Assignment M1
CS6750 Spring 2019

Dan Higgins
daniel.higgins@gatech.edu

Abstract. According to a new report from Juniper Research, smart devices like the Amazon Echo, Google Home and Sonos One will be installed in a majority – that is, 55 percent – of U.S. households by the year 2022.(Perez, 2018) With this accelerated adoption rate of voice-assisted speakers comes the desire by consumers for new and innovative ways to share, access and socialize with these speech-enabled services.

Problem Space.

The smart speaker market and the services that are enabled through these devices continue to grow at a rapid pace however many of the interfaces to these services are lagging. This is especially true when it comes to the consumers ability to take advantage of these services in diverse contexts outside of their own home configurations. The current services that do offer some level “portability" are constrained in their scope of use and the interfaces are overly complex to configure and use.

For example, customers who have purchased music streaming services like Amazon Music Unlimited would struggle with the effort required to simply play music through another family members Echo device. Additionally, numerous services like Amazon Prime Movies and Netflix use sophisticated algorithms to help in making movie viewing choices based on prior viewing experiences. This can be very helpful when watching a movie alone or with like-minded friends and family, but this is often not suitable when a more diverse group has gathered to watch

something together. In this situation, we would prefer to have suggestions that take into consideration all the participating members.

The principal problem in both of these scenarios is that the services and devices are not fully aware of the contexts in which they are being used.

User Types

The users that we are most interested in initially would be technology, early adopters. These individuals are interested in and excited about having services that more seamlessly integrate their modern technologies into their lives, making it simple and even transparent to use these technologies to improve personal experiences and experiences in a group environment.

Additionally, our selected users are open-minded about location privacy concerns and would be willing to have a third party have location information for the purpose of improving its services. However, this does not imply that users are not concerned about privacy.

We recognize that advanced /expert users would be a good starting point but considering novice users should also be an important component when making design considerations. We would also take into consideration "secondary users" who we define as other individuals in a group who are impacted by the voice-enabled technology or service but who do not have any direct control over the technology. (For example, we would consider some who is hearing the music Alexa is playing but who did not start this music a secondary user.)

Data Inventory

In order to ensure that we collect appropriate data while performing our need finding exercises, the following list of questions should be used for reference. These questions server two principal purposes. First, they will help during the planning phase of need finding to ensure that our methods

collect the "right data" and second, they will help during the execution of need finding as a validation that the data we desire is actually being collected.

Questions

1. Who are the primary users of the system?
2. When and Where do the users interact with the system?
3. In what contexts (environments) do the users execute tasks?
4. What are the users' goals in using the system?
5. What are the tasks the user wants to accomplish?
6. What are their subtasks or pre-tasks that need to be accomplished?

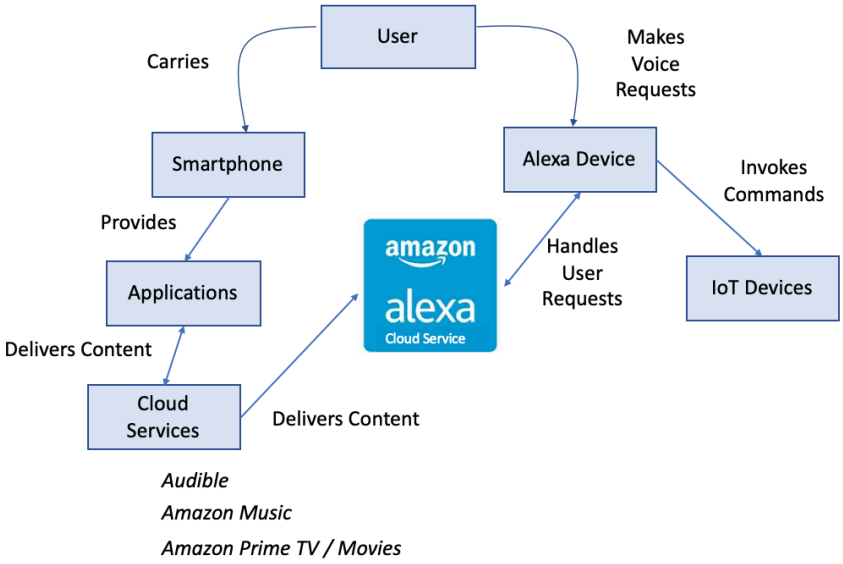

Figure 1: Need Finding Flow for Voice Enabled Technologies

Plan 1: Interview

The first need finding method to be applied will be the interview. In this method, we will be looking to derive insights and perspectives from

potential users. The plan will be to do in person one-on-one interviews with a small group of (3 or 4) users who currently actively use voice-enabled speaker devices. The interviews are expected to last no longer than one hour. I am explicitly narrowing the number of interviewee's to better meet time and bandwidth constraints of the project.

The interviews will be scripted however the script will not be followed rigorously allowing the interview subject to add additional insights. The interview will be recorded (if acceptable to the interviewee). The recording is expected to improve the flow of the interview and support better data retentions as it relates to the above data inventory. Additionally, notes will be taken as a mind map. We recognize that having a second interview participant is often helpful to take note and confirm emotional and other queues from the user that cannot be recovered from recordings and notes alone, but this is not possible for the current research.

The interview script will be following the outline provided by the Institute of Design at Stanford (stanford.edu, 2007) We start with an explanation of the interview process and what we hope to achieve followed by a few open-end questions to elicit responses to fill the first three data inventory questions. The second half or the interview will be more targeted and aimed at tasks and sub-tasks with an interest in the initial configuration, privacy and sharing location information. Targeting data inventory questions 4, 5, and 6.

Drawbacks and Potential Biases

Although the interview process is likely to provide some excellent results, I do recognize there are some potential drawbacks that must be kept in mind with this need finding method. 1. "It is a human tendency to try and create details and to tell a story the way we think something happened rather than how it happened." ("How to Conduct User Interviews," 2017) 2. Users are not designers, and although we want concrete data and the emotions of interactions with users, caution should be applied if specific design information is being provided as feedback.

Plan 2: Survey

The second need finding method to be applied will be the survey. In this method, we will be looking to answer the data inventory questions using a broader audience. Ideally, two surveys would be done the first soliciting qualitative data followed by a second survey based on the results of the first that would provide more quantitative results. However, for this project, we will be creating a survey that aims to reach a middle ground of both quantitative and qualitative. This is being done for the same time and bandwidth constraints described in plan 1.

The plan includes initial internal testing of draft surveys for qualitative feedback and quantitative results testing. The Appendix contains some initial draft questions that should not be considered final. The survey will be hosted using google survey tools (unless other requirements force a change to this decision.) and there will be a number of iteration on the development before the survey go out to the users.

The survey will be kept short with the expectation that a more extended survey would reduce the response rate and the validity of the answered questions. The goal of the survey is to gather information pertinent to the data inventory which will then be used to inform rest of the design process. The survey will start with an initial "Screening Question" to ensure we are capturing the demographic we are looking to evaluate and weeding out the rest. (Data Inventory 1) The question design will not only show the Boolean decision of whether or not the survey taker is a voice enable technology user, it will capture the level of their current usage. (Note: Although it may also be important to understand why users do not use this technology, we are initially focusing only on users who are currently actively using the technology.) We follow this initial question with questions that target current usages and potential pain points of usages specifically focusing on location and context (Data Inventory 2, & 3) These question are to be followed by questions addressing the specifics of the systems tasks (Data Inventory 4, 5, & 6) and closing with an open-end question to capture any additional thoughts the survey taker may have.

Drawbacks and Potential Biases

Although survey question development is a well-studied area and numerous techniques exist for constructing good surveys. We still must be diligent to try not to include questions that have biases built into them which could unintentionally affect the survey results.

Additionally, we should be aware of the time and effort required to process the results of the survey. Specifically, if open-ended questions are used the process of compiling the data into meaningful results is often time-consuming and should not be underestimated.

Plan 3: Participant Observer

The third need finding method to be applied will be the Participant Observer. In this method, we will be looking to be an unbiased observer of people using voice-enabled technologies in different contexts. Data collection will occur through informal conversations and will include the review of user manuals of current devices as well as a review of the existing literature on the subject.

We will be applying varying levels of involvement with the user community during the participant observer process. Including "overt" involvement where people will be aware of my desire to learn for design purposes, "covert" involvement where I will withhold my longer-term intentions to not unduly influence the observed behavior. And a "combination" involvement where some participants in a group event will be aware of my intent while others will not.

Data will be captured in an observation log after each active session and the results organized into a coherent story aligning with the data inventory where applicable. One advantage of Participant Observation process that we hope to test is that using this method can uncover truths that can unintentionally be obstructed when a direct query method such are survey or interviews are used.

Drawbacks and Potential Biases

As with each need finding method, we recognize inherent biases that could affect the results. One of the significant potential biases in Participant Observation is "You are not your user." (Joyner, 2017) To mitigate this bias,

we must focus on the users and their emotions and not on the overserves own expectations. This is done through active listening and being aware of the potential bias.

References

How to Conduct User Interviews. (2017). Retrieved from https://www.interaction-design.org/literature/article/how-to-conduct-user-interviews

Joyner, D. (2017). Human-Computer Interaction. Retrieved from https://www.udacity.com/course/human-computer-interaction--ud400

Perez, S. (2018). Voice-enabled smart speakers to reach 55% of U.S. households by 2022, says report. Retrieved from https://techcrunch.com/2017/11/08/voice-enabled-smart-speakers-to-reach-55-of-u-s-households-by-2022-says-report/

stanford.edu. (2007). Need Finding Tools. Retrieved from https://hci.stanford.edu/courses/cs447/docs/NeedFindingCribSheet.pdf

Appendix

Interview Script

Introduction: "Hi I am a GA Tech student study interfaces into voice enable technologies. I am interested in hearing about your experiences with systems like Google Home, and Amazon Echo. There are no right or wrong answers I just want to get a sense of how you use or would like to use these tools."

Kick-off: What voice-enabled technologies do you currently uses?

Build rapport: What are some of the most common uses for your voice-enabled speaker?

Grand Tour: Can you describe a specific example of using your voice-enabled technology in a group environment? How successful was it? What happened? What areas were less than optimal?

Reflection: If you were to think about what would make an ideal experience when using your voice-enabled technology what would it look like?

Wrap-up: Thank you for spending this time with me. Are they any things that you may have thought of that we have not yet touched upon?

The outline for this Human Computer Interface (HCI) Design interview is derived from the work of the Institute of Design at Stanford (stanford.edu, 2007)

Survey

Note: The survey questions are still a work in progress.

Survey intro text: Thank you for agreeing to answer a few questions about voice-enabled technologies. Your answers will be kept confidential and will help in the design of a new interface for a voice-enabled service.

1. How many times a week do you use a smart speaker? Such as Amazon Echo, or Google Home. <dropdown> *Never, A few times a week, at least three times a day, continuously throughout the day*.
2. If you have configured and used an Amazon service such as Amazon Music, Amazon Prime Movies, Audible at a friend or family members home. Tell us about your experience. *<open response space>*
3. Is sharing your location information with a service provider like Google or Amazon something you are comfortable with?

<dropdown> *I would not do this, I would do it but only under certain circumstances, I am not concerned and would easily do it for a service I wanted.*

4. Is sharing your phones contact information with a service provider like Amazon or Google something you are comfortable doing? <dropdown> *I would not do this, I would do it but only under certain circumstances, I am not concerned and would easily do it for a service I wanted.*
5. What are some common tasks you ask your voice enabled speaker to perform? *<open response space>*
6. Do you use Amazon Contact feature for Alexa? *<dropdown> What is that?, I don't trust it, never, sometimes, occasionally, always.*
7. Tell us about configuring new services with your voice enabled speaker. Is it easy or difficult to configure? Please explain why. *<open response space>*
8. Have you ever wanted to use your voice enabled speaker outside of your home? Where did you want to use it? Please explain. *<open response space>*
9. Do you use your voice enable speaker to control your TV? *<dropdown> You can do that?, Never, I prefer not to, Once a month, one a week, all the time.*
10. What additional features do you wish your voice controlled speaker had? *<open response space>*