Assignment M4

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Abstract — Spotify is a music streaming service that allows users to access over 60 million tracks. As on September 2020, it had 320 million monthly active users with more than 4 billion playlists.[1] However, there are critical gaps in the core interface of the service which can be redesigned for a refined user experience. This study will dive deep into the task of creating a new playlist while applying principles of Human Computer Interaction.

1 QUALITATIVE EVALUATION

I will use a **survey** to evaluate the **textual prototype** created in Assignment M3. The prototype is defined in Appendix A for quick reference. We will get feedback from the participants around using a drop and drop based approach to add songs to a playlist on Spotify.

1.1 Evaluation plan

The participants for the survey will be primarily recruited using CS6750 EdStem forums. I will also recruit friends and family members through email to reach a varied audience across various user contexts, environments and levels of expertise. The evaluation will take place on an online portal which can be accessed using desktop or mobile browser. The survey can be taken in any isolated environment where the participants have low cognitive load and can effectively answer the questions. We will not record the exercise as we don't want the participants to become overly cautious in their responses. In addition, there is not much value in recording survey participants. We need to watch hours of video just to see their reaction to each question which will not result in actionable data.

[1] Source for catalogue size and active listeners data: Spotify Newsroom

1.2 Survey questions

The survey will include the following questions to get feedback on the prototype:

Q1 How much time do you spend listening music per week?

- o 0 – 4 hours
- o 5 – 9 hours
- o 10 – 14 hours
- o 15+ hours

Q2 How many playlists do you create in a month on Spotify?

- o 0 – 2
- o 3 – 5
- o 6 – 10
- o 11+

Q3 Select the activities that you do while listening music.

- o Exercising
- o Working
- o Cleaning
- o Driving
- o Studying
- o Others

Q4 If you selected- "Others" in the previous question, please add your answer here.

Q5 What is your impression of using drag and drop gestures to add songs to a playlist compared to searching for songs using keyboard, touchpad?

Q6 Would you recommend any improvements to the drag and drop functionality for adding songs?

Q7 In what situations, are you most **likely** to use drag and drop to add songs to a playlist?

Q8 In what situations are you most **unlikely** to use drag and drop to add songs to a playlist?

Q9 Were you able to able find relevant information to effectively use the drag and drop functionality?

Q10 How did you discover the drag and drop functionality while using the application?

Q11 What are the mistakes that you made while using drag and drop? (Example – you choose the incorrect song while dragging it to a playlist.)

1.3 Addressing requirements

The responses gathered as part of the survey will help in evaluating if the prototype is in coherence with the requirements in the data inventory and requirements definition phases.

The prototype is targeted towards users with various levels of expertise; therefore, we are evaluating if the 'drag and drop' functionality is **discoverable** and **usable**. The interface should also be **flexible**, **tolerant** and we will identify patterns in reported **user mistakes**. We want to provide multiple methods to achieve user's goal of adding songs to a playlist. The survey will provide valuable data if users are able to **identify the necessary actions** to complete the tasks.

Users who don't understand the English language should be able to simply drag a song to a playlist. Knowledge of the interface's default language should not impact usability of the feature and we will place emphasis on **inclusivity**. The users should be able to identify the optimal method (text-search vs drag-drop) depending on their **immediate context** which will narrow down the gulf of execution.

2 EMPIRICAL EVALUATION

I will empirically evaluate the **wireframe prototype** created in Assignment M3. The prototype is defined in Appendix B for quick reference. The existing text-

search based interface is redesigned to support voice search for songs which can be added to the playlist.

2.1 Control and experimental conditions

***What are you testing*—** We are testing the discoverability of the voice search feature and evaluate the improvements in user experience as compared to text-based search. We will gather data in various user contexts such as driving a car, working out, walking in the park, cooking etc.

***What is the point of comparison*—** The point of comparison is a paper prototype of the existing interface for adding songs to a playlist. Currently, the users can search for any song using their keyboard or touchpad and add it to the preferred playlist. We will evaluate our prototype's performance against the existing interface.

***Null hypothesis*—** The prototype doesn't enable the user to add songs to the playlist more efficiently.

***Alternate hypothesis*—** The prototype enables the user to add songs to the playlist more efficiently.

***Experimental method*—** The experimental method will be **within-subjects**. Each participant will add 5 songs to a playlist using the interfaces outlined above. The aim is to capture time-based metrics while the user completes the task. I will track the time taken by a participant to complete each action such as using voice to search for songs, selecting song to add. In addition, I will track the idle time spent by the user and also number of mistakes made. I will use **paired t-tests** to analyze the data generated and validate the hypothesis. The aim is to perform these tests on data collected by making the participants perform the tasks in various user context and environments with different cognitive loads. For example, I will collect the metrics when the user is driving a car and adding songs to a playlist. The main goal of our experiment is to provide the user an optimal method to add songs to their playlists in each scenario. The data analysis will help us understand the best method for various contexts like cooking, driving, working out in the gym.

The voice-based prototype isn't expected to outperform text-search in all contexts but we must document what we cannot control.

Lurking variables — A potential lurking variable can be the order in which the participants use the 2 interfaces. In order to avoid this, I will assign the interfaces in random order. In addition, the prototype doesn't have a working implementation of the voice-based search; therefore, external factors such as background noise or peculiarities in user's accent which can impact resolution of the user's command are not accounted for. A potential mitigation is to have an ad-hoc integration with Google voice search to validate the user's utterance. However, this will compromise the original context of the experimental method.

3 PREDICTIVE EVALUATION

In this section, I will perform a predictive evaluation of the **verbal prototype** created in Assignment M3. The prototype is defined in Appendix C for quick reference. The aim is to evaluate the redesigned interface for creating collaborative playlists which can be shared using a QR code.

I will create **GOMS model** to analyze the tasks performed by the user. The idea is to determine how efficiently an expert user can create a collaborative playlist in which other users can add songs. The user's goal and initial situation is described in Figure 1 below. The users can select the appropriate method to create a playlist based on their immediate context. The low-level operators involving clicking on 'create playlist', generate a QR code and allowing other users to scan the code for adding songs to a collaborative playlist. The user is aware of their goal in advance and I won't be evaluating their navigation around the interface.

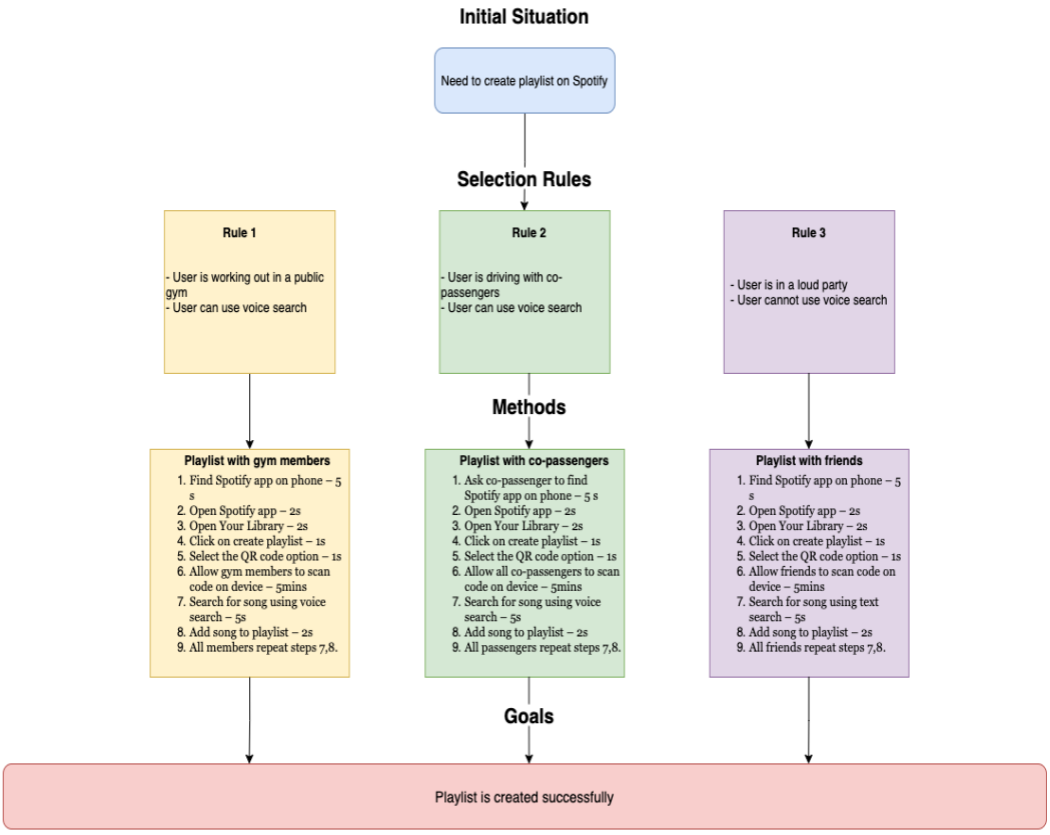


Figure 1—GOMS model for verbal prototype

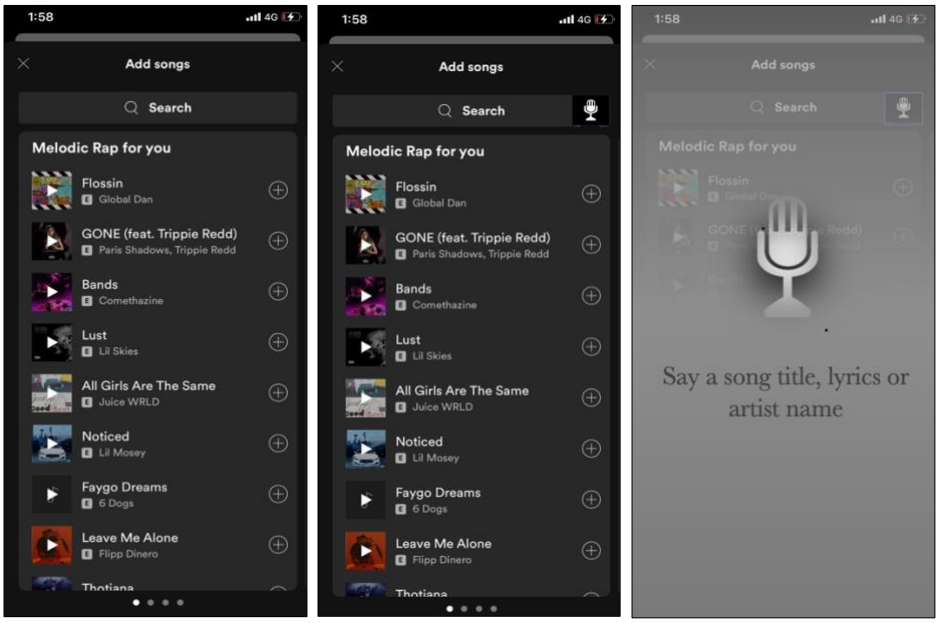
4 PREPARING TO EXECUTE

I will carry out **qualitative** and **predictive** evaluation for my prototype. It is easy to carry out the survey as a low-cost alternative which gives us access to a large number of responses. It also addresses most of the requirements outlined in the data inventory and initial requirements definition phase. The predictive evaluation will help us look at the interface from an expert user's perspective using the GOMS model. It provides us instant feedback on the prototype's performance which can be used to refine the product in upcoming iterations. There are several lurking variables called out in empirical evaluation which negatively impact the quality of the analysis. We don't have a working prototype with in-built support for voice-based search; therefore, I feel that the proposed empirical evaluation will fail to provide accurate results.

5 APPENDIX A

Consider a scenario where a user is listening to a song while working out and they like that song. The redesigned interface will allow the user to directly add this song to a playlist using **drag and drop**. This leverages the **affordance** of adding an item from the shelf to your basket in the grocery store. It is also consistent with the **industry standards** of using drag and drop gestures in operating system to move files from one directory to another. The new experience will enable the user to long press on the song title which will trigger an animation to move the song to a new location.

6 APPENDIX B



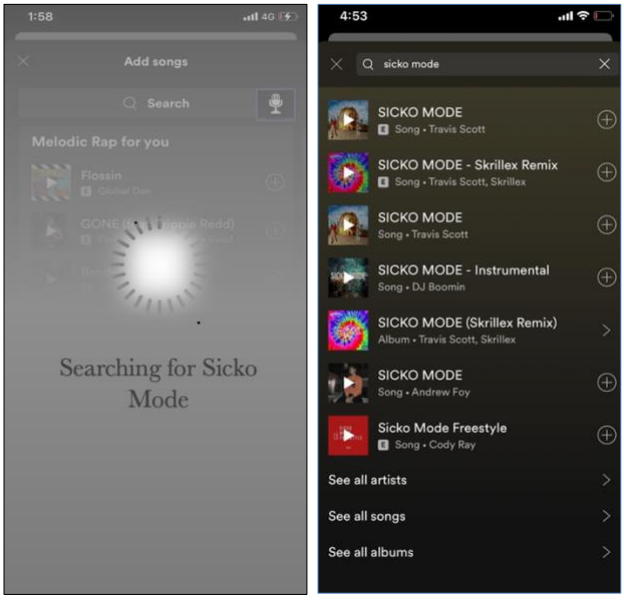


Figure 2—Wireframe prototype for redesigned interface.

7 APPENDIX C

Description— This section describes a **verbal prototype** for making collaborative playlists which can be shared using a QR code. The conversation script for the prototype is outlined in the subsequent sections.

"I am proposing a new technique of creating collaborative playlists. Whenever a user creates a new playlist, a unique QR code will be generated which can be shared with other people conveniently. Any person who scans this QR code will be able to access the playlist on Spotify. Now, multiple users can build a playlist together in accordance with the principles of social cognition. This will help users who interact with Spotify's interface while performing activities with high cognitive load." – This short introduction provides context for the prototype and also sets the agenda for follow-up questions.

"Have you used a QR code before? How was your experience?" – The person will provide a response based on their interaction with QR codes. Most users have used this technology to scan a menu in a restaurant or to download an app. If a person has never used QR codes, I would give them a quick demo of the interface before

proceeding further. This question aims to understand if the target audience is familiar with the proposed idea of using QR code.

"Do you find collaborative playlists helpful? Will it help if your co-passenger can add music to a playlist while you are driving?" – The person may or may not like this idea. Some users may think that their co-passengers will add some songs that they don't particularly like. In this case, we will ask them for suggestions to prevent that scenario. A potential solution could be to ask for approval from the playlist owner before adding any songs. We will **branch out to dive deep** into the user's pain points and their proposed solutions.

"What will be your preferred method to create a new playlist – existing text search interface or using QR code to collaboratively create a playlist?" – This will provide insights into the **effectiveness of the redesign and user's inclination** to switch to the new interface. If the person thinks that they prefer the existing interface, we will ask them the reasons for their decision. Again, we will **branch out to dive deep** further into the answers and get actionable feedback on the redesign.

"What do you like about the proposed redesign?" – The person will provide feedback and comments about the positive aspects of the redesigned interface.

"What do you dislike about the proposed redesign?" – The person will provide feedback and comments about the negative aspects of the redesigned interface.