ObservAnt
Usability Testing Report

by Jason Sterkenburg

Team STOMP

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Project Overview

This report details efforts made to evaluate the usability of team STOMP's app, ObservAnt. ObservAnt was developed as part of a Citizen Science project, which helps scientists to connect with local communities and crowdsource data collection for their research projects.

Our app was developed for Dr. Storer, who is interested in studying ant mounds. In particular he is interested in comparing ant mounds made in North America and ant mounds made in Europe. The ObservAnt app allows Dr. Storer to collect vast amounts of data about ant mounds in the local area (Keewenaw Peninsula), such as ant mound dimensions, location of ant mounds, environmental conditions around ant mounds (nearby flora), and materials used in the construction of ant mounds.

High school and middle school students from nearby communities (Keewenaw Peninsula) will be the primary users of the app. It is expected that they will use the app as part of their science class curriculum. As such, we also expect that teachers will be instructing students about proper use of the app, as well as supervising data collection, and reviewing student submissions data before final submissions are sent to Dr. Storer for analysis.

User Interface

A typical workflow is illustrated on the right (pages 1-9)

(1) The first page serves as a home page. Pressing "transect page" begins data collection.

(2) Users start a transect on this page.

(3) If a user sees an ant mound, they record one here. If they don't they end the transect.
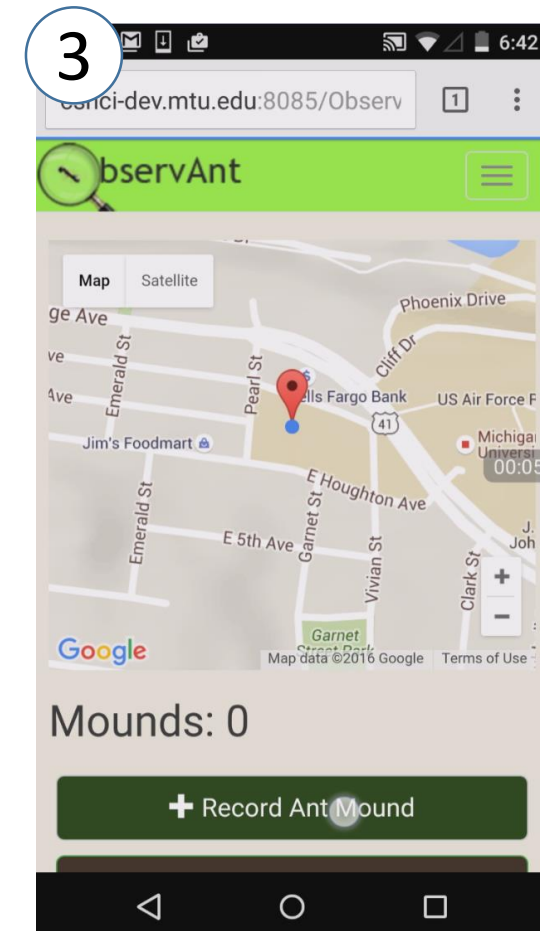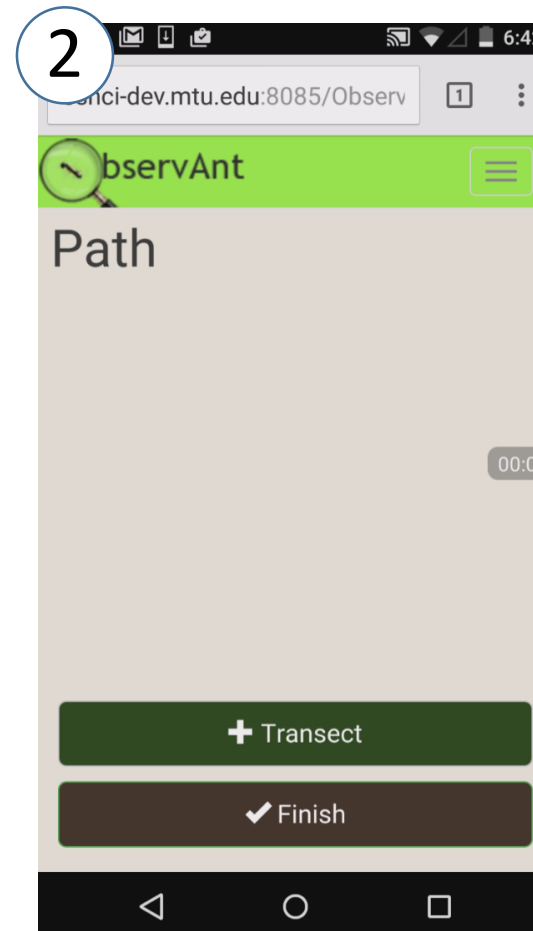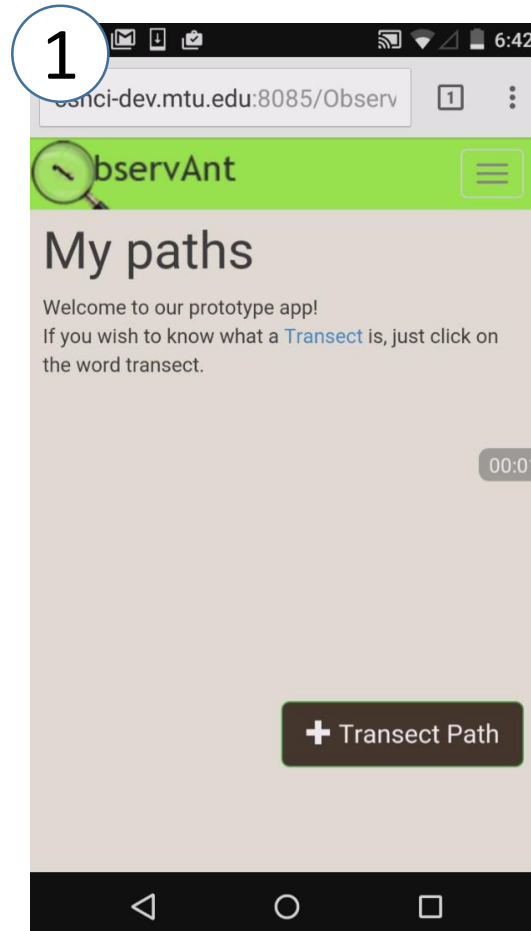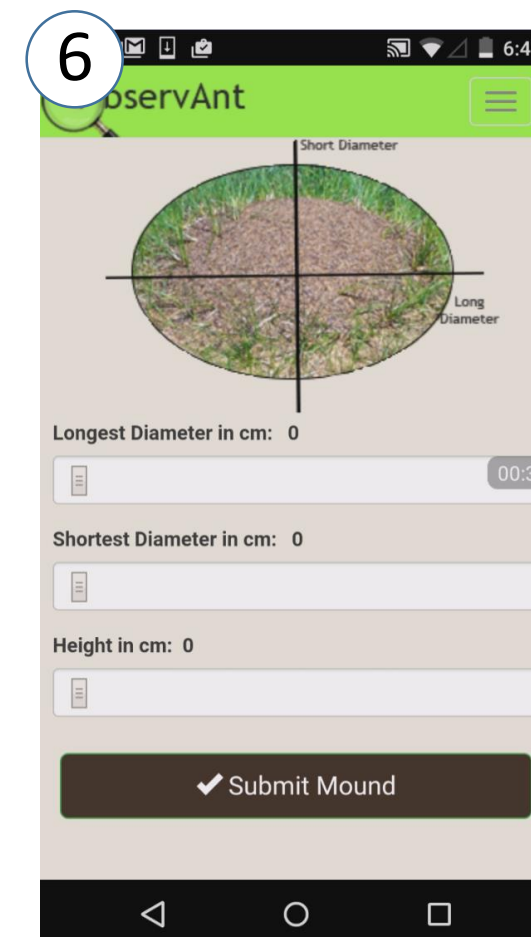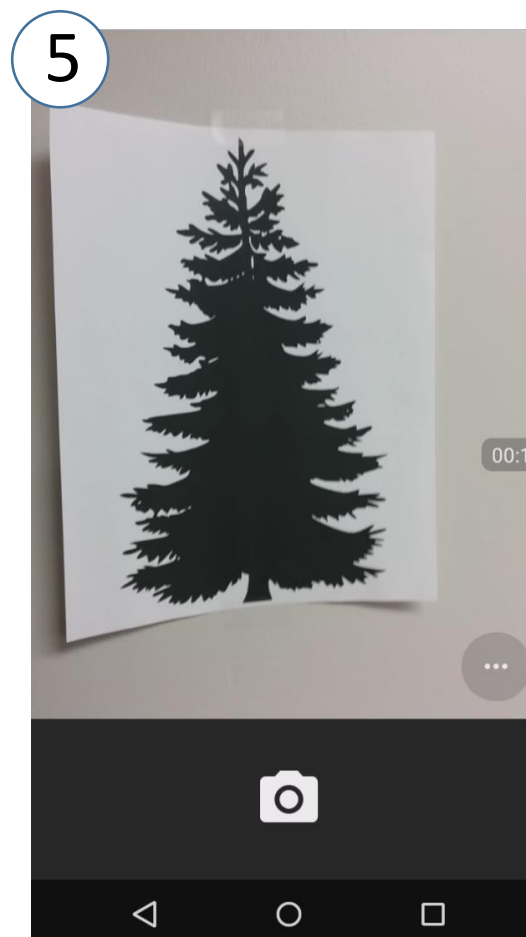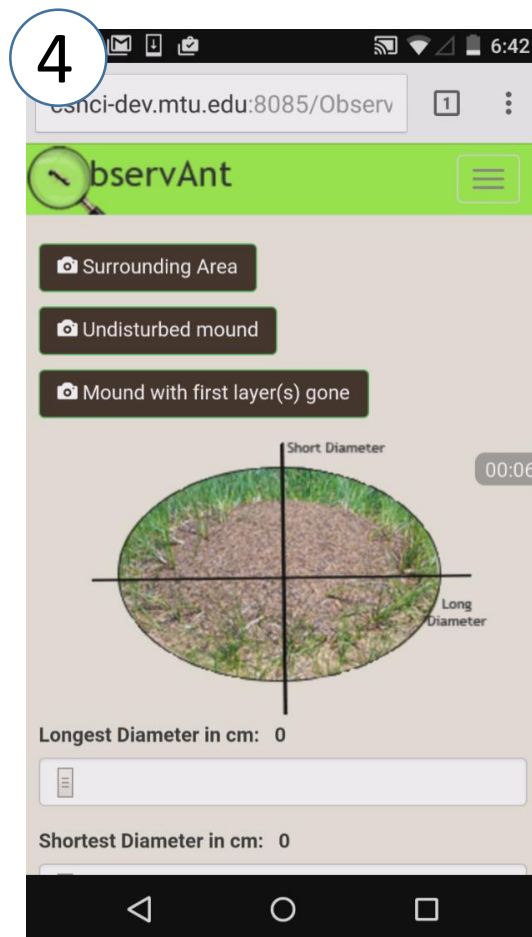
User Interface (continued)

(4) Users enter pictures and enter mound measurements on this page.

(5) Users take and approve/retake pictures on this page.

(6) Users return to data collection page (Figure 4) after selecting pictures and then submit their mound.
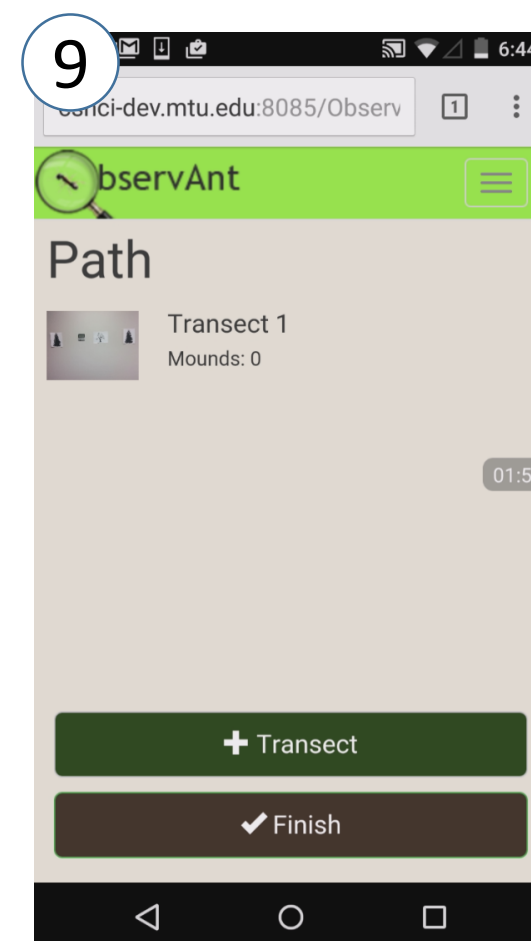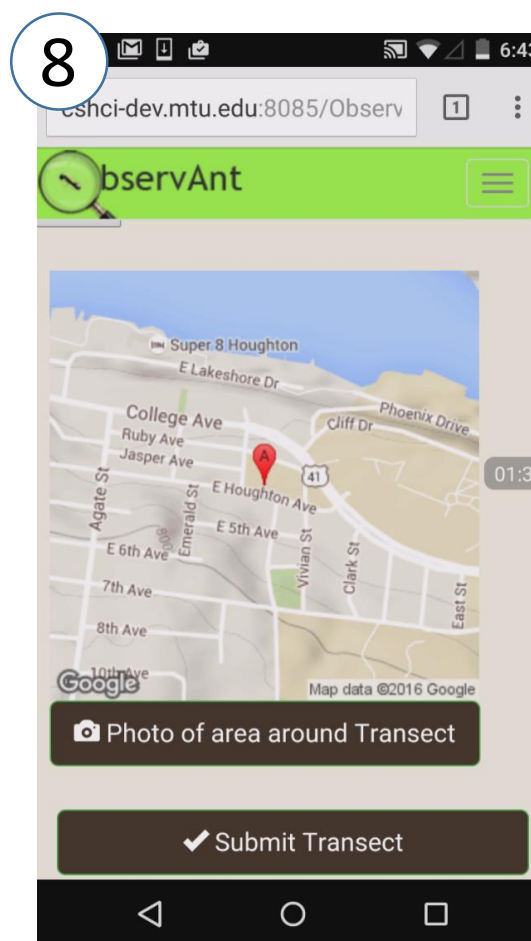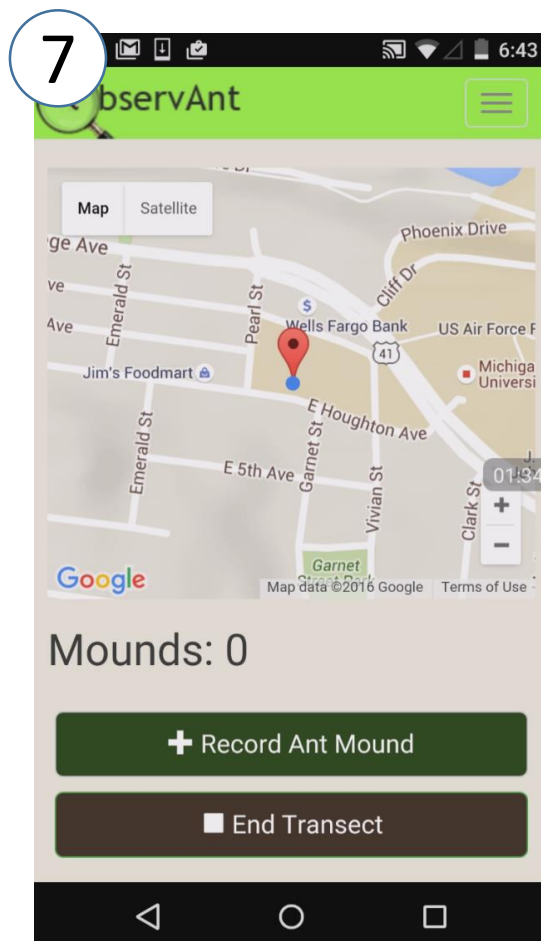
User Interface (continued)

(7) User can repeat process if they see another ant mound. Otherwise, they end the transect.

(8) Users take a photo of the area surrounding the transect and submit the transect.

(9) Users can review previous submissions and choose to start a new transect or finish the transect.
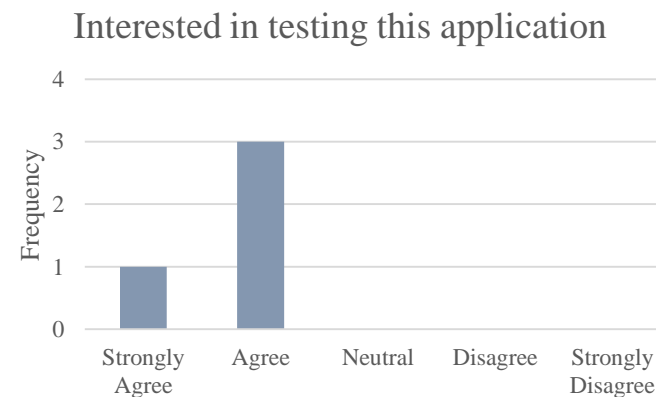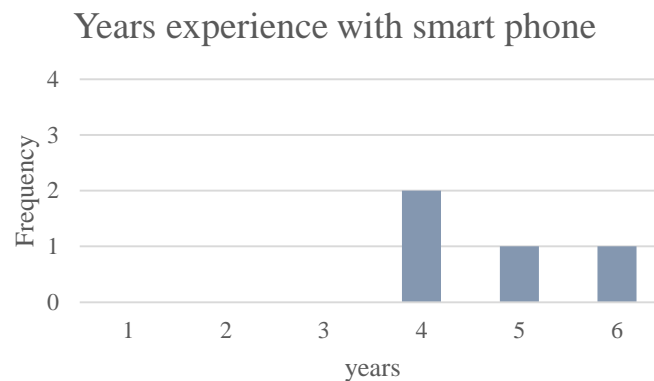
Goals

Goals – the primary goal of usability testing was to identify all major and minor usability issues associated with app use by primary users, in expected use case scenarios. A secondary goal was to identify usability issues associated with edge case scenarios, which were designed to elicit use errors expected by the UX expert, but were not necessarily scenarios that represent typical use cases. This was accomplished by testing two use cases, naïve and trained, and four edge cases.

- 2 Use Case Scenarios
  - Naïve Use – users given basic introduction, but no explicit training on data collection procedure or app use.
  - Trained Use – users given explicit instruction on how to collect data appropriately and how the app is to be used according to the developers.
- 4 Edge Case Scenarios
  - No mounds – users are told to start a transect and then imagine that they see no ant mounds, "what do you do?"
  - Editing pics – users told to take a picture then imagine they didn't like it, "what do you do to fix it?"
  - Reviewing transects – users asked show experimenter how many transects they've completed.
  - Returning to home – users asked how they might return to the home page from a non-homepage location

Participants

Participants – Four computer science (cs) undergraduates at MTU completed usability testing for extra credit in various CS courses. They reported a range of 4-6 years of experience using smart phones. They also reported being generally interested in evaluating the app.

It is unknown how representative the cs undergraduates are of high school or middle school students, with respect to previous smart phone experience. It is likely, however, that cs students have more technical experience and knowledge of app development, which may influence their approach to usability testing and may differ from how primary users may interact with the app.

Years experience with smart phone

Interested in testing this application

Naïve & Trained Use Case

Task Subgoals (page 3-5)

- ☐ Press *transect path*
- ☐ Press *transect*
- ☐ Press *record ant mound*
- ☐ Press *surrounding area*
- ☐ Take photo of surrounding area
- ☐ Press *undisturbed ant mound*
- ☐ Take photo of undisturbed ant mound
- ☐ Measure the ant mound
- ☐ Enter measurement data
- ☐ Press *mound with first layer gone*
- ☐ Take photo of mound with first layer gone
- ☐ Press *end transect*
- ☐ Press *photo of surrounding area*
- ☐ Take photo of surrounding area
- ☐ Press *submit transect*
- ☐ Press *finish*
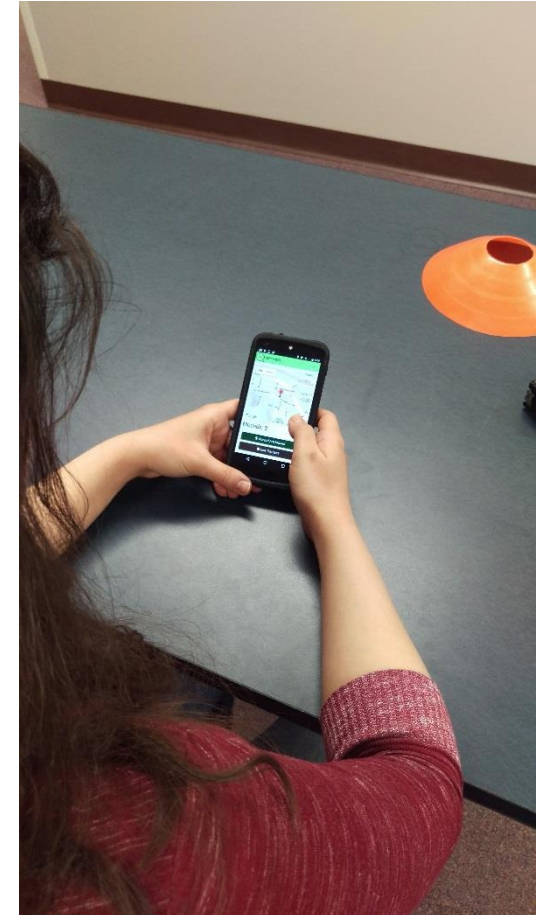
No Mound Case

Task Subgoals

- ☐ Press *transect path*
- ☐ Press *transect*
- ☐ Press *end transect*
- ☐ Press *photo of area around transect*
- ☐ Take photo of surrounding area (camera)
- ☐ Press *submit transect*
- ☐ Press *finish*
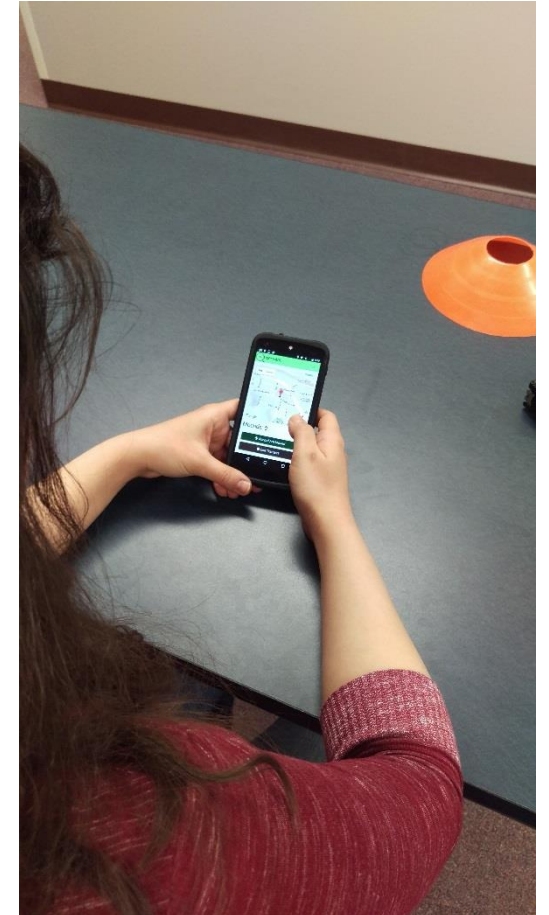
Review Submissions

Task Subgoals

- ☐ Press *transect path*
- ☐ Press *transect*
- ☐ Press *end transect*
- ☐ Press *photo of area around transect*
- ☐ Take photo of surrounding area (camera)
- ☐ Press *submit transect*
- ☐ Press *finish*
- ☐ View Review Page (count submissions)
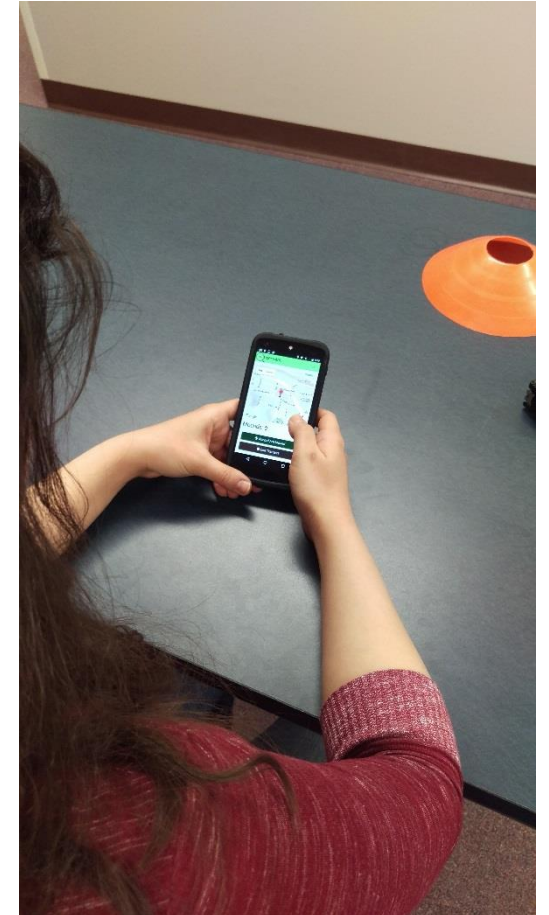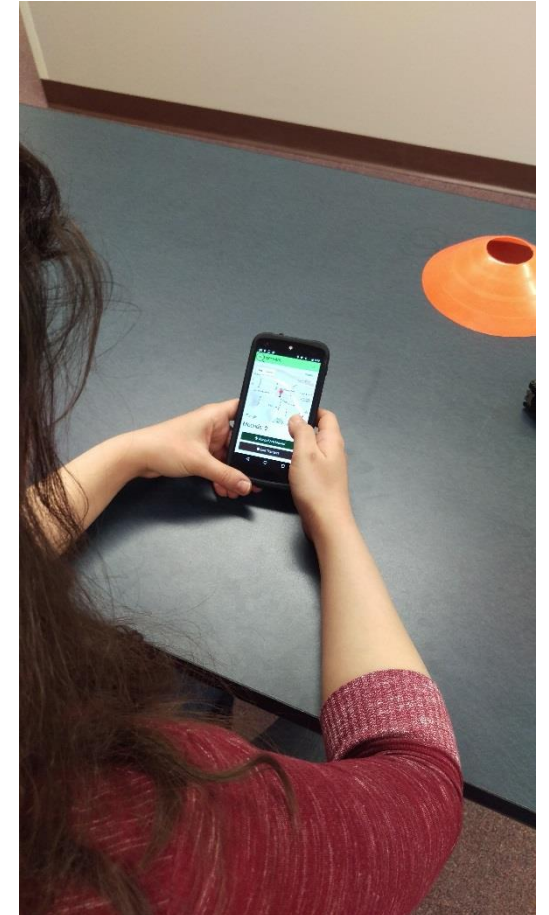
Edit Photos

Task Subgoals

- ☐ Press *transect path*
- ☐ Press *transect*
- ☐ Press *end transect*
- ☐ Press *photo of area around transect*
- ☐ Take photo of surrounding area (camera)
- ☐ Press *photo of area around transect*
- ☐ Take new photo of surrounding area (camera)

Return to Homepage

Task Subgoals

☐ Press *ObservAnt*
    OR
☐ Press *hamburger menu*
☐ Press *home*
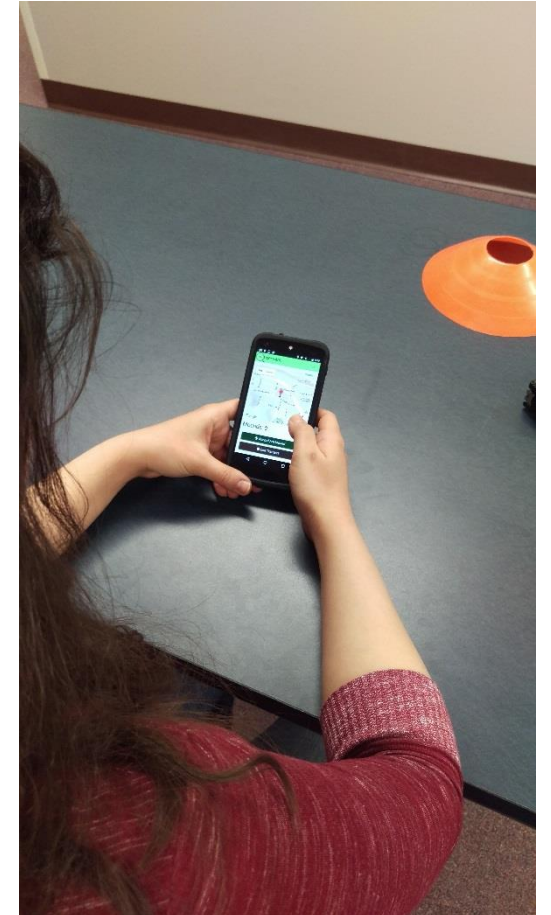
Assessment Framework

Quantitative Measures

- Major errors
  - unable to complete task
  - giving up/asking for help
  - mistake without possible recovery
  - submission with incomplete/incorrect data.

- Minor errors
  - mistake with recovery

Qualitative Measures

- Observations of anything that could not be categorized as a major or minor error including, looks of confusion, looks of frustration, observations of obstacles to task completion.

Findings – Use Errors

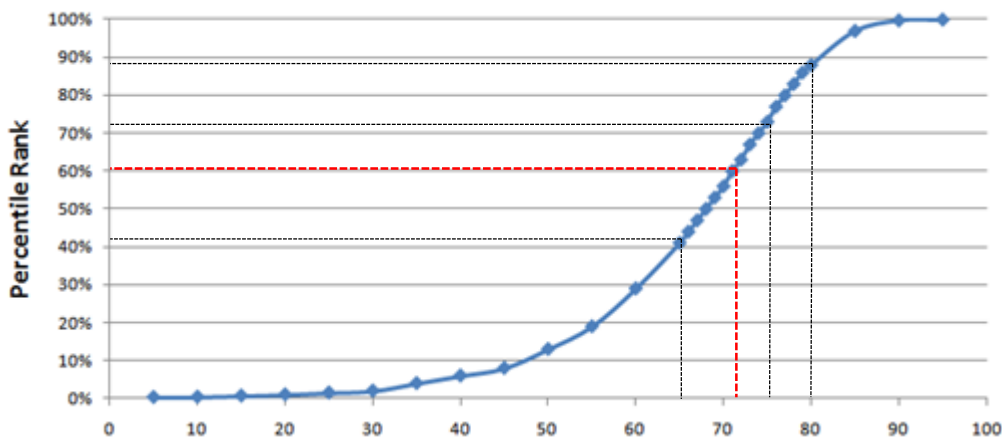- Major Errors – Participants generally had difficulty completing the typical use case scenario, but were able to complete the same task after training.
- Among the major errors the most common issues were:
  - Order of measurement – participants measuring the mound after removing the top layer of soil
  - No mounds - Submitting empty data in the no mound case, or not starting a transect at all
  - Giving up on reviewing past transect submissions.

	Major Errors			Minor Errors	
ID	Frequency	Description	Frequency	Description	

P1	3	Naïve Use
		  - order
		No mound
		  - submitted empty data
		Review transects
		  - gave up
			2	Naïve use
				  - hit slider when scrolling
				  - submitted video, but recovered	

P2	5	Naïve Use
		  - order
		  - surrounding area (mound)
		  - surrounding area (transect)
		No Mound
		  - didn't start transect
		Review transects
		  - gave up
			0		

P3	3	Naïve Use
		  - surrounding area (mound)
		No Mound
		  - submitted picture
		Review transects
		  - gave up
			0		

P4	3	Naïve Use
		  - order
		  - surrounding area (mound)
		Review transects
		  - gave up
			1	Naïve use
				  - tried to take multiple photos	

Findings – System Usability Scale (SUS)

Participants rated the app using the SUS and gave an average score of 71, which ranks in the 61st percentile among 500 other studies that have used SUS. There was some variance in the scores appears to be related to the number of use errors committed. People who committed fewer use errors rated the app as better than those who had more use errors.

	I would like to use this app frequently	I found the app unnecessarily complex	I thought the app was easy to use	I think that I would need the support of a technical person to be to use this app	I found the various functions in this app were well integrated	I thought there was too much inconsistency in this app	I would imagine that most people would learn to use this app very quickly	I found the app very cumbersome to use	I felt very confident using the app	I needed to learn a lot of things before I could get going with this app	Overall SUS Score
P1	4	2	4	1	4	2	5	2	4	1	75
P2	2	1	3	1	4	1	4	1	2	4	65
P3	5	1	5	2	4	2	5	1	5	2	80
P4	3	2	4	3	4	1	4	1	4	4	65
Average	3.5	1.5	4	1.75	4	1.5	4.5	1.25	3.75	2.75	71.25

|	Overall SUS Score	Percentile	Grade
P1	75	74	B
P2	65	43	C-
P3	80	89	A-
P4	65	43	C-
Average	71.25	61	C+

Findings – Qualitative Analysis

- Participants did not use the map (pictured left)
- Some participants ignored or were confused by the ant mound diagram, plus small text (pictured right)
- Participants generally looked for summary results in hamburger menu or homepage
- Participants occasionally did not submit final picture of area surrounding a transect because they were not aware it was a button.
- One participant had issue with the number of clicks to start recording data (2 start transect buttons)
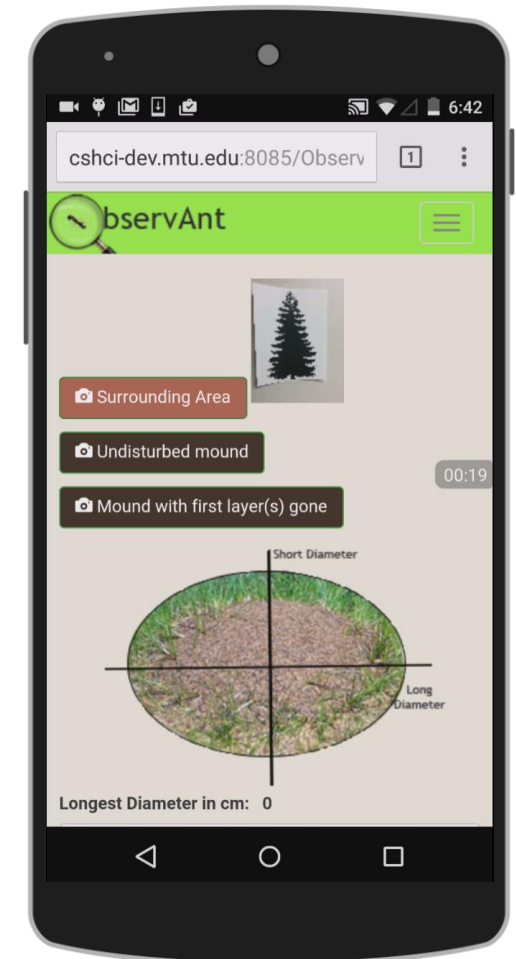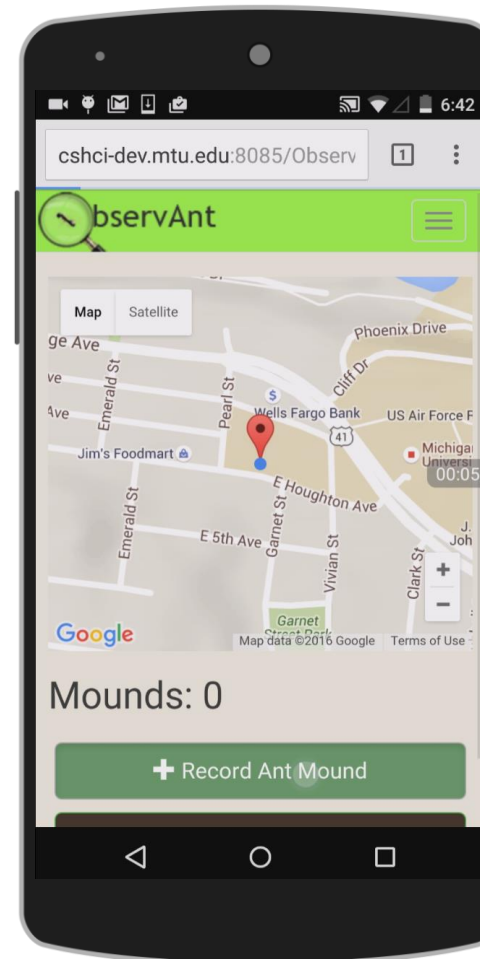
Findings – Common Questions

Participants generally rated the app as easy to use, also enjoyed using the app, which one minor exception, and would like to use the app again. These results may reflect a bias participants have to give high scores. The system usability scale (SUS) results rate similar questions against a normalized scale, which mitigates the bias effect. Regardless, the app appears to be rated as average-to-above-average.

App was easy to use

I enjoy using this app

I would use this app again
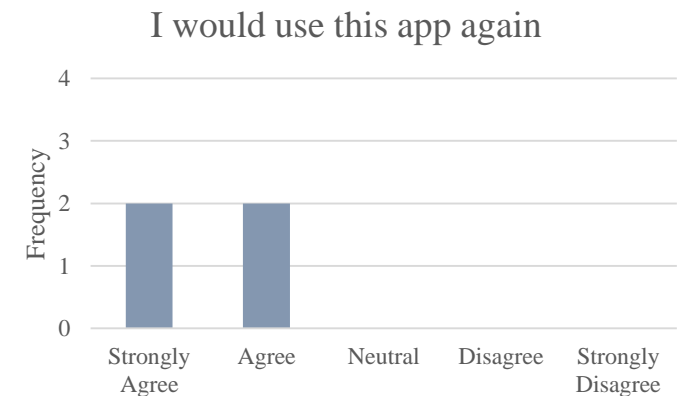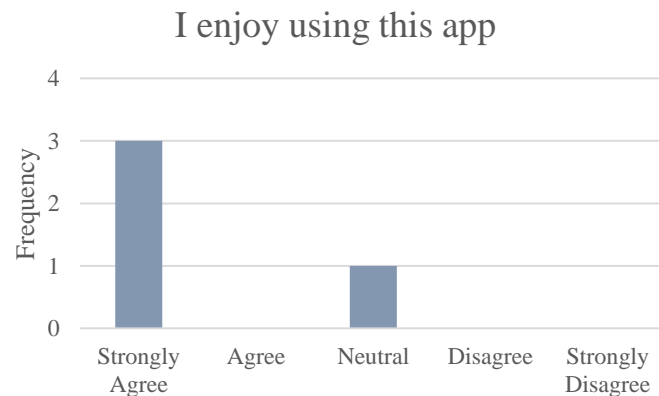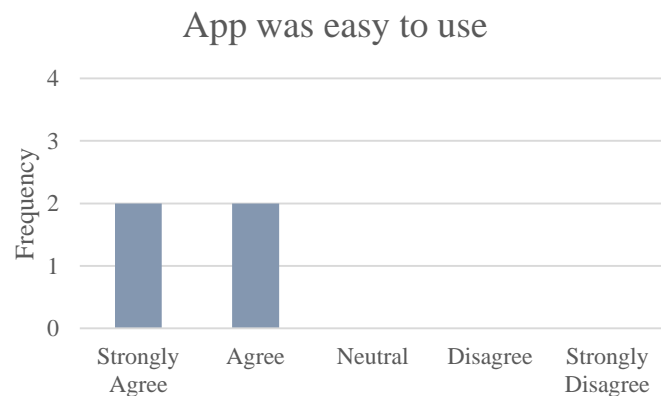
Design Recommendations

1) Change order of data entry so measurement comes before picture of ant mound with top layer removed

2) Consider adding more descriptive label for button on "record ant mound page", e.g., "No mounds found."

3) Consider adding visual aid, or description of "surrounding area" for both ant mounds and transects

4) Consider adding text box instead of sliders

5) Consider adding review summary in the hamburger menu

Appendix A – Undergrad Attendance

Usability Testing Sessions

Colin Hogue (3)

Matthew Kersten (3)

Joan Perez Guerrero (2)

Appendix B - Bug Report

ID	Name	Frequency	Location	Description
1	Camcorder Error	1	camera selection page	Choosing an imporoper input option (not camera) from phone option thrown an error (not handled by us yet)
2	Define transect w/ phone	2	home page	Does not provide in-page description (uses apple definition)
3	False increment	0	mound data page	Mound count increments every time a user goes back to data entry page and then goes forward
4	Ghost sliders	0	mound data page	When a user goes back after submitting data for a mound, the slider values show zero but the slider positions are maintained from the previous data (number says 0, but position is 10)
5	Forever red button	A lot	mound data page	Buttons stay red until something else is clicked
6	Failure to increment	1	mound data page	ant mound count did not increment after submission of complete data