Heuristic Evaluation of Data Labeling Tasks

Homework #3

For this assignment, you will conduct a heuristic evaluation of a citizen science data collection or data labeling project. Many citizen science projects ask participants (users) to mark or label data that is eventually used for later analysis. This process is very similar to the way that data scientists ask users to label data for the eventual use of model building. This assignment will help you think about the role that users play in many data science projects when they are tasked with labeling data.

Assignment Deliverable

The deliverable for this assignment will be a Google Doc (i.e., a link to a Google Doc). You will turn the assignment in by sharing your Google Doc with the teaching staff. You will indicate that you have completed the assignment by submitting a link to your Google Doc through the relevant Canvas assignment submission. Make certain your Google Doc is shared with the entire teaching staff - so that it can be graded.

The requirements of your deliverable are:

- Your deliverable should be in the form of a heuristic evaluation report.
- Your report should be at least 2500 words long (and no longer than 6000 words).
- It should have your name, the date, and the assignment title at the top.
- It should contain the following sections:
  A. A description of the Zooniverse project being evaluated and a specific scope of the evaluation
  B. A section describing 5-7 heuristics that you choose to apply during the evaluation. The report should include your severity metrics or the severity determination scales that you will use for your findings.
  C. A summary of the findings for each of the heuristics
  D. A section containing the notes you took when you conducted the individual heuristic evaluation sessions. This could be an appendix.
- A reflection about how performing this heuristic evaluation informed your understanding of the roles and experiences of users in data science data collection efforts. Note: this is not a common part of a heuristic evaluation report, but is a requirement of this assignment.

Step 1: Heuristic evaluation practices and procedures

Heuristic evaluation has been part of user experience (UX) practices for many years. There is lots of documentation on how to perform a heuristic evaluation. Here is a short list of starting points for understanding what you will need to do:

- Heuristic Evaluation: How to Conduct a Heuristic Evaluation (Interaction Design Foundation)
- How to Conduct a Heuristic Evaluation (Nielsen Norman Group)
- A Complete Guide to Heuristic Evaluation (Medium)
- Heuristic Evaluation: 9 Things To Remember When Doing the Evaluation (Medium)
- Heuristic evaluation (Wikipedia)

The descriptions all convey a similar process for conducting a heuristic evaluation. For this assignment your process will be as follows:

1. **Define the scope** - You'll pick a Zooniverse project, explore that project by completing several tasks associated with your selected project. Most of the time there is just one *type* of task, but you should perform several to understand what is required. Once you've done that, you can then identify 1-2 aspects of the task that your heuristic evaluation will consider.
2. **Define the heuristics** - You will state and define the heuristics you will ask the evaluators to apply. You need to state and define the heuristics in a way that the individual evaluators will be able to read and understand what you are asking them to judge or evaluate about the task.
3. **Conduct the evaluations** - You will conduct two heuristic evaluations using two different individuals from the course. During your sessions you will need to brief your evaluators by providing them the heuristics you are applying during the evaluation. During the evaluation you will take notes so that you know where the project met or violated the heuristics according to the evaluators.
4. **Summarize the results** - You will write up the results of the heuristic evaluations based on the notes that you took.

This is clearly a somewhat abbreviated heuristic evaluation process than what is detailed in some of the descriptions above. After all, this is a class homework and the goal here is to help you understand the user experience - not train you as UX professionals.

As well, almost every description of heuristic evaluation states that the evaluators should be experts in UX. For this assignment, I'm asking you to do your best as a UX expert. You have used lots of software, you've interacted with all kinds of things. Participate in good faith, do your best to follow the heuristics when you are asked to be the evaluator for another student. I'm sure you will find something interesting about the projects you evaluate.

Step 2: Pick a project to evaluate

Zooniverse is a well-known platform for conducting citizen-science projects. The platform provides support for project creators (i.e., individuals and teams who hope to get people to help them label, mark, or annotate large datasets) and project participants (i.e., users, the

public, who participate in labeling, marking or annotating data). You can read more about Zooniverse from their website. They have an interesting FAQ that lists a number of questions about the platform. There have been numerous publications regarding the general success of Zooniverse for promoting participation in citizen science projects.

You will pick one "Project" in Zooniverse and you will conduct a heuristic evaluation of that project. Your concerns are not with how the project supports the scientists who are running the project. Your concerns are with the participants, contributors, or users who perform the requested tasks that are part of a project.

Projects are organized around a number of sub-categories: Arts, Biology, Climate, History, Language, Literature, Medicine, Nature, Physics, Social Science, and Space. A project can be listed in several of these categories at once. Browse the categories and the project description pages until you find a project that interests you.

Once you have selected a project, you should attempt to complete 10-12 tasks. Your goal is to make sure you understand what the tasks are asking the users to do, the workflow, what might be easy or hard about the task, etc. Many projects allow you to just start working - no need to join - other projects require that you join before you can complete work. In general, projects have a project specific tutorial that explains what you are to do as a participant in the project.

As you perform your tasks you should probably take screenshots of the work. The screenshots will be helpful as you document your heuristic evaluation results.

Most projects also have a dedicated discussion forum. You should take time to review the various discussions to understand concerns that users may be raising.

Based on your experience, write a short paragraph describing the scope of the heuristic evaluation. Write to clarify on what part of the task, interaction, workflow, etc. of this project your heuristic evaluation will focus.

Step 3: Define the heuristics to be applied during the evaluation

Heuristic evaluations have been around long enough that there are differing sets of heuristics. In fact, a common practice is to tailor a chosen set of heuristics to match the specific goals of the evaluation. Based on the scope you described in Step 2 above, you should develop a set of 5-7 heuristics that will be applied to your selected project by the heuristic evaluators. For each heuristic you should have a brief name for the heuristic and 1-2 sentences describing what the heuristic means. These descriptions should be clear enough that another person should be able to understand what the heuristic is and how they would identify good or bad implementations of the property that the heuristic is attempting to evaluate.

Developing and justifying your own unique heuristics might be a bit more work than you would want to do. Relying on the prior work of experts in this area is a good idea. Some of the readings from Step 1 provide examples of different lists of heuristics. As well, additional Google searches and additional readings are likely to provide you with heuristics that you can adopt for your evaluation. Depending on the scope you defined (in Step 2), you may need to adopt heuristics from different lists. For the heuristics you use, remember to cite your sources.

The best practices describe having clear objectives and metrics for each of your heuristics. Take a few minutes to define the metrics that you will use to determine severity levels, or metrics for each of your heuristics.

Step 4: Conduct the heuristic evaluation

Conducting the heuristic evaluation sessions will require between 30-60 minutes. Schedule individual times with two (2) classmates to serve as your heuristic experts. Your evaluation protocol should be something like this:

1. **Welcome** (~3-4 minutes) - Welcome your heuristic evaluator. Describe for them the project they will be evaluating.
2. **Review heuristics** (~7-10 minutes) - Provide them the set of heuristics you want them to apply. Provide them your written definitions for each heuristic. Review each heuristic with them and make sure to answer any questions they have.
3. **Conduct the evaluation** (~20-30 minutes) - Have your evaluator perform at least 3 tasks to explore the tasks, workflow, and interaction of the project. As they attempt the tasks they should be working to identify where the heuristics are satisfied or violated. You should be taking careful notes. Some of the process descriptions (in Step 1 above) provide templates for note taking. You should consider adopting one of those to help you be consistent and comprehensive.
4. **Follow-up** (~5-10 minutes) - You ask follow-up questions to clarify what the evaluator identified in their evaluation. Ask for specific examples. Your evaluator may have to perform additional tasks in the project to illustrate their answers to your follow-up questions. Obvious follow-up questions that you should ask are about defined heuristics which the evaluator did not address in their initial review, but you may also have clarifications for some of the issues they also identified.
5. **Closing** (~1-2 minutes) - Make sure to thank your evaluator for their time and effort to help you with Homework #3.

Step 5: Write-up results and summary reflection

The Assignment Deliverables section above outlines the expectations for your write-up. Your heuristic evaluation report should identify potentially effective or ineffective aspects of the individual project you identified. Your reflection should consider the participant role more broadly by responding to these four questions:

1. In what ways are Zooniverse project participants (users) contributing to "science"?
2. How do Zooniverse project participants (users) benefit from the effort (or work) they contribute to a project?
3. In what ways could Zooniverse better protect participants (users)?
4. As a data scientist who might ask users to contribute work, labels, annotations, etc. to a data science effort, how has the work on this evaluation changed your perceptions of working with users?

Submission

The deliverable for this assignment is a written report, write-up. You should submit a Google Doc (i.e., a link to a Google Doc). You will indicate that you have completed the assignment by submitting a link to your shared Google Doc through the relevant Canvas assignment submission. You should make sure that your Google Doc has been shared with each of the indicated email addresses of the instructional staff.