 days	4/1/2022	4/5/2022		100.00%
3.3.1	Prepare For Prototype 1	3 days	4/1/2022	4/3/2022		100.00%
3.3.2	Prototype 1	1 day	4/4/2022	4/4/2022		100.00%
3.3.3	Team Meeting	1 day	4/5/2022	4/5/2022		100.00%
3.4.0	**Report 3**	9 days	4/3/2022	4/12/2022		100.00%
3.4.1	Set-up Report & Tasks	1 day	4/3/2022	4/3/2022		100.00%
3.4.2	Report 3 Draft	1 day	4/3/2022	4/5/2022		100%
3.4.3	Report 3 Final	7 days	4/6/2022	4/12/2022		100.00%
4.0	*Team Saira - Phase 4*	22 days	4/12/2022	5/3/2022		100.00%
4.1.0	**Front-End Development**	12 days	4/12/2022	4/23/2022		100.00%
4.1.1	Process images using ML algorithm	5 days	4/12/2022	4/15/2022		100.00%

4.1.2	Configure OSmnx to work with user input	2 days	4/15/2022	4/16/2022		100.00%
4.1.3	Connect Image pulling script to UI	8 days	4/16/2022	4/23/2022		100.00%
4.2.0	**Prototype 2**	3 days	4/23/2022	4/25/2022		100.00%
4.2.1	Prepare For Prototype 2	2 days	4/23/2022	4/24/2022		100%
4.2.2	Prototype 2	1 day	4/25/2022	4/25/2022		100%
4.2.3	Team Meeting	1 day	4/25/2022	4/25/2022		100%
4.3.0	**Report 4**	10 days	4/24/2022	5/3/2022		100%
4.3.1	Set-up Report & Tasks	1 day	4/24/2022	4/24/2022		100%
4.3.2	Report 4 Draft	3 days	4/24/2022	4/26/2022		100%
4.3.3	Report 4 Final	7 days	4/27/2022	5/3/2022		100%
5.0	***Team Saira - Phase 5***					0.00%
5.1.0	**Front-End Development**					
5.1.1	Continue to work on UI					
5.1.2	Implement Data Visualization					
5.2.0	**UI Development**					
5.2.1	Work on filter number of pictures, the cost, or confidence interval					
5.3.0	**Database Development**					
5.3.1	Develop Database					
5.3.2	Store KAB score, location, date, etc					
5.4.0	**Final**					
5.4.1	Final Report					
5.4.2	Prepare For Presentation					
5.4.3	Prepare Visuals & Demos					
5.4.4	Rehearse Presentation					

3.5 Cost Tracking Chart



Phase 1	Projected	Actual	Variance
Total Cost	1,875	2,600	-725
Phase 2			
Total Cost	1,975	1,960	15
Phase 3			
Total Cost	6,250	5,425	825
Phase 4			
Total Cost	4,875	3,950	925

Total	Projected	Actual	Variance
as of 5/3	14,975	13,935	1,040

Total Project Cost Estimate	Total Accumulated as of 4/25
$16,725.00	$13,935.00

3.5 Cost Tracking Breakdown

Project Milestone Cost Estimates | **Actual Cost For Each Milestone**

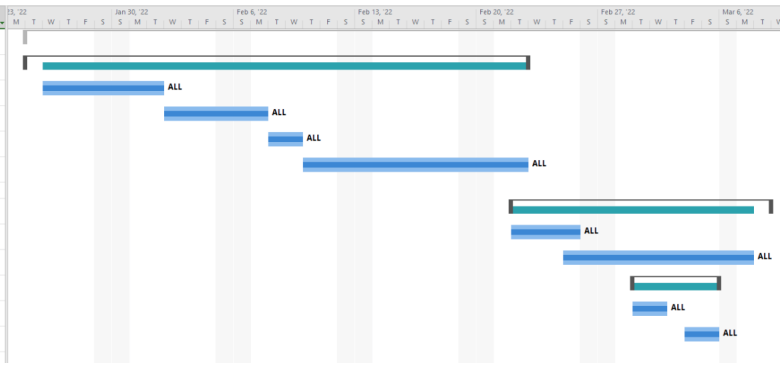
Project Name	*SAIRA*	Start Date	1/25/22
Clent Name	*Dr. Wesley Schultz*	End Date	5/17/22

Project Phases	Projected Hours	Cost per Hour	Total Cost	Actual Hours	Total Accumulated Costs as of 5/3
Phase 1	*5 members*			*1/25-2/22*	
Phase 1 Tasks	*75*	*$25*	*$1,875*	*104*	*$2,600.00*
Phase 2	*5 members*			*2/22-3/8*	
Phase 2 Tasks	*79*	*$25*	*$1,975*	*78.4*	*$1,960.00*
Phase 3	*5 members*			*3/8-4/12*	
Phase 3 Tasks	*250*	*$25*	*$6,250*	*217*	*$5,425*
Phase 4	*5 members*			*4/12-5/3*	
Phase 4 Tasks	*195*	*$25*	*$4,875*	*158*	*$3,950*
Phase 5	*5 members*			*4/3-5/17*	
Phase 5 Tasks	*70*	*$25*	*$1,750*		
Total	669	*25 per hr*	*$16,725*		*$13,935*

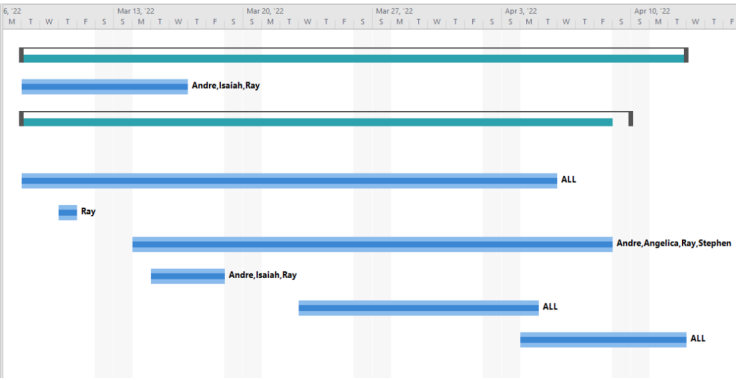
		Total Project Cost Estimate	**Total Accumulated as of 5/3**
Total Hours	*669*		
Team Fee's	*$16,725.00*	*$16,725.00*	*$13,935.00*

3.6 Gantt Chart

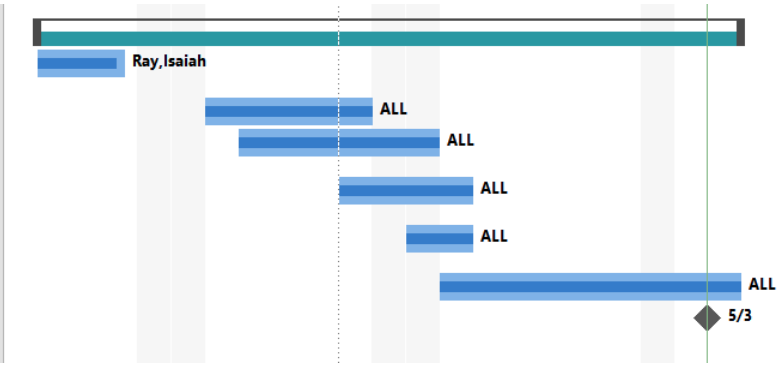
Task Name	Start	Finish	Estimated Hours	Actual Hours	% Complete
Phase 1	**Tue 1/25/22**	**Tue 2/22/22**	**75**	**104**	**100%**
Proposal	Wed 1/26/22	Tue 2/1/22	5	10	100%
Research	Wed 2/2/22	Mon 2/7/22	5	6	100%
JAD 1	Tue 2/8/22	Wed 2/9/22	10	12	100%
Report 1	Thu 2/10/22	Tue 2/22/22	20	26	100%
Phase 2	**Tue 2/22/22**	**Tue 3/8/22**	**79**	**78.4**	**100%**
JAD 2	Tue 2/22/22	Fri 2/25/22	5	5	100%
Report 2	Fri 2/25/22	Mon 3/7/22	23.5	27	100%
Image Development	**Tue 3/1/22**	**Sat 3/5/22**	**9.5**	**9**	**100%**
Test Image Pulling	Tue 3/1/22	Wed 3/2/22	8	8	100%
Motify Program	Fri 3/4/22	Sat 3/5/22	1.5	1.5	100%



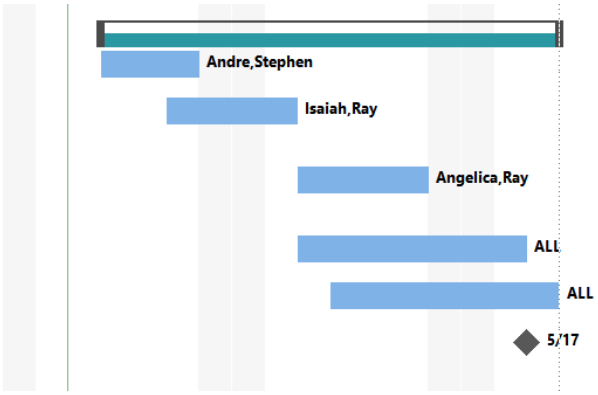
Task Name	Start	Finish	Estimated Hours	Actual Hours	% Complete
Phase 3	**Tue 3/8/22**	**Tue 4/12/22**	**250**	**217**	**100%**
Research	Tue 3/8/22	Wed 3/16/22	6	3	100%
Cloud Development	**Tue 3/8/22**	**Sat 4/9/22**	**51**	**51**	**100%**
Image Gathering	Tue 3/8/22	Tue 4/5/22	36	28	100%
Setup Cloud	Thu 3/10/22	Thu 3/10/22	3	3	100%
OSMnx	Mon 3/14/22	Fri 4/8/22	12	10	100%
UI Development	Tue 3/15/22	Fri 3/18/22	24	20	100%
Prototype 1	Wed 3/23/22	Mon 4/4/22	48	40	100%
Report 3	Mon 4/4/22	Tue 4/12/22	25	20	100%



Task Name	Start	Finish	Estimated Hours	Actual Hours	% Complete
Phase 4	**Wed 4/13/22**	**Tue 5/3/22**	**195**	**158**	**98%**
Database Development	Wed 4/13/22	Fri 4/15/22	7	2	80%
Prototype 2	Mon 4/18/22	Fri 4/22/22	35	27	100%
TCP Connection	Tue 4/19/22	Sun 4/24/22	10	10	100%
Connect Image to UI	Fri 4/22/22	Mon 4/25/22	23	7	100%
Configure user input	Sun 4/24/22	Mon 4/25/22	14	9	100%
Report 4	Mon 4/25/22	Tue 5/3/22	38	35	100%
Report 4 due	Tue 5/3/22	Tue 5/3/22			100%



Task Name	Start	Finish	Estimated Hours	Actual Hours	% Complete
Phase 5	**Wed 5/4/22**	**Tue 5/17/22**	**70**		**0%**
Data Visualization	Wed 5/4/22	Fri 5/6/22	10		0%
Store previous requests	Fri 5/6/22	Mon 5/9/22	12		0%
Adjust HTML form	Tue 5/10/22	Fri 5/13/22	15		0%
Final Report	Tue 5/10/22	Mon 5/16/22	10		0%
Final Presentation	Wed 5/11/22	Tue 5/17/22	13		0%
Final Report Due Date	Tue 5/17/22	Tue 5/17/22			0%



Meeting Minutes

Call to order

A meeting of Team SAIRA with Dr. Schultz was held on Zoom at 3pm on April 25 th, 2022 and lasted roughly 30 minutes.

Attendees

Attendees included Dr. Wesley Schultz, Ray Cruz(Scrum Leader), Angelica Olmedo(Project Manager), Andre Castillo(Systems Analyst), Stephen Palumbo(Documentation), and Isaiah Martin(Programmer).

Reports

The meeting was based around Prototype 2. We discussed how the functional UI can take a json file and read inputs. We have also set up the TCP connection and developed the backend(flask). Additionally, we mentioned how the machine learning team needed a fresh set up of 5,000 images due to one of the psychology students causing the data set to be corrupted. We discussed how during this current phase the total costs was around $16,025, which is about 1800 under what we had estimated. As the meeting continued, we discussed how it takes roughly 25 minutes to process 1600 images. Towards the end of the meeting, Dr. Schultz gave a use case of what he would potentially use this system for. It would be nice if he is able to pick 100 random locations, 1600 per city and receive all 160,000 scores which would be stored in a database. Giving the system the ability to have an ongoing request. Thus, giving developers a starting point to work with. As a team we discussed that it is feasible but would need to discuss with the machine learning team. Overall, this was a productive meeting and we feel we are making progress towards the end product.

Unfinished business/Open Issues

- Plan to work on a single search bar

- Tool that would let you force a smaller number of images and be able to manually override the system, so it’s more user friendly rather than being hardcoded.

- Ability to have a link that the user could use to take them to see the cost through Google.

-Storing previously searched data

Goal

-The end goal is to ultimately have a fully functioning web application that can be used for years to come as well as a tool designed for Keep America Beautiful to use to facilitate asking questions about litter to the entire global community.

Announcements

-As a team, we plan to have scheduled check-ins with the client throughout the semester. Dr. Schultz mentioned he liked to be part of Spring meetings.

-We agreed that Sundays at 1 pm will work best when it comes to accommodating everyone's schedule, as well as brief or bi-weekly updates.

-Additionally, Team SAIRA plans to have daily meetings and weekly scrum meetings to stay on top of our progress and goals towards successfully completing this project.

Timesheets For Week 11 and 12

Andre Castillo

	Timesheet for Week Ending:		Week 11		
Team Name	Team SAIRA				
Member Name	Andre Castillo			Role	Application Development
Signed:					
Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/12/2022	Process images using ML algorithm	5	3	-2	yes
4/12/2022	Connect Image pulling script to UI	5	4	-1	yes
4/12/2022	Meetings	9	9	0	yes
Totals for Week in hours		19	16	-3	

	Timesheet for Week Ending:		Week 12		
Team Name	Team SAIRA				
Member Name	Andre Castillo			Role	Application Development
Signed:					
Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/19/2022	Prototype 2	7	5	-2	yes
4/19/2022	Meetings	4	4	0	yes
Totals for Week in hours		11	9	-2	

	A	B	C	D	E	F	G
2		Timesheet for Week Ending:		Week 13			
4	Team Name	Team SAIRA					
6	Member Name	Andre Castillo			Role	Application Development	
8	Signed:						
12			Planned	Actual		Task	
13	Date	Task	Hours	Hours	Difference	Completed?	
15	4/26/2022	Report4 Final	4	3	-1	yes	
16	4/26/2022	Meetings	3	3	0	yes	
25	Totals for Week in hours		7	6	-1		

Angelica Olmedo

	Timesheet for Week Ending:	Week 11			
Team Name	Team SAIRA				
Member Name	Angelica Olmedo			Role	Project Manager
Signed:					

Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/12/2022	Process Images using ML algorithm	7	3	-4	yes
4/12/2022	Meetings	3	3	0	yes
Totals for Week in hours		10	6	-4	

	Timesheet for Week Ending:	Week 12			
Team Name	Team SAIRA				
Member Name	Andre Castillo			Role	Application Development
Signed:					

Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/19/2022	Prototype 2	7	5	-2	yes
4/19/2022	Meetings	4	4	0	yes
Totals for Week in hours		11	9	-2	

	Timesheet for Week Ending:	Week 13			
Team Name	Team SAIRA				
Member Name	Angelica Olmedo			Role	Project Manager
Signed:					
Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/26/2022	Report 4 draft	5	5	0	yes
4/26/2022	Meetings	3	3	0	yes
Totals for Week in hours		8	8	0	

Isaiah Martin

	Timesheet for Week Ending:	Week 11			
Team Name	Team SAIRA				
Member Name	Isaiah Martin			Role	Application Development
Signed:					
Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/12/2022	Configure Osmnx to work with user input	6	5	-1	yes
4/12/2022	Meetings	9	9	0	yes
Totals for Week in hours		15	14	-1	

	Timesheet for Week Ending:	Week 12			
Team Name	Team SAIRA				
Member Name	Isaiah Martin			Role	Application Development
Signed:					

Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/19/2022	Prototype 2	8	6	-2	yes
4/19/2022	Meetings	4	4	0	yes
Totals for Week in hours		12	10	-2	

	Timesheet for Week Ending:	Week 13			
Team Name	Team SAIRA				
Member Name	Isaiah Martin			Role	Application Development
Signed:					

Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/26/2022	Report4 Final	4	3	-1	yes
4/26/2022	Meetings	3	3	0	yes
Totals for Week in hours		7	6	-1	

Stephen Palumbo

	Timesheet for Week Ending:	Week 11			
Team Name	Team SAIRA				
Member Name	Stephen Palumbo			Role	Documentation
Signed:					
Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/12/2022	Process Images using ML algorithm	4	3	-1	yes
4/12/2022	Meetings	3	3	0	yes
Totals for Week in hours		7	6	-1	

	Timesheet for Week Ending:	Week 12			
Team Name	Team SAIRA				
Member Name	Stephen Palumbo			Role	Documentation
Signed:					
Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/19/2022	Report 4 draft	6	3	-3	yes
4/19/2022	Prototype 2	6	2	-4	yes
4/19/2022	Meetings	4	4	0	yes
Totals for Week in hours		16	9	-7	

	Timesheet for Week Ending:	Week 13			
Team Name	Team SAIRA				
Member Name	Stephen Palumbo			Role	Documentation
Signed:					
Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/26/2022	Report 4 final	3	3	0	yes
4/26/2022	Meetings	3	3	0	yes
Totals for Week in hours		6	6	0	

Ray Cruz

	Timesheet for Week Ending:	Week 11			
Team Name	Team SAIRA				
Member Name	Ray Cruz			Role	Team Leader
Signed:					
Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/12/2022	Process Images using ML algorithm	5	4	3	yes
4/12/2022	Connect image pulling script to UI	5	4	0	yes
4/12/2022	Meetings	9	9	0	yes
Totals for Week in hours		19	17	3	

	Timesheet for Week Ending: _____	Week 12			
Team Name	_____Team SAIRA_____				
Member Name	_____Ray Cruz_____			Role _____	Team Leader
Signed:	_____ _____				
Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/19/2022	Prototype 2	13	12	-1	yes
4/19/2022	Report 4 draft	4	3	-1	yes
4/19/2022	Meetings	4	4	0	yes
Totals for Week in hours		21	19	-2	

A	B	C	D	E	F
	Timesheet for Week Ending: _____	Week 13			
Team Name	_____Team SAIRA_____				
Member Name	_____Ray Cruz_____			Role _____	Team Leader
Signed:	_____ _____				
Date	Task	Planned Hours	Actual Hours	Difference	Task Completed?
4/26/2022	Report 4 Final	5	4	-1	yes
4/26/2022	Meetings	3	3	0	yes
Totals for Week in hours		8	7	-1	