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Team 25: Plant Attribute Extraction
Bi-Weekly Update 1

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Project Summary

- Birds-eye view images of crops taken from Drone.
  - Cotton
  - Wheat
- Data generated from user input on website.
  - Code utilizes the dat or CHM files and generates data tables of different file types (CSV, GeoJSON, shp, and xls)
- Generated attributes can be downloaded on site
  - Canopy Cover
  - Canopy Height
  - Canopy Volume
  - Excess Green (ExG)

What are the Issues?

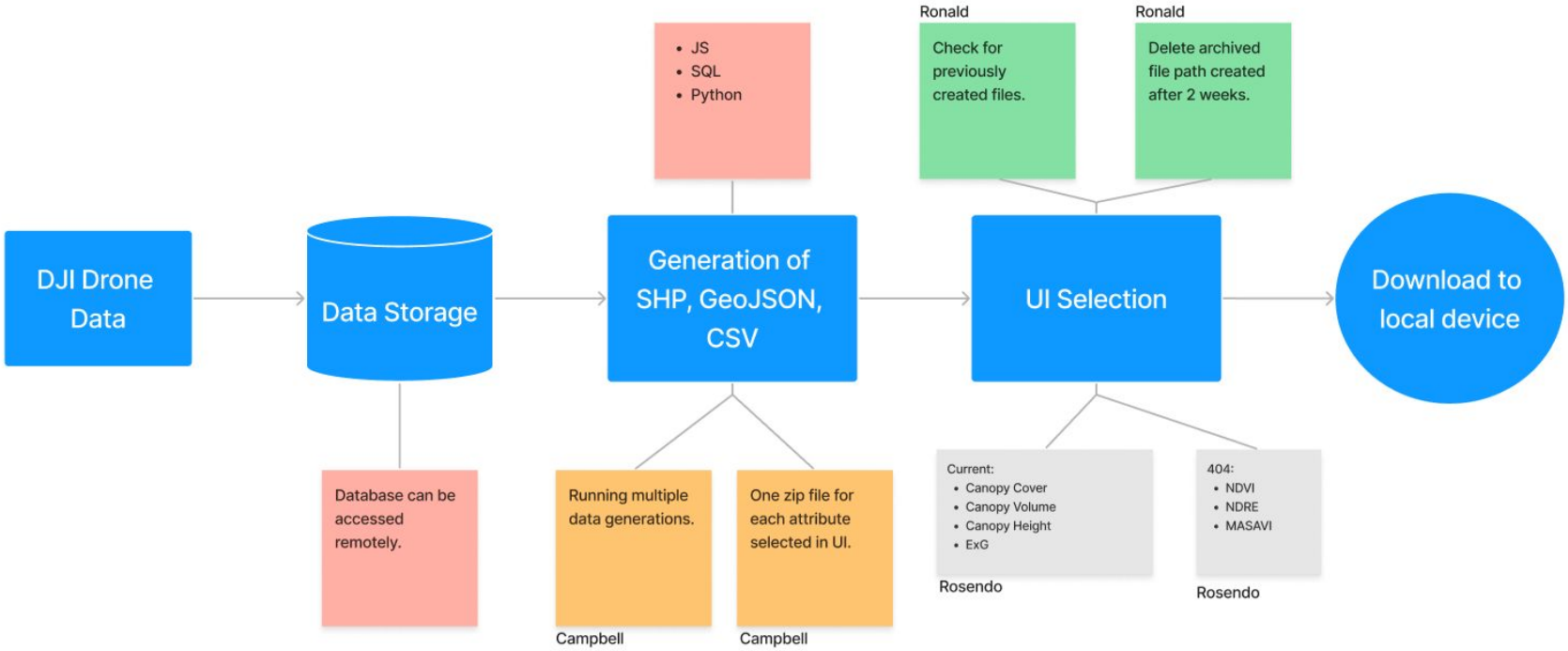
Problems

- Generation of Canopy data for different files was simple and inefficient for generating lots of data.
- UI did not have suitable selections to be able to select multiple files, or none for the case with the Canopy Height Model.
- Manipulation of files after generation was not featured.

Solutions

- Allowing the user to select multiple files to generate and implement into a single data file.
- Manipulating the UI to allow the user to select which files they would like to generate.
- Deleting and analyzing the generated files to not fill up the archive with copies of the same data.

Project/Subsystem Overview



Major Project Changes for 404

- Adding multispectrum options to select other than RGB:
  - Normalized Difference Vegetation Index (NDVI)
  - Normalized Difference Red Edge Index (NDRE)
  - Modified Soil Adjusted Vegetation Index (MSAVI)
- Adding selections for the UI for the user to add.
- Generating a zip file for each of the attributes and associated data.
- Extending the directory manipulation to multispectrum.

Project Timeline

In Progress

Pending

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Subsystem 1: Directory Manipulation

Ronald Batista

Directory Manipulation - 403 Accomplishments

Ronald Batista

- 2 documents created:
  - checkZipStatus
    - Allowed to check if the “generate attributes” button was used previously.
    - Testing was done but part of the generation of the attributes was not accessible for testing initially (post-generation).
  - deleteTempResults
    - Preference by sponsor for any generation of data to be deleted after 2 weeks
    - Code was in place prior but not implemented. Added timer to code to manipulate when archived file was deleted.

Current Tasks for 404

Ronald Batista

- checkZipStatus
  - Discovered *sys.argv* not correctly reading file path for code to evaluate. Code was updated as of last week.
  - Adding different test cases to see the response of the file existing.
- deleteTempResults
  - Same *sys.argv* issue arose, condition resolved.
  - Once checkZipStatus is 100%, then deleteTempResults will be integrated alongside to make sure both can work at the same time.
- Once RGB has been implemented, next steps will be to implement the multispectral data.

```
$zip_file_path_noExt = str_replace(".", "", $_GET["zipfile_path_noExt"]);
$zip_file_path_noExt = str_replace(" ", "_", $zip_file_path_noExt);

$zip_file_path = str_replace(".", "", $_GET["zipfile_path"]);
$zip_file_path = str_replace(" ", "_", $zip_file_path);
```

checkZipStatus

```python
def main():
    zip_file_path_noExt = sys.argv[1] #grabs system arguments containing the path to the temp results dirtectory and zipfile downloaded by the client

    print("Selected File Path noExt: ", zip_file_path_noExt) #code here is similar to setup of deleteTempResults.py
    zip_file_path = sys.argv[2]

    print("Selected zip_file_path: ",zip_file_path)

    if (os.path.exists(zip_file_path)): #difference lies here where the file is not deleted
        print("The temp results directory and zip file have already been generated, you can download the generated results.")
    else:
        print("The temp results directory and zip file do not exist!")

if __name__ == "__main__":
    main()
```

```php
#PHP code that grabs the path to the zip file and the temporary results directory. The code then calls to a python file (CheckZipStatus.py) which then checks the status o
    $zip_file_path_noExt = str_replace(".", "", $_GET["zipfile_path_noExt"]);
    $zip_file_path_noExt = str_replace(" ", "_", $zip_file_path_noExt);

    $zip_file_path = str_replace(".", "", $_GET["zipfile_path"]);
    $zip_file_path = str_replace(" ", "_", $zip_file_path);

     $returningArray = array();
     array_push($returningArray, $zip_file_path);
     array_push($returningArray, $zip_file_path_noExt);

     # Call Python code with field information to check the Zip file and temp results directory.
     $checkZip_command = "python3 /var/www/html/uas_tools/canopy_attribute_generator/Resources/Python/CheckZipStatus.py $zip_file_path_noExt $zip_file_path";
     array_push($returningArray, $checkZip_command);
     $result = shell_exec($checkZip_command);
     if($result){                                    // If there is a result push result to array being passed back in JSON format
       # echo "Python has been executed!";
       array_push($returningArray, $result);
        }else{
          array_push($returningArray, "ERROR: Was unable to call to the CheckZipStatus python executable!");     // Else, append Error on to returning JSON object.
        }

     echo json_encode($returningArray);     //return returning array regarding this call in JSON format.
     die();

?>
```

deleteTempResults

```php
$zip_file_path = $_GET["zipfile_path"];
$zip_file_path_noExt = $_GET["zipfile_path_noExt"];

$returningArray = array();
array_push($returningArray, $zip_file_path);
array_push($returningArray, $zip_file_path_noExt);

# Call Python code with field information to delete Zip file and temp results directory.
$generateZip_command = "python3 /var/www/html/uas_tools/canopy_attribute_generator/Resources/Python/deleteTempResults.py $zip_file_path_noExt $zip_file_path";
array_push($returningArray, $generateZip_command);
$result = shell_exec($generateZip_command);
if($result){                                    // If there is a result push result to array being passed back in JSON format
  # echo "Python has been executed!";
  array_push($returningArray, $result);
   }else{
     array_push($returningArray, "ERROR: Was unable to call to the deleteTempResults python executable!");     // Else, append Error on to returning JSON object.
   }

echo json_encode($returningArray);     //return returning array regarding this call in JSON format.
die();
```

```python
def main():
    zip_file_path_noExt = sys.argv[1]       #grabs system arguments containing the path to the temp results dirtectory and zipfile downloaded by the client
    print(zip_file_path_noExt)
    zip_file_path = sys.argv[2]
    print(zip_file_path)

    #t = 604800  # a week in seconds
    t = 120 #timer test
    while t:  #Loop creates timer to keep data in data in database for a week before deleting
       mins, secs = divmod(t, 60)
       timer = '{:02d}:{:02d}'.format(mins, secs)
       time.sleep(1)
       t -= 1 # reduces t variable

    if (os.path.exists(zip_file_path_noExt)):   #if these paths exist, delete them
        shutil.rmtree(zip_file_path_noExt)
        os.remove(zip_file_path)
        print("The temp results directory and zip file were deleted successfully!")
    else:
        print("The temp results directory and zip file do not exist!")

#---------------------------------------------------------------------------------------------------------Run Main
if __name__ == "__main__":
    main()
```

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Subsystem 2: User Interface

Rosendo Torres

User Interface - 403 Accomplishments

Rosendo Torres

- Implementation and population of dropdown menus
  - Redesign of dropdown menus in order to allow for multiple file display
  - Ability to select multiple files for generation
- Finished all required warnings
  - If any of the required attributes are not selected it will not allow for result generation and warn the user as to why it isn't allowed
  - If any of the required results aren't generated it won't allow for file download and warn the user as to why it isn't allowed
- Implemented results and file download tables
- Visually touched up the website/generator with any changes the sponsor asked for

User Interface - 404 Current Tasks

Rosendo Torres

- Completion of any visual touch ups the sponsor may have
- Implementation of NDVI user interface components
- Population of dropdown menus with NDVI data/files
- Testing of NDVI user interface requirements
- Addition of any new restrictions based on NDVI calculations

Tables Implementation

```
<div class="col-lg-12">
    <label>Select Canopy Attributes to Generate:</label>

          <div class="col-md-12" id="product-list-wrapper-0" style="margin-top: 15px;   max-height: 230px; display: inline-block;">
          <table id="product-table-0" class="table table-bordered">
            <thead style="">
              <tr style="color: white; background: black;">
                <th style="border: none;">
                  <input id="check-all-caTable" type="checkbox" checked="" onchange="ToggleAllRowData_caTable();">
                </th>
                <th style="border: none;">--Select All--</th>
              </tr>
            </thead>
            <tbody id="product-list-0">
              <tr>
                <td style="">
                  <input id="ch_cb" name="ch_cb" type="checkbox" value="CanopyHeight" checked="" onchange="ToggleRowData_caTable();">
                </td>
                <td style="">
                  <span>CanopyHeight</span>
                </td>
              </tr>
              <tr>
                <td style="">
                  <input id="cv_cb" name="cv_cb" type="checkbox" value="CanopyVolume" checked="" onchange="ToggleRowData_caTable();">
                </td>
                <td style="">
                  <span>CanopyVolume</span>
                </td>
              </tr>
            <tr>
              <td style="">
                <input id="cc_cb" name="cc_cb" type="checkbox" value="CanopyCover" checked="" onchange="ToggleRowData_caTable();">
              </td>
              <td style="">
                <span>CanopyCover</span>
              </td>
            </tr>
            <tr>
              <td style="">
```

Dropdown Menu Implementation

```
<!--Select Boundary div-->
<div class="col-md-12" style="margin-top: 15px;">
            <div class="form-group">
                <label>Boundary</label>
                <select id="boundary" name="boundary" class="form-control">
                  <option value="0" selected="selected">--Select a Boundary File--</option>
                </select>
            </div>
</div>

<!--Select Orthomosaic div-->
<div class="col-md-6" style="margin-top: 15px;">
  <div class="form-group">
    <label>Orthomosaic</label> <br>
      <div id="orthomosaic_list" name="orthomosaic_list" class="dropdown-check-list" tabindex="100">
        <span class="anchor">--Select Orthomosaic File--</span>
          <ul class="items">
            <div id="orthomosaic" name="orthomosaic"></div>
          </ul>
      </div>
    </div>
  </div>

  <!--Select Canopy Height Model (CHM) div-->
<div class="col-md-6" style="margin-top: 15px;">
  <div class="form-group">
  <label>Canopy Height Model</label>
    <div id="canopy_list" name="canopy_list" class="dropdown-check-list" tabindex="100">
      <span class="anchor">--Select a Canopy Height Model File--</span>
        <ul class="items">
          <div id="canopy_height_model" name="canopy_height_model"></div>
        </ul>
    </div>
  </div>
</div>
```

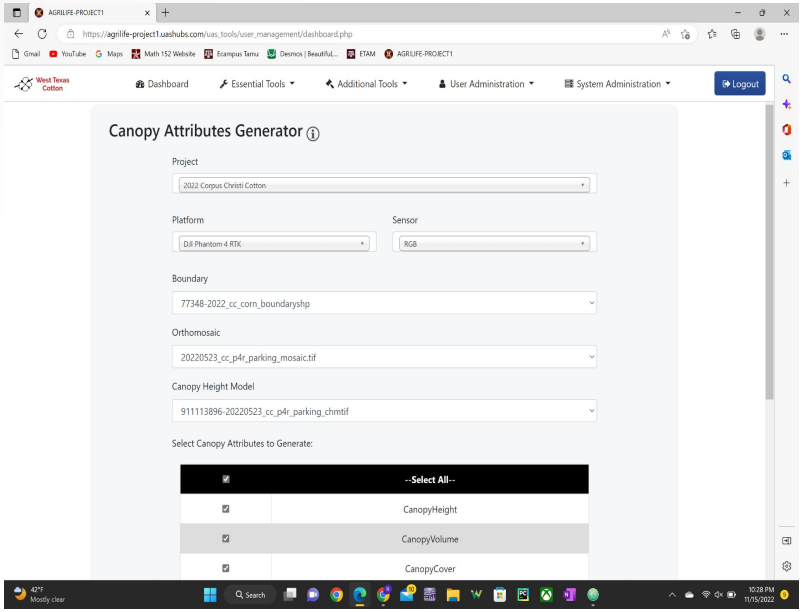
```
.dropdown-check-list {
  display: inline-block;
}

.dropdown-check-list .anchor {
  position: relative;
  cursor: pointer;
  display: inline-block;
  padding: 5px 50px 5px 10px;
  border: 1px solid #ccc;
}

.dropdown-check-list .anchor:after {
  position: absolute;
  content: "";
  border-left: 2px solid black;
  border-top: 2px solid black;
  padding: 5px;
  right: 10px;
  top: 20%;
  transform: rotate(225deg);
}

.dropdown-check-list .anchor:active:after {
  right: 10px;
  top: 21%;
}

.dropdown-check-list ul.items {
  padding: 2px;
  display: none;
  margin: 0;
  border: 1px solid #ccc;
  border-top: none;
}

.dropdown-check-list ul.items li {
```

Dropdown Menu Population

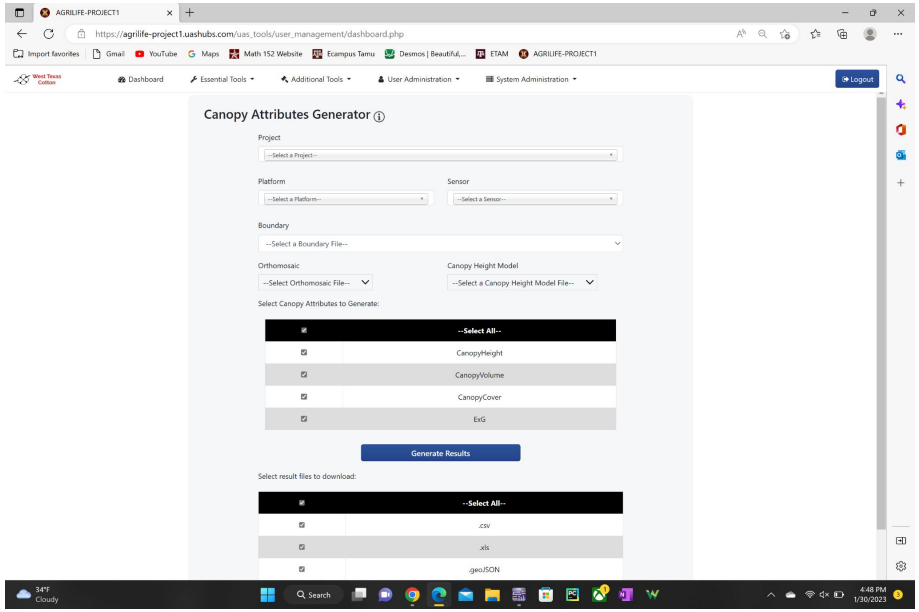
```
var ortho_cnt = 0;
function GetOrthomosaicList() {
  console.log("----------------------------------------GetOrthomosaicList()");

  if(empty_ortho != 0 && ortho_cnt != 0){
    $('#orthomosaic').empty();
    empty_ortho = 0;
    ortho_cnt = 0;
  }

  var selected_project_id = $('#project').val();
  selected_project_id = selected_project_id.split("::")[1];
  console.log("This is the selected project id:  ");
  console.log(selected_project_id);

  var selected_platform_id = $('#platform').val();
  console.log("This is the selected platform id:  ");
  console.log(selected_platform_id);

  var selected_sensor_id = $('#sensor').val();
  console.log("This is the selected sensor id:  ");
  console.log(selected_sensor_id);

  $.ajax({
      url: "Resources/PHP/FlightIDs.php",
      dataType: 'text',
      data: {
          selected_projectID: selected_project_id,
          selected_platformID: selected_platform_id,
          selected_sensorID: selected_sensor_id,
      },
      success: function (response) {
          var data = JSON.parse(response);
          if (data.length > 0) {

              $.each(data, function (index, item) {
                  var flight_id = item.ID;                //what displays in the d
                  console.log("Getting Orthos with flight ID: ");
                  console.log(flight_id);

                  $.ajax({
```

```
    console.log("Getting Orthos with flight ID: ");
    console.log(flight_id);

    $.ajax({                                                          //AJAX call to Orthomosiac ph
        url: "Resources/PHP/Orthomosaic.php",
        dataType: 'text',
        data: {
            flightID: flight_id,
        },
        success: function (response) {                                //Grab response from AJAX cal
            var data = JSON.parse(response);                          //Parse results into JSON for
            if (data.length > 0) {                                    //If respose is not empty

                $.each(data, function (index, item) {                 //for each row/item in respor
                    if(ortho_cnt == 0){
                      var checkAll = "<li><input type=checkbox name=check-all-orthomosaic id=check-all-orthomosaic" +
                      " onchange=ToggleAllOrthomosaics();" + " value=>" + "All" + "</li>";
                      $("#orthomosaic").append(checkAll);
                    }
                    ortho_cnt = ortho_cnt + 1;

                   var ortho = "<li><input type=checkbox id=orthomosaic" + ortho_cnt +" value='" + item.FileName
                                + "::" + item.UploadFolder + "/" + item.FileName      //Orthomosaic file path
                                + "::" + item.EPSG                                    //ESPG associated with orthom
                                + "'" + " onchange=ToggleOrthomosaics();" + ">" + item.FileName + "</li>";

                    $("#orthomosaic").append(ortho);

                });
* this out as I was unable to emtpy the drop down menu after selecting another Project - Christian Leal
```

Webpage Display



Older Website



Newer Website

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Subsystem 3: Attribute Modification & Storage

Campbell Motter

Attribute Modification & Storage

Campbell Motter

Accomplishments since 403 70 hrs of effort	Ongoing progress/problems and plans until the next presentation
• Multiple selections for Orthomosaic and Canopy Height Model(CHM) can now generate results successfully. • All attributes are generated and stored within their own separate folders, and then copied to the results folder. • Download zip now has the correct file path, matching the results folder created by generateZip.py file.	• Currently working on merging all of the CSV files generated into one CSV file in order for efficient comparison of the generated data. This will be completed using the pandas import. • Currently working on merging all of the SHP files for the same reason stated above. This will be completed using the geopandas import. • Amending the directory tree to include more specific grouping based on attributes, and zipping together the files containing the same attribute.

Notes:

- An increase in memory capabilities of the website has resolved the few errors present within the attribute generation process. This was done by the sponsors team.
- When we are given the new deliverables for 404, there might be a change in subsystems in order to evenly distribute the work and technical merit given the change in scope by the new deliverables
- A possible way to increase technical merit and efficiency of the attribute generation would be to add threading. This would run all of the attribute generations simultaneously.

Attribute result examples:

left: CSV

Row name	Col	FID	20220523
1	1	0	0.02056595
1	2	1	0.02549317
1	3	2	-0.0121878
1	4	3	0.06381568
1	5	4	0.17575994
1	6	5	0.06538012
1	7	6	0.52365637
1	8	7	0.28521359
1	9	8	0.42652851
1	10	9	0.39120442
1	11	10	0.18587758
1	12	11	0.38030854
1	13	12	0.18536243
1	14	13	-0.0772267
1	15	14	0.19025867
1	16	15	0.2224765

Right: geojson


```
"features": [
{ "type": "Feature", "properties": { "Row name": "1", "Col": "1", "FID": 0,
    "20220408": -0.181372106075287 }, "geometry": { "type": "Polygon",
    "coordinates": [ [ [ -97.561375500074107, 27.783301333443891 ], [
    -97.561366266270298, 27.78330143798275 ], [ -97.561365085698867,
    27.78321895303419 ], [ -97.561374319495684, 27.783218848495121 ], [
    -97.561375500074107, 27.783301333443891 ] ] ] } },
{ "type": "Feature", "properties": { "Row name": "1", "Col": "2", "FID": 1,
    "20220408": -0.23261353373527499 }, "geometry": { "type": "Polygon",
    "coordinates": [ [ [ -97.561365758918441, 27.783301443726625 ], [
    -97.561356525114647, 27.783301548264841 ], [ -97.561355344550535,
    27.783219063316469 ], [ -97.561364578347366, 27.783218958778068 ], [
    -97.561365758918441, 27.783301443726625 ] ] ] } },
{ "type": "Feature", "properties": { "Row name": "1", "Col": "3", "FID": 2,
    "20220408": -0.19582214951515201 }, "geometry": { "type": "Polygon",
    "coordinates": [ [ [ -97.561356017762776, 27.783301554008677 ], [
    -97.561346783958982, 27.783301658546247 ], [ -97.561345603402259,
    27.783219173598074 ], [ -97.561354837199076, 27.783219069060319 ], [
    -97.561356017762776, 27.783301554008677 ] ] ] } },
```

Directory


20220408_cc_p4r_parking_mosaic_20220427_cc_p4r_parking_mosaic_2022_cc_corn_boundary
20220408_cc_p4r_parking_mosaic_20220523_cc_p4r_parking_mosaic_2022_cc_corn_boundary
20220408_cc_p4r_parking_mosaic_2022_cc_corn_boundary
20220408_cc_p4r_parking_mosaic_2022_cc_corn_boundary_chm1
20220408_cc_p4r_parking_mosaic_2022_cc_corn_boundary_chm2
20220408_cc_p4r_parking_mosaic_2022_cc_corn_boundary_chm3
20220427_cc_p4r_parking_mosaic_20220408_cc_p4r_parking_mosaic_2022_cc_corn_boundary
20220427_cc_p4r_parking_mosaic_20220523_cc_p4r_parking_mosaic_2022_cc_corn_boundary
20220427_cc_p4r_parking_mosaic_2022_cc_corn_boundary
20220427_cc_p4r_parking_mosaic_2022_cc_corn_boundary_chm1
20220427_cc_p4r_parking_mosaic_2022_cc_corn_boundary_chm2
20220427_cc_p4r_parking_mosaic_2022_cc_corn_boundary_chm3
20220523_cc_p4r_parking_mosaic_20220408_cc_p4r_parking_mosaic_20220427_cc_p4r_parking
20220523_cc_p4r_parking_mosaic_20220408_cc_p4r_parking_mosaic_2022_cc_corn_boundary
20220523_cc_p4r_parking_mosaic_20220427_cc_p4r_parking_mosaic_2022_cc_corn_boundary
2022_Corpus_Christi_Cotton_20220408_cc_p4r_parking_mosaic_20220523_cc_p4r_parking_mosaic_2022_cc_corn_boundary_results
2022_Corpus_Christi_Cotton_20220408_cc_p4r_parking_mosaic_20220523_cc_p4r_parking_mosaic_2022_cc_corn_boundary_results.zip

Currently working on: File Merging

```
if ((len(selected_CanopyHeightModel_list) > 1) || (len(selected_orthomosaic_name_array > 1))):
    for i in selected_orthomosaic_name_array:
        for j in (len(selected_chm_name_array) - 1):
            for a in len(attributes):
                chm_name1 = "chm" + str(j + 1)
                chm_name2 = "chm" + str(j + 2)
                #potentially change ortho name to i
                csv_path_name = path_to_temp_folder + "/" + attributes[index] + "/" + attributes[index] + "_" + selected_
                shp_path_name = path_to_temp_folder + "/" + attributes[index] + "/" + attributes[index] + "_" + selected_
                if j < 1:
                    csv_file1_name =  "/var/www/html/uas_data/download/product/" + selected_project_name + "/" + i + "_"
                    shp_file1_name =  "/var/www/html/uas_data/download/product/" + selected_project_name + "/" + i + "_"
                else:
                    #change this variable so that it doesnt get chnaged for every iteration
                    csv_file1_name = csv_path_name
                    shp_file1_name = shp_path_name
                csv_file2_name =  "/var/www/html/uas_data/download/product/" + selected_project_name + "/" + i + "_" + se
                shp_file2_name =  "/var/www/html/uas_data/download/product/" + selected_project_name + "/" + i + "_" + se
                csv_File1 = pd.read_csv(csv_file1_name)
                csv_File2 = pd.read_csv(csv_file2_name)
                # need to be changed to shp file reading and merging in geopanadas
                #shp_File1 = pd.read_csv(shp_file1_name)
                #shp_File2 = pd.read_csv(shp_file2_name)
                #shutil.rmtree(csv_path_name)
                mergeFile = pd.merge(csv_File1, csv_File2, how = 'outer')
                mergeFile.to_csv(csv_path_name)
'''
```

Execution & Plan

Case	Ownership	Tested?	Functions?	Due	1/27/23	2/10/23	2/24/23	3/10/23	3/24/23	4/7/23	4/14/23
Allowing the *Generate Attributes* Button to be selected without the seleceton of CHM files for certain cases.		Y	Y	1/27/23							
Implementation of running the website with the selection of multiple files for RGB data.		Y	N	2/24/23							
Files successfully downloaded from the website in a zip file.		Y	Y	2/24/23							
The use of checkZipStatus to check the existence of a generated file to notify the user for RGB data.		Y	N	2/24/23							
Implementation of deleteTempResults to have the generated file deleted in two weeks for RGB data.		Y	N	2/24/23							
Meging together CSV files for RGB data.		Y	N	2/24/23							
Merging together SHP files for RGB data		N	N	2/24/23							
Create more specific zipping, grouping based around attributes		N	N	3/10/23							
Add a function that will zip together all of the seperate attribute zip folders		N	N	3/24/23							
Implementation of warnings based on new 403 requirements		Y	Y	1/27/23							
Population of NDVI data/options into dropdown menus		N	N	2/24/23							
Testing of NDVI attributes in order to download results		N	N	3/10/23							
Population of NDRE data/options into dropdown menus		N	N	3/24/23							
Testing of NDRE attributes in order to download results		N	N	4/7/23							
Population of MSAVI data/options into dropdown menus		N	N	4/14/23							
Testing of MSAVI attirbutes in order to download results		N	N	4/14/23							
Implementation of warnings based on any restrictions with data		Y	N	4/14/23							
checkZipStatus and deleteTempResults code created for multispectral data.		N	N	3/10/23							
Data manipulation created for NDVI regarding file deletion and analysis.		N	N	3/24/23							
Data manipulation created for NDRE regarding file deletion and analysis.		N	N	4/7/23							
Data manipulation created for MSAVI regarding file deletion and analysis.		N	N	4/7/23							
Merging together CSV files for multispectral data.		N	N	4/14/23							
Merging together SHP files for multispectral data.		N	N	4/14/23							
checkZipStatus and deleteTempResults code implemented and runs with the multispectral data.		N	N	4/14/23							
Addition of downloadable multispectral data.		N	N	4/14/23							

Ownership Legend	
	Ronald
	Rosendo
	Campbell

	Completed
	In Progress
	Pending
	Behind

Thank You!

Questions?