Assignment M5
CS6750 Spring 2019

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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, and access their digital media content as well as new ways to socialize with friends and family using these speech-enabled services.

Qualitative Evaluation: 2 pages

Think-aloud Evaluation Discussion

The participants: Three individuals took part in the *Think-aloud* evaluation. All participants were family members ages 21, 38, 53 and all have knowledge of Alex devices and Amazon services.

How well did the sessions go? The sessions ran well with each participant making unique observations. The evaluation sessions took place in a casual environment in my home which is the expected environment that actual usage of the interface would take place.

Were all sessions run the same, or did you make changes between participants? The sessions were run the same in terms of the format and content however the sessions occurred at different times of the day, and the participants had different skill levels in understanding voice-enabled technology, but all had a good understanding of Alexa.

Is there anything you would do differently purely organizationally next time? As the participants were chosen based solely on convenience and availability, I feel a more rigorous selection process may have improved the results as social desirability bias was likely at play with the family member participants.

Summary of Raw results of your evaluation

Note: See Appendix A for the prototype which gives flavor to the below raw data.

Participant 1:

- Would this work anywhere? In a foreign country in a different State?
- Why not just "loan" me the Album. Then I could listen to it without you or until you came and took it back?
- I didn't know I could have multiple accounts on Alexa.
- This is a great idea, but I wish it were more straightforward to get going.

Participant 2:

- To say "From Dan's Account" sounds cool but wouldn't there be conflicts? How many Dan's do you know?
- Does "Family Group" transfer from home to home? So if you're in my "Family Group" am I in yours?
- Why not just set up with the Alexa on your phone? You would not need to be home to do that, correct?
- Nice idea I would totally use this we have lots of great music, but I can't play it at our Dad's house.

Participant 3:

- Ok, This makes sense.
- Is "Family Group" similar to Adding an Account to you Alexa?
- Voice Authentication sounds cool.

- When will it be available?

Analysis of feedback

What are the main takeaways for improving the interface?

- Provide multiple paths through the interface to accomplish a task.
- Simplify or remove any interactions with devices that are not Alexa enabled.
- Enhance the interface to support more help type activities. For example, Alexa could say: Sorry I did not understand; Would you like some help answering?"

What feedback surprised you? I was surprised at the simple idea of "loaning" a book or movie such that it is only available to the person who borrowed it. This seems like a good idea that needs further development.

What feedback did you receive that you expected? Most of the feedback was as expected as the interface tries to follow the paradigms set forth with other Alexa Interfaces. So, the general likes and dislikes of Alexa also came up in the evaluation, and these were expected.

Changes that feedback suggests

Based on the qualitative feedback it is clear that simplification to the initial registration process would be highly desirable. My participants would be comfortable just sharing a password into an account even if it was not compliant with the subscription rules. This feedback might not be the same if we had a larger and more diverse audience of participants.

Predictive Evaluation:

Evaluation Discussion

In this evaluation, we will be using a *cognitive walkthrough*. The expectation is to evaluate what a novice user might be seeing, hearing thinking and

doing while interacting with the Alexa voice interface. It is expected that our novice user has a basic understanding of Amazon Alexa's functionality and capabilities.

The **Goal** we have in mind is for the user (Anne) to Play a movie, which she owns on Amazon Prime Movies, through an Alexa enabled device at a family member's home. (The full details of this scenario are available in Appendix B)

Cognitive Walkthrough

Note: We will use *GoEx* to indicate the **Gulf of Execution** and *GoEv* to indicate the **Gulf of Evaluation**. After each request-response interaction with Alexa we will evaluate each Gulf.

Users Action: "Alexa play Iron Man from Anne's Account in the living room."

Alexa Response: "I don't know Anne's Account. Would you like to add an account to the Family group?"

- *GoEx Evaluation*: The user must know to say "from Anne's Account" to trigger the action this indicate a wide Gulf; However the verb *"from"* is **consistent** with the Alex grammar and syntax. So the Gulf is narrowed with this understanding. Also, note that additional conversation paths could be added to support different **user actions** (i.e., requests)
- *GoEv Evaluation*: This gulf is narrow as the user would expect some response and the Yes / No nature of the question is helpful and natural.

Users Action: "Yes"

Alexa Response: "OK, I see the account Anne@yahoo.com nearby is this the Account you would like to add?"

- *GoEx Evaluation*: Here the intention is to advance the conversation and the action to say "Yes" or "No" is **consistent** with the interface and of course **maps** well to any similarly posed question whether asked by a voice device or a human. (Thus a narrow gulf.)
- *GoEv Evaluation*: The gulf is wider as the user must be able to **recognize** their account name. This may not always be obvious if the account was set up by another family member. Also, the users must be running the Alexa Application on their Phone in order to be discovered.

Anne: "Yes"

Alexa: "OK I have added this account and sent a confirmations request to Anne@Yahoo.com's phone"

- *GoEx Evaluation*: Same as above with "Yes" or "No" response. The interface here has a narrow gulf of execution.
- *GoEv Evaluation*: The response requires additional **interpretation** by the User as Alexa does not say explicitly "*go to your phone to confirm".* To narrow this gulf of evaluation a Notification / Alert could be sent to the phone to help further **communicate** the response.

Anne:<Confirms Acceptance to the Family Group from her phone>

Kathleen's:<Alexa Device is configured to allows nearby accounts to join without additional confirmation> (This is a configurable option.)

- *GoEx Evaluation*: Here *Gulf of execution* is rather large as there is a required change of interface to support the forward progression. However, this is required to ensure appropriate security and authentication of the user's identity.
- *GoEv Evaluation*: The *Gulf of evaluation* is large here as the feedback is minimal. What could be added to the interface is that once the confirmation occurs on the phone, Alexa could reply with: "I have

your confirmation" or "You are configured to use this Account." This feedback would help narrow the Gulf.

Anne: "Alexa play Iron Man 2 from Anne's Account in the living room."

Alexa: "OK" <The movie starts playing on the Fire TV in Kathleen's Livingroom>

- *GoEx Evaluation*: The Gulf is narrow here even though the user is required to restate the initial action. As this is **consistent** with other Alexa interface.
- *GoEv Evaluation*: The response of "OK" provides confirmation and narrows the Gulf of evaluation as there may be a slight delay in buffering and starting the movie. (The start of the movie is the final feedback.)

Evaluation Summary and Next Steps:

Additional Needfinding:

Given our improved understanding of the user which we gathered from the current evaluations, we would likely benefit from another round of needfinding to improve the interface. I would recommend both *interview* and *participant observation* as needfinding exercises. We could use the *interview* to confirm and enhance the desired changes found in the *think-aloud* evaluation and use participant observation to record interactions with Alexa that require complex sentence structures for successful execution. The participant observation can further enhance those concepts that brought up in the predictive evaluation.

Questions to be answered

Design alternatives

One critical design alternative captured during the evaluation was the idea of "loaning" digital media through Alexa. For example, Alexa: "Loan the Iron Man Movie to Anne's Account." Adding loaning to the interface might simplify the need to be present when your media is being used but would potentially add complications to the interface. Additional needfinding would be required to discover if this idea is viable and if so how to best integrate the concept into the interface.

Revisions to the prototypes

Given the positive feedback from our evaluations and our current understand of the user and the interface we could start developing prototypes that could be executed on an Alexa Device. Many of the expected user interactions have been confirmed and could be coded, significantly increasing the fidelity of the prototypes. Additionally, those areas that have stronger critiques can be left open for future development when additional needfinding is completed.

Further Evaluation

Although the fidelity of the current prototypes would not support *Empirical Evaluation.* Another round of *Qualitative Evaluation* would be beneficial. We should, however, enhance the plan for Empirical Evaluation and ensure that the next level of fidelity generated in the prototype could support *Empirical Evaluation*. We can do this by focusing the empirical evaluation on a small but essential area of the interface and by scripting the analysis in advance of the actual evaluation.

References

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/

Appendix

A. Verbal Prototype used for Qualitative Evaluation

I am going to start by simulating a user scenario. The user is at a family member's home, and they would say something like “Alexa play The Beatles Live in the living room from Dan’s Account," and the Alexa device in the living room of the family members home would start to stream the music content.

So, you ask: What makes this interesting? What's interesting is that Dan is the one who owns the media content “The Beatles Live” (which is a rare Album and cannot be easily purchased), yet he is effortlessly able to play that content at a friend or family members home by just making a request to Alexa.

So, you say: There must be a catch! Now, yes there is a small catch. The catch is that Dan would have to be a member of a “family group” where the content is being streamed. Let’s define the “family group” as a collection of external Amazon accounts that have been granted permission to use the Alexa devices in this friend or family members home.

OK So, how do you add an Account to the family group? Adding Dan to the “family group” would be accomplished with a setup screen in the Alexa App of the family member. Similar to how other Alexa services are configured. Once the account was added, a voice confirmation would be required from Dan’s Account. This would sync the two accounts and tie Dan’s voice to the Authorization.

OK So to set this up in the first place Dan would need to be at his home, correct? Yes, so maybe that the small catch we said above may not be that small. As Dan would have to be at his home in order to pre-configure the system. That is to accept, and voice authenticate membership into the "family group".

OK, but once the Alexa "family group" is set up it would be as easy to play your music, movies, and books in your friends' home as it would be to play them in your own home. Yup!

Are you worried about Account spoofing? Yes, current Voice recognition is pretty easy to trick but we could add an additional voice passcode.

B. **Wizard of Oz Prototype used for Predictive Evaluation**

The Idea

The system recognizes the user's location and identity based on their cell phones GPS and allows for streaming content to nearby Amazon Alexa devices. It is important to note that the cell phone connects to the Amazon cloud and does NOT need to have access to any local Wi-Fi networks. To use the service, start with the wake word "Alex" followed by an "invocation request" (this could be any Amazon service request that you use at home) and then end the request with "From XYZ Account" Where XYZ is the name you have given your Alexa Account. So, for example, "Alex play Iron Man 2 from Dan's Account".

Prerequisites

The user has an Alexa Account and Amazon Services that they currently use: Unlimited Music, Prime Movies, Audible. Additionally, the user has

the Amazon Alexa App running on their cell phone allowing Amazon Alexa to know their location.

Scenario Setup

The user Anne is at her sister Kathleen's home who also has Alexa. Kathleen does not own the Iron Man 2 Movie, but Anne does, and the two want to play the movie for their kids.

User Interaction

Anne: "Alexa play Iron Man from Anne's Account in the living room."

Alexa: "I don't know Anne's Account. Would you like to add an account to the Family group?"

Anne: "Yes"

Alexa: "OK I see the account Anne@yahoo.com nearby is this the Account you would like to have added?"

Anne: "Yes"

Alexa: "OK I have added this account and sent a confirmations request to Anne@Yahoo.com's phone"

Anne:<Confirms Acceptance to the Family Group from her phone>

Kathleen's:<Alexa Device is configured to allows nearby accounts to join without additional confirmation> (This is a configurable option.)

Anne: "Alexa play Iron Man 2 from Anne's Account in the living room."

Alexa: "OK" <The movie starts playing on the Fire TV in Kathleen's Livingroom>