CS6750 Summer 2021 Assignment M5 Improving the HCI of "introduce yourselves" for OMSCS students in the "world map"—qualitative and predictive evaluations

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Abstract—Self-introduction is routinely seen in each OMSCS class, but introductory (mega)threads in class forums are typically lengthy for reading and effective impression. The present project seeks to improve the alternative interface of "world map" for self-rendering.

1 BACKGROUND

This project concerns the lengthy introductory (mega)threads repetitively seen at the beginning of each OMSCS class. To facilitate student connections either within or beyond specific classes, the map-based HCI has the potential of improving the present (mega)threads, hence was selected as the target of my "M" project. My previous needfinding in "M2" has identified numerus user "needs" in the present map, such as insufficient content and unsupported query. Based on these identified "needs", my "M3" prototyping focused on three alternative ways for the map query visualization. With these prototypes, I have proposed three plans in my "M4" report for qualitative, empirically, and predictive evaluations, respectively. Now, for closing one iteration of this development cycle, the present work executed the plans of qualitative and predictive evaluation. The empirical evaluation was not executed due to lack of resource. For readers' reference, all my previous "M" reports can be accessed here.

2 QUALITATIVE EVALUATION

My qualitative evaluation focused on my paper/wireframe prototype of different map visualizations with a regular computer (Fig.1) or with a mobile device (Fig.2). Mobile devices generally have smaller screens, so a flat map on a regular monitor would shrink into an earth globe on a tablet/phone screen. This qualitative evaluation was a survey conducted on GaTech's website of

PeerSurvey, targeting my fellow OMSCS students—the major users of my present design. Within the two weeks period of survey (June.27 - July.11, 2021), I have obtained responses from 21 participants. All the participants responded to the same set of questions (listed below) without any between-subject question variations. The only issue I noticed here is the smaller sample size as compared to the target number of 25 participants. OMSCS students tend to be busy towards the end of semester; so, I would set a longer expiration period next time to collect more responses.

Figure 1—The wireframe prototype of a flat map. The "clicked" bubble is magnified with corresponding user information shown in a frame of the same color as the bubble.

Figure 2—The wireframe prototype of a globe visualization with tablets/phones. The globe is rotatable (left) and zoomable (right).

2.1 Raw survey results

To facilitate referencing and reviews, I am also including the 8 survey questions below (in a smaller font). Their corresponding answers received are shown in Table.1.

1. *Are you aware that self-introductions in an OMSCS class can be rendered as a forum (mega)thread like this (the forum link) and/or as a map visualization like this (the map link)?*
2. *Assuming identical information (e.g., name, avatar, geological location, occupation, OMSCS history, hobby, interesting personal factor …) contained in both the (mega)thread and the map, and assuming appropriate privacy (e.g., specific address blurred) protection, do you like the map better than the (mega)thread?*
3. *As shown in this wireframe prototype (Fig.1), the present design has added more information fields into the map that are customizable and visible upon a bubble clicking (occupation, OMSCS completion history, language, hobbies, and an interesting personal factor shown here). Do you think such a replenishment improves the original map visualization?*
4. *If you answered "no" to question 3, is there anything in your mind that can be implemented for obtaining a "yes" from you?*
5. *As shown in this wireframe prototype, the flat map visualization can automatically shrink into a globe view upon the detection of a tablet/phone screen. Do you think this feature of automatic conversion improves the original map visualization?*
6. *If you answered "no" to question 5, is there anything in your mind that can be implemented for obtaining a "yes" from you?*
7. *As shown in the above picture, the blue signs of one finger dragging (left screen) and two finger pinching/spreading (right screen) means the globe is rotatable and zoomable in the tablet/phone screen. Do you think these features improve a static globe visualization?*
8. *If you answered "no" to question 7, is there anything in your mind that can be implemented for obtaining a "yes" from you?*

Table 1 — Raw responses obtained from the 8 survey questions (Q1-Q8) of qualitative evaluation. Each row records the response of one participant.

#	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
1	Yes	Yes	Yes	\	No	Flat map is better	Yes	\
2	Yes	Yes	Yes	\	Yes	\	Yes	\
3	Yes	Yes	Yes	\	Yes	\	Yes	\
4	No	Yes	Yes	\	Yes	\	Yes	\
5	No	Yes	Yes	\	Yes	\	Yes	\
6	Yes	Yes	Yes	\	Yes	\	Yes	\
7	No	No	Yes	\	Yes	\	Yes	\
8	No	No	Yes	\	Yes	\	Yes	\
9	Yes	Yes	Yes	\	Yes	\	Yes	\
10	Yes	Yes	Yes	\	Yes	\	Yes	\
11	No	Yes	Yes	\	Yes	\	Yes	\
12	Yes	Yes	Yes	\	Yes	\	Yes	\
13	Yes	No	Yes	\	Yes	\	Yes	\

14	No	Yes	Yes	\	Yes	\	Yes	\
15	No	Yes	Yes	\	Yes	\	Yes	\
16	Yes	Yes	Yes	\	Yes	\	Yes	\
17	No	Yes	Yes	\	Yes	\	Yes	\
18	No	Yes	Yes	\	Yes	\	Yes	\
19	No	Yes	Yes	\	Yes	\	Yes	\
20	Yes	Yes	Yes	\	Yes	\	Yes	\
21	No	Yes	Yes	\	No	3D visualization is too complicated. It would probably render more slowly too. 2D map is easier to understand	Yes	\

2.2 Result analyses

All statistical results reported below were generated by IBM SPSS (Version 27.0) with all 95% confidence intervals (CI95%) estimated by 1000 bootstrap samples.

Q1 was asked to ensure that all participants were aware of both the (mega)thread and the map for a meaningful comparison. I was initially planned to exclude those answered "No" to Q1 in my subsequent analyses because their incognizance could lead to uninformed decisions. However, I still included them in the present report for two reasons. (i) The present sample size was smaller than expected so additional attrition was undesirable. (ii) URLs of both the (mega)thread and the map were provided in Q1. Participants unaware of them had to visit them first to be able to say "No". But once they had visited the URLs, they became aware of these HCIs hence their subsequent answers would still be meaningful. Statistically, there were 11 participants answered "No" (52.4%) and 10 participants answered "Yes" (47.6%) to Q1.

Q2 was asked to evaluate whether the map is generally preferable over the (mega)thread (assuming identical information and appropriate privacy protection). To this question, 3 participants said "No" (14.3%, $CI_{95\%\_lower}$=0.0%, $CI_{95\%\_upper}$=33.3%) and 18 said "Yes" (85.7%, $CI_{95\%\_lower}$=66.7%, $CI_{95\%\_upper}$=100.0%). Given that the $CI_{95\%\_lower}$ of "Yes" was greater than the $CI_{95\%\_upper}$ of "No", the percentage of "Yes" was significantly higher than that of "No", meaning most participants liked the map better than the (mega)thread. In other words, this evaluation confirmed the superiority and usefulness of the map HCI.

Q3 evaluated the proposed information fields to be added and visualized in the map. Since all participants answered "Yes" (100.0%) to Q3, that was a solid

indication of acceptance to the present prototype. Namely, the OMSCS students not only liked the map in general (Q2), but also liked the specific information fields and visualization proposed in my prototype.

Since Q3 received all "Yes" answers, no participants responded to Q4.

Q5 evaluated the context-dependent (on a PC or a mobile device) view switching between a flat map and an earth globe. Number of participants answered "No" and "Yes" were 2 (9.5%, $CI_{95\%\_lower}$=0.0%, $CI_{95\%\_upper}$=23.8%) and 19 (90.5%, $CI_{95\%\_lower}$=76.2%, $CI_{95\%\_upper}$=100.0%), respectively. Again, a significant majority liked this switching design, indicating a positive evaluation to the present prototype.

The two participants who said "No" to Q5 explained their thoughts in Q6. They liked the flat map irrespective to the device. They suggested that this witching feature should be optional rather than mandatory/automatic.

Q7 evaluated the proposed rotation and zooming features associated with the globe view. These functional features received a "Yes" from all the participants (100.0%), hence have undoubtedly passed the evaluation.

Q8 received no responses as all participants were satisfied with the design of Q7.

The main takeaways for this survey are general positive evaluations from my fellow OMSCS students. These results do fit well with my expectation because of three reasons. (i) The prototype is partially functioning so many users do have real using experience. (ii) The prototype was designed for OMSCS students, which include myself; so, my design was able to put myself in the users' shoes. (iii) The prototype features came from my earlier survey of needfinding, which probably shared some respondents with the present survey. The feedbacks surprised me are those two responses of not using globe view even on mobile devices. I personally do not agree with these responses. But since the globe view is simply a paper/wireframe prototype at present, both me and the two respondents could change mind when seeing a prototype with higher fidelity.

2.3 Potential changes based on qualitative evaluation

Since most feedbacks were satisfactory, the only change is to make the map-globe switching customizable rather than automatic and mandatory.

3 PREDICTIVE EVALUATION

The predictive evaluation focuses on my card prototype of query result visualization and potential contacts selection. This evaluation is a cognitive walk through in the viewpoint of a novice user.

Suppose I, as an OMSCS student, want to find a teammate for a collaborative project. After providing my searching criteria, say, "show me those who have completed the same (at least one) OMSCS courses as I have", this query will return multiple candidates for my further screening. The card prototype (Fig.3) visualizes these candidates in a series of card presentation; and my iterative filtering starts with the goal of selecting out potential teammates for further communication.

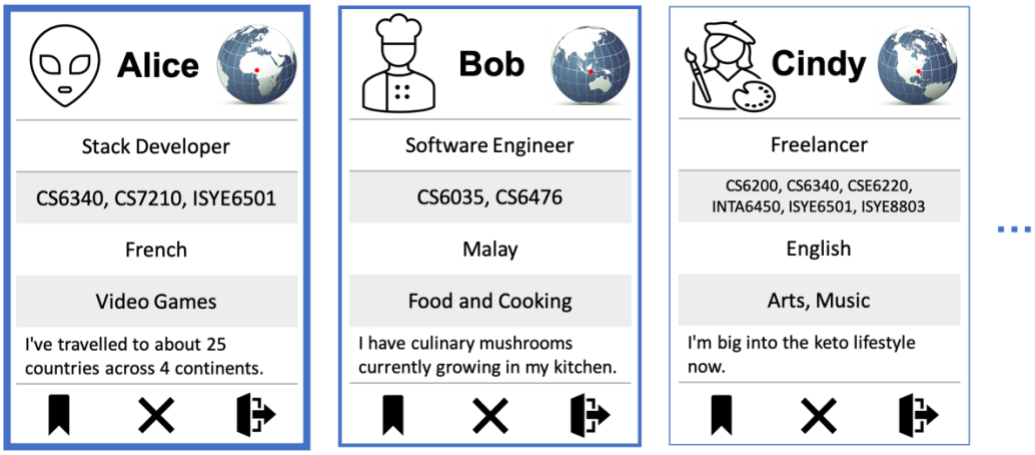

Figure 3—The card prototype of candidate screening. Each card represents a potential candidate for a series of viewing.

On seeing the 1st card, I know that this student satisfies my searching criteria, and I should either select or dismiss him/her. As shown in the card, I can easily understand the information fields of avatar, name, geological location, occupation, OMSCS history, language, hobbies, and fun factor. Then I see three icons at the bottom of the card. I guess (based on the HCI design principle of consistency) that clicking on these icons may mean "bookmark", "close", and "exit", respectively. Considering my goal, I guess that "bookmark" allows me to select/save this person for further consideration. But wait, what's the difference between the "close" and "exit"? [issue_1 noticed] OK, I have figured out by trail and error that the "close" means dismiss this person and "exit" means to terminate this viewing procedure. The 1st person seems to be a good teammate,

so I will click on the "bookmark". Now the 1st card disappears and the 2nd one pops up. The 2nd card looks similar to the 1st one; but wait, why is its frame thinner than the first one? [issue_2 noticed] After consulting the help document, I realize the frame thickness represents the number of shared OMSCS courses. OK, because the 2nd person shares less courses with me than the 1st one, I click on the "dismiss" icon and there appears the 3rd person. But her shared courses are even less than the 2nd person. Now I actually want to "dismiss" the 3rd person and "bookmark" the 2nd one. But how can I go back? [issue_3 noticed] Finally, I figured out how to go back and want to exit. I click on "exit" and the cards disappear. This disappearance confirms the termination of this viewing procedure, but what should I do next? [issue_4 noticed]

As noted above in shading text, I noticed 4 issues in my cognitive walkthrough. These issues hamper the learnability (how fast the user can star using the interface) of the present HCI and will be addressed below in my evaluation summary.

4 EVALUATION SUMMARY

4.1 Information I would like to understand about the user more

As shown above in my evaluation survey, 3 participants answered "No" to Q2. These answers are separated from the prototype because they expressed a general negative evaluation to the map. In my initial needfinding, insufficient information and specific address revealing were identified as the two issues of the map HCI. That is why the present Q2 has explicitly assumed equal information and appropriate privacy protection. The present feedback indicates that besides insufficient information and privacy protection, there must be additional weaknesses in the map undiscovered in my initial needfinding. Therefore, in my additional needfinding exercises, I would target OMSCS students who generally evaluate negatively to the map and ask for their specific concerns.

4.2 Additional design alternatives

Jointly considering the present paper/wireframe (Fig.1, 2) and card (Fig.3) prototypes, they brought to my mind an additional design alternative of combining these renderings together. Comparing Fig.1 (or Fig.2) vs. Fig.3, I see

basic personal characteristics (avatar, location, occupation…) shown in both with a major difference on available actions. With the card rendering (Fig.3), users can take actions of "bookmark" and "dismiss"; but these actions are not available in the map rendering. Because users may also want to bookmark or hide a particular person just during a casual viewing (not on a specific searching task), the actions of "bookmark" and "dismiss" can also be added into the map or globe views shown in Fig.1 or Fig.2. This design alternative may improve the general HCI consistency and provide more convenience for users in their friend finding.

4.3 Brainstorm for prototype revision

For my paper/wireframe prototype shown in Fig.1 and Fig.2, the received evaluations were generally positive. So besides making the map-globe switching optional, the prototype will be raised to a higher level of fidelity with the globe rendering implemented on mobile devices. Only this fidelity level can address the concern of participant #21 in the survey, either approving or disapproving the practical concern of 3D globe rendering.

For my card prototype shown in Fig.3, I will stay at the present level of fidelity and address the 4 noticed issues. Specific revisions will include: (i) providing a brief tutorial guide to first time users, highlighting and explaining different HCI elements (e.g., the frame thickness) like a function walkthrough typically seen at the beginning of a new video game; (ii) text labeling the action icons for minimizing confusion; (iii) adding an "undo" button for error tolerance; and (iv) showing a list of bookmarked person upon termination and prompting on each with "send him/her a message".

4.4 Plan for the next evaluation

Due to the weaknesses identified in the present work, particularly in the card prototype, I plan to address these weaknesses first, update the present card prototype, and then perform an additional round of qualitative evaluation. This future qualitative evaluation will survey my fellow OMSCS students for their feedbacks on the map HCI in general, to discover more user concerns mentioned above; and feedbacks on my updated card prototype, to discover issues that I may have missed in the present predictive evaluation. After these additional qualitative evaluations and with the actual implementation, I think the design will then be ready for the empirical evaluation as proposed in my report of M4.