Satellite Shade Analysis

Testing Artifacts

Prepared for: **Dr. Doerry**

Prepared by: **JBOP Solutions**

Taylor Born,

Ben Johnson,

Steffen Olson,

Rachel Pang

Version 1.00

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Introduction:

This brief document contains a few examples relating to the testing we've performed on the project. This includes the unit testing outputs we received based on given input, some examples of the integration testing we've performed with different component interactions, and documents relating to the formal usability testing we performed.

This by no means contains all of the testing we have done for our project, just a few different artifacts and charts detailing some of the more important and formalized tests we performed on our system, and the different components it contained.

Example Unit Testing Inputs and Outputs:

The following tests were done to see if the preparation that the shade calculator algorithm performs on the data it receives is correct.

Test 0:

Console Output:
Test 0

Generated coordinates (given headings and distances):
Tree at (6,7)
Tree at (6,1)
Tree at (6,16)
Module at (12,7)

Test 1:

Console Output:
Test 1

Generated coordinates (given headings and distances):
Tree at (28,26)
Tree at (28,15)
Tree at (17,19)
Tree at (10,6)
Tree at (-25,31)
Module at (13,25)

Example Integration Testing:

Integration was performed primarily by performing certain functionality of different parts of the system that interact, and checking the Google App Engine database to ensure everything works as intended. This chart lists a few of these tests.

Test Number	What's Being Tested	Expected Output	Actual Output	Pass/Fail	Mitigation (If Fail)
1	Saving/Loading Projects In Shade Calculator with Average Number of Obstructions	6 trees, 2 obstructions, and 5 modules at given coordinates	6 trees, 2 obstructions, and 5 modules at given coordinates	Pass	N/A
1.1	Shade Calculation with Test 1's Project Information	Shade percentage given for each month and an overall year	Shade percentage given for each month and an overall year	Pass	N/A
2	Saving/Loading Projects In Shade Calculator with Minimal Obstructions	3 trees, 0 obstructions, and 3 modules at given coordinates	3 trees, 0 obstructions, and 3 modules at given coordinates	Pass	N/A
2.1	Shade Calculation with Test 2's Project Information	Shade percentage given for each month and an overall year	Shade percentage given for each month and an overall year	Pass	N/A
3	Calculating the Shade Percentage with an Excessive Amount of Modules.	4 trees, 2 obstructions, and 14 modules at given coordinates	4 trees, 2 obstructions, and 14 modules at given coordinates	Pass	N/A
3.1	Shade Calculation with Test 3's Project Information	Shade percentage given for each month and an overall year	Failure with calculate.py, error given in console. No shade percentage given.	Fail	Perform specific unit testing on calculate.py to figure why it doesn't complete when there is too many modules
4	Google Account Login, Load A Project, and Perform Shade Calculaion on saved project data	Successful login, Accurate loading of obstuctions/modules, and successful calculation with no errors	Successful login, Accurate loading of obstuctions/modules, and successful calculation with no errors	Pass	N/A

Integration Test #1 Output:

Edit Entity: Project

Decoded entity key: User: name=rkp32@nau.edu > **Project: id=5629499534213120**

Entity key: ag1zfnNzYS10ZXN0aW5ncisLEgRVc2VyIg1ya3AzMkBuYXUuZWR1DAsSB1Byb2plY3QYgICAgICAgAoM

Enter information for the entity below. If you'd like to change a property's type, set it to Null, save the entity, edit the entity again, and change the type.

Showing full fields. See clipped data.

address

value: 2112 S Huffer Ln, Flagstaff AZ 86011

type: text

clientname

value: John Doe

type: string

data

value: {"map_center":{"lng":-111.65707943753854,"lat":35.17714354884351},"map_zoom":20,"circles":
[{"lng":-111.65739208459854,"lat":35.17714592263737,"height":18,"radius":8.546232478962484},
{"lng":-111.6572941839695,"lat":35.17709878666977,"height":17,"radius":6.540684707595233},
{"lng":-111.65717884898186,"lat":35.17697930235041,"height":15,"radius":4.063701437175899},
{"lng":-111.65718019008636,"lat":35.1769233967829,"height":15,"radius":5.05147847685821}],"polygons":[{"points":
[{"lng":-111.65709167718887,"lat":35.17727965711102},{"lng":-111.65708765387535,"lat":35.17726102199497},
{"lng":-111.65705412626266,"lat":35.177265406728544},{"lng":-111.65705546736717,"lat":35.17728733039285}],"height":27},
{"points":[{"lng":-111.65716007351875,"lat":35.17723471358857},{"lng":-111.65715739130974,"lat":35.17721717464623},
{"lng":-111.65711849927902,"lat":35.17722375175006},
{"lng":-111.65712118148804,"lat":35.17724238687464}],"height":27}],"markers":
[{"lng":-111.65685161948204,"lat":35.176942031993065,"height":20},
{"lng":-111.65689587593079,"lat":35.17724567542562,"height":20},
{"lng":-111.65700316429138,"lat":35.17723909832356,"height":20},
{"lng":-111.65711849927902,"lat":35.177150307393866,"height":20},
{"lng":-111.65708765387535,"lat":35.176912434919124,"height":20}]}

type: text

date YYYY-MM-DD HH:MM:SS

value: 2014-04-16 21:34:21.842160

type: gd:when

extrainfo

value: NAU's Engineering Building

type: text

name

value: MyProject

type: string

Integration Test #2 Output:

Edit Entity: Project

Decoded entity key: User: name=btj26@nau.edu > **Project: id=5629499534213120**

Entity key: ag1zfnNzYS10ZXN0aW5ncisLEgRVc2VyIg1idGoyNkBuYXUuZWR1DAsSB1Byb2plY3QYgICAgICAgAoM

Enter information for the entity below. If you'd like to change a property's type, set it to Null, save the entity, edit the entity again, and change the type.

address

value: 7250 W Donald Dr Glendale, AZ 85310

type: text

clientname

value: Ben Johnson

type: string

data

value: {"map_center":{"lng":-112.21295134110449,"lat":33.68787852316033},"map_zoom":20,"circles":
[{"lng":-112.21291445195675,"lat":33.68777729485495,"height":20,"radius":1.846677832433194},
{"lng":-112.21284739673138,"lat":33.68778399023148,"height":20,"radius":2.333900439634715},
{"lng":-112.21278838813305,"lat":33.68783755322511,"height":23,"radius":4.151655660789054}],"polygons":[],"markers":
[{"lng":-112.21298821270466,"lat":33.68785987112927,"height":15},
{"lng":-112.21290774643421,"lat":33.68787772544841,"height":15},
{"lng":-112.21283800899982,"lat":33.68788553671188,"height":15}]}

type: text

date YYYY-MM-DD HH:MM:SS

value: 2014-04-16 18:09:13.111940

type: gd:when

extrainfo

value: Its me

type: text

name

value: Test

type: string

Save Entity Cancel

Integration Test #3 Output:

Decoded entity key: User: name=rkp32@nau.edu > **Project: id=5629499534213120**

Entity key: ag1zfnNzYS10ZXN0aW5ncisLEgRVc2VyIg1ya3AzMkBuYXUuZWR1DAsSB1Byb2plY3QYgICAgICAgAoM

Enter information for the entity below. If you'd like to change a property's type, set it to Null, save the entity, edit the entity again, and change the type.

Showing full fields. See clipped data.

address

value: 2112 S Huffer Ln, Flagstaff AZ 86011

type: text

clientname

value: John Doe

type: string

data

value: {"map_center":{"lng":-111.65711698846475,"lat":35.17717020440344},"map_zoom":20,"circles":
[{"lng":-111.65739208459854,"lat":35.17714592263737,"height":18,"radius":8.546232478962484},
{"lng":-111.6572941839695,"lat":35.17709878666977,"height":17,"radius":6.540684707595233},
{"lng":-111.65717884898186,"lat":35.17697930235041,"height":15,"radius":4.063701437175899},
{"lng":-111.65718019008636,"lat":35.1769233967829,"height":15,"radius":5.05147847685821}],"polygons":[{"points":
[{"lng":-111.65709167718887,"lat":35.17727965711102},{"lng":-111.65708765387535,"lat":35.17726102199497},
{"lng":-111.65705412626266,"lat":35.177265406728544},{"lng":-111.65705546736717,"lat":35.17728733039285}],"height":27},
{"points":[{"lng":-111.65716007351875,"lat":35.17723471358857},{"lng":-111.65715739130974,"lat":35.17721717464623},
{"lng":-111.65711849927902,"lat":35.17722375175006},
{"lng":-111.65712118148804,"lat":35.17724238687464}],"height":27}],"markers":
[{"lng":-111.65685161948204,"lat":35.176942031993065,"height":20},
{"lng":-111.65695488452911,"lat":35.1769639557446,"height":20},
{"lng":-111.65688514709473,"lat":35.177033015523264,"height":20},
{"lng":-111.6569696366787,"lat":35.177063708739404,"height":20},
{"lng":-111.65688648819923,"lat":35.17713715317381,"height":20},
{"lng":-111.65697902441025,"lat":35.17717332727385,"height":20},
{"lng":-111.65689587593079,"lat":35.17724567542562,"height":20},
{"lng":-111.65699645876884,"lat":35.17727198382846,"height":20},
{"lng":-111.6570420563221,"lat":35.176955186244705,"height":20},
{"lng":-111.65705144405365,"lat":35.17705274687782,"height":20},
{"lng":-111.65708228945732,"lat":35.177145922654084,"height":20},
{"lng":-111.65711984038353,"lat":35.17713057606298,"height":20},
{"lng":-111.65711179375648,"lat":35.17706699729758,"height":20},
{"lng":-111.65708765387535,"lat":35.176912434919124,"height":20}]}

type: text

date YYYY-MM-DD HH:MM:SS

value: 2014-04-16 21:34:21.842160

type: gd:when

extrainfo

value: NAU's Engineering Building

type: text

name

value: MyProject

type: string

Integration Test #4 Output:

Example Usability Testing:

Usability testing was performed at Rooftop Solar very informally when we met up with them to show off the product. Because of time restraints, we were unable to perform any formal testing.

However, we created a usability testing document that we used to perform testing on people of various experience and knowledge of our system. This encompassed three parts of our project including logging in, creating a project and performing the shade analysis given specific information. The results of this testing can be found on the following three scanned usability documents.

- The first attached test document was performed by a grad student with minimal knowledge of our project or system
- The second attached test document was performed by a student with minimal knowledge of our system and how to perform it
- The third attached test document was performed by a student with extensive knowledge of our system and how to perform it.

These tests, although fairly last minute, gave a good indication on specific improvements that could be made on the project, or more clear for the inexperienced.

Satellite Shade Analysis Tool Usability Testing Form

Name of Tester: Michael McCormick

Date of Testing: 4-29-14

Overview:

The Satellite Shade Analysis Tool we've created deals with the inefficiencies with initial shade analysis for solar companies. Right now, most solar companies have to go to a potential client's location and use a SunEye device, which takes fish-eye lens photos upward to check for obstructions at potential locations for solar paneling to get an initial sun access estimate.

What our application aims to do is perform this initial analysis using a web application of our creation. We want to make this application as user friendly as possible, so the tool is easy to learn and use without issue for new users and solar companies in general.

Tasks:

Begin by going to http://ssa-testing.appspot.com/ and follow the steps in order below. If you do not feel like using your personal Google Account required in order to test this, one can be provided for you. If there are any troubles or confusion use the space provided to explain the issue.

For this testing, use the following information to complete an initial shade analysis. Feel free to detach this sheet for reference if needed.

Client: Ben Johnson

Address: 7250 W. Donald Dr. Glendale, AZ 85310 (USA).

Shade Information: 1 palm tree in front yard 25ft, 1 other tree right side of house 30ft. 2 solar panels on front-middle of roof, located 18ft from the ground.

1) Log into the website using your Google Account.

Difficulty (circle selection):

Very Easy (Easy) Medium Hard Extremely Hard Impossible

Problems/Comments:

Should indicate why login is necessary?
Why is Google the only option?

2) Create a new project based on the client information provided and select it.

Difficulty (circle selection):

Very Easy Easy (Medium) Hard Extremely Hard Impossible

Problems/Comments:

Should use non-expandable text boxes
drop down menu for state selection
What is extra info for?

3) Place the obstructions and solar modules listed in the client information and calculate the shade

Difficulty (circle selection):

Very Easy Easy Medium (Hard) Extremely Hard Impossible

Problems/Comments:

Hard to use the tools - tutorial may be helpful
Map went to wrong house to begin with
Would be nice to be able to zoom in slightly more without going to street view

Post Use Analysis (circle selection):

Ease of Use:

Very Easy Easy (Medium) Hard Extremely Hard Impossible

General Look:

Very Good (Good) Alright Bad Extremely Bad Terrible

Shade Analysis Process:

Very Good Good (Alright) Bad Extremely Bad Terrible

Overall Rating:

Very Good Good (Alright) Bad Extremely Bad Terrible

General Comments/Suggestions for Application:

The site looks pretty good
May want to:
resize some of the buttons
add a tutorial w/ picture examples
show what the shade results mean in terms of cost & whether or not it makes sense to get one
non-expandble text boxes
add one more zoom option (may not be possible w/ Google Maps)

Thanks a lot for helping us test our application! Hand the form back to Ben, and have a great day!

Satellite Shade Analysis Tool Usability Testing Form

Name of Tester: Glen Cook

Date of Testing: 4/22/14

Overview:

The Satellite Shade Analysis Tool we've created deals with the inefficiencies with initial shade analysis for solar companies. Right now, most solar companies have to go to a potential client's location and use a SunEye device, which takes fish-eye lens photos upward to check for obstructions at potential locations for solar paneling to get an initial sun access estimate.

What our application aims to do is perform this initial analysis using a web application of our creation. We want to make this application as user friendly as possible, so the tool is easy to learn and use without issue for new users and solar companies in general.

Tasks:

Begin by going to http://ssa-testing.appspot.com/ and follow the steps in order below. If you do not feel like using your personal Google Account required in order to test this, one can be provided for you. If there are any troubles or confusion use the space provided to explain the issue.

For this testing, use the following information to complete an initial shade analysis. Feel free to detach this sheet for reference if needed.

Client: Ben Johnson

Address: 7250 W. Donald Dr. Glendale, AZ 85310 (USA).

Shade Information: 1 palm tree in front yard 25ft, 1 other tree right side of house 30ft. 2 solar panels on front-middle of roof, located 18ft from the ground.

1) Log into the website using your Google Account.

Difficulty (circle selection):

(Very Easy) Easy Medium Hard Extremely Hard Impossible

Problems/Comments:

easy to find

2) Create a new project based on the client information provided and select it.

Difficulty (circle selection):

Very Easy (Easy) Medium Hard Extremely Hard Impossible

Problems/Comments:

Weird when Project Name is long

Bug found: Project Name can't have ' or it breaks, other special characters might break it too.

3) Place the obstructions and solar modules listed in the client information and calculate the shade

Difficulty (circle selection):

Very Easy Easy (Medium) Hard Extremely Hard Impossible

Problems/Comments:

with it was able to edit shape of tree

Post Use Analysis (circle selection):

Ease of Use:

Very Easy Easy (Medium) Hard Extremely Hard Impossible

General Look:

Very Good (Good) Alright Bad Extremely Bad Terrible

Shade Analysis Process:

Very Good (Good) Alright Bad Extremely Bad Terrible

Overall Rating:

Very Good (Good) Alright Bad Extremely Bad Terrible

General Comments/Suggestions for Application:

Help link does nothing

log out logged me out of google

now I cry.

TEN OUT TEN

Thanks a lot for helping us test our application! Hand the form back to Ben, and have a great day!

Satellite Shade Analysis Tool Usability Testing Form

Name of Tester: C. Nakai McCarty

Date of Testing: 28 April 2014

Overview:

The Satellite Shade Analysis Tool we've created deals with the inefficiencies with initial shade analysis for solar companies. Right now, most solar companies have to go to a potential client's location and use a SunEye device, which takes fish-eye lens photos upward to check for obstructions at potential locations for solar paneling to get an initial sun access estimate.

What our application aims to do is perform this initial analysis using a web application of our creation. We want to make this application as user friendly as possible, so the tool is easy to learn and use without issue for new users and solar companies in general.

Tasks:

Begin by going to http://ssa-testing.appspot.com/ and follow the steps in order below. If you do not feel like using your personal Google Account required in order to test this, one can be provided for you. If there are any troubles or confusion use the space provided to explain the issue.

For this testing, use the following information to complete an initial shade analysis. Feel free to detach this sheet for reference if needed.

Client: Ben Johnson

Address: 7250 W. Donald Dr. Glendale, AZ 85310 (USA).

Shade Information: 1 palm tree in front yard 25ft, 1 other tree right side of house 30ft. 2 solar panels on front-middle of roof, located 18ft from the ground.

1) Log into the website using your Google Account.

Difficulty (circle selection):

(Very Easy) Easy Medium Hard Extremely Hard Impossible

Problems/Comments:

Log-in button is easy to see and intuitively placed.

2) Create a new project based on the client information provided and select it.

Difficulty (circle selection):

(Very Easy) Easy Medium Hard Extremely Hard Impossible

Problems/Comments:

3) Place the obstructions and solar modules listed in the client information and calculate the shade

Difficulty (circle selection):

(Very Easy) Easy Medium Hard Extremely Hard Impossible

Problems/Comments:

The process was easy, but I was unsure I was looking at the correct property

Post Use Analysis (circle selection):

Ease of Use:

(Very Easy) Easy Medium Hard Extremely Hard Impossible

General Look:

(Very Good) Good Alright Bad Extremely Bad Terrible

Shade Analysis Process:

Very Good (Good) Alright Bad Extremely Bad Terrible

Overall Rating:

(Very Good) Good Alright Bad Extremely Bad Terrible

General Comments/Suggestions for Application:

N/A

Tell the person to use street-view, because I didn't think to!

Thanks a lot for helping us test our application! Hand the form back to Ben, and have a great day!