8Tracks:

Exploring human-curated music playlists using social tags

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Introduction

As an avid music listener, I have always been troubled in listening to music that interests me. I find it very frustrating to organize music into a playlist. To add to this, I feel it is a cumbersome task to think about tracks one would like based on the mood or theme he or she is currently interested in and organize that to playlist to play at that moment.

To my advantage, 8Tracks (www.8tracks.com) is a social platform that allows users to curate their own playlists and other users can select those pre-built playlists to satisfy their music related informational need. While the platform has a nice mechanism of creating or listening to playlists, the unique feature about the website is the ability to discover these playlists. The platform allows the user to select a combination of three or less tags based on their mood, music genre or artist and presents the user with a series of playlists that comprise of those tags. Since the playlists are user created, the tags present on the playlists are also user-generated, which gives the entire concept of discovering music a more humane approach compared to traditional approaches of searching for tracks or playlists using text-based search.

While, I have always been amazed by the kind of music I get to hear on the 8Tracks platform, I was always interested in finding out that how well the platform is able to satisfy the music informational need of other users and how satisfied do the users feel listening to the music that comes up based on three or less tag choices of theirs. For this reason, I chose to study the user behavior of using 8Tracks while searching for music of their own interest. The questions I was trying to answer through this study are as follows:

- How the use of tags selection for getting a list of music playlists influence the user's search experience when listening to online radio?
- Does prior knowledge about the tags make it even more convenient for users to perform the search process?
- Whether a use of tag-based methodology leads to lesser cognitive effort and allows user to focus more on the content retrieved than on the search process?

In the following study, I aimed to answer the above questions by performing a laboratory based evaluation of 8Tracks. Research study participants comprised of users that are novice internet radio listeners and experienced listeners as well as users who have formal music training and who don’t. The users completed three tasks ranging from simple to complex, over the 8Tracks portal and answered relevant post-task questionnaire. The following sections provide a detailed overview of the process used, results of the pilot study and improvement suggestions for next steps.

Related Work

8Tracks has been one of the very few music information retrieval systems who have tried to use the approach of social tagging to playlist and music. While, other systems have used the concept of tagging, most of the systems just allow the user to use a particular tag from the tag cloud to retrieve relevant content that is tagged with the particular tag. The approach of 8Tracks is pretty novel in it's application of tags as it allows the user to use a combination of three or less tags to retrieve relevant content which allows the user to mix different genres and categories in the MIR context.

While there are several papers available that illustrate the concept of using tags to retrieving content, most of them are concentrated about what tags are and how they can be applied to music information retrieval but I haven't found one that tries to discover the usage of a combination of tags for music information retrieval and it's user experience impact, in the manner 8Tracks incorporates it.

System Description

[1]8tracks.com is an internet radio and social networking website revolving around the concept of streaming user-curated playlists consisting of at least 8 tracks. Users create free accounts and can either browse the site and listen to other user-created mixes, and/or they can create their own mixes.

Users can search for playlists called mixes by individual artist, specific genre, or by utilizing user-generated tags that are emotionally and/or psychographically descriptive tags (i.e. autumn, love, sad, eclectic). Users use the explore feature to select a combination of tags to get a series of playlists based on those tags.

A standard query using the explore feature allows the user to select three or less tags which can be tags selected through the tag cloud or one that is searched using the search box present below the tag cloud. The portal adds tags to the list reflected above the tag cloud, as the user keeps on selecting or searching tags. Based on the reflected results, if the user wants to edit his/her query, he/she can click on the selected tags in the tag list that removes the particular tag and allows the user to add more tags, hence, refreshing the results displayed.

Screenshots of the system are presented in **(Appendix G)**

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[1] 8tracks.com. (n.d.). In Wikipedia, the free encyclopedia. Retrieved December 3, 2014, from http://en.wikipedia.org/wiki/8tracks.com

Methodology

Sample

All research subjects that were recruited were expert users in searching information online but not all of them were experts in retrieving music online. Participants mainly comprised of students from the University of Michigan. They were expected to be experienced computer users and somewhat experienced with searching information online. Users were recruited by email-communication and by word of mouth. A background questionnaire was given to all participants before the search tasks to get knowledge on their search capabilities and their affection towards music.

The sample users comprised of participants that were regular online-radio listeners (30-50 hours / week) and of seldom online-radio users (4-6 hours / week). The user set also comprised of avid music listeners or musician and also occasional music listeners. One trait common among all users was that they have used an online music service for some time before.

For a more comprehensive study, I would like to recruit more people who have a music background, either formally trained musicians or casual instrument players. The users would be strictly recruited based on the number of hours they listen to music online and also, need to have a strong interest in music playing or listening. This would help me gain more relevant data and insights about experienced users and how their behavior differed from novice users.

Study Procedures

The pilot study took place in the course of four days in various rooms of the University of Michigan campus. Participants were given the same laptop to perform the study wherein the system was prepared with all the necessary software and hardware equipment and relevant websites and questionnaire were opened for the user in advance.

Upon arrival, the users were given a brief introduction about the study and the intent of the study. They were given a consent form to solicit agreement with the process of the study. Post consent form filling, they were given a background questionnaire to understand more about their web system usage and their music interests. After the background questionnaire, the users were introduced to the 8Tracks system and were explained the various features of the system that were related to the study.

After the system briefing the users were given three tasks, one after another to be performed in the 8Tracks interface. After each task, they were given a post-task

questionnaire to be filled that captured parameters related to the user's satisfaction with the outcome and the complexity of the task. The user's were asked to use the think-aloud methodology to explain what they were experiencing while doing a particular task and what factors were they judging when going through the playlist results. Post performing the three tasks the users were asked to fill a post activity questionnaire to solicit their input on the various aspects of the system and were then interviewed in an exit interview to understand their experience with the system and their degree of satisfaction with it.

Each study with a particular user lasted for approximately 45 minutes which included the system briefing, the questionnaire completion and completion of three tasks. The users were not limited by any time to perform a task so that I could gain insights about how involved they are with the system and the task. Since, music searching is more of a interesting task for most people, I wanted to see their level of satisfaction and comfort or frustration while performing different tasks. Though users were not limited by time, most users finished a particular task in approximately five minutes.

Search Tasks

The tasks were designed in a manner that allows the user to incorporate their own music interests in the task. The were specifically not given any particular artist or any theme so that the task can incorporate their artist of interest and music genres of their interest. The tasks were given in the same order to all the users as it would ensure that all the users are becoming familiar with the system in the same manner as they proceed from task I to task III. Hence, rotation of tasks was not applied for this particular study. The tasks given in the same order to the users are as follows:

I. Recollect your recent favorite music artist. Try to find songs that belong to that artist.

II. Choose a particular language of music which you hear. Select or search that tag and select other tags based on your interests to find playlists of songs of your interest.

III. You are hosting a family event for a celebration of your choice. You need to search music for a performance which you are doing along with friends or cousins. Search for relevant tracks for this performance.

The tasks were specifically designed in a manner that they can incorporate users with different backgrounds and demographics and can also cater to users with different linguistic and musical preferences.

Criteria and Measurements

The aim of the study was to focus on the user's experience over the system and not to measure the efficiency of the system to search for results. Efficiency was particularly not considered for this system because music search based on interests is a leisure activity and in this study I wanted to focus on the user's experience without the time constraint. Individual differences between participants was captured using the Background questionnaire that gathered details on their online music listening, music theme preferences and whether they were regular music listeners. Data was captured in four relevant areas to judge the user's experience and their emotional reaction of using the site.

One of the criteria measured was effectiveness of the search results. It was measured by how relevant the results were to the user based on the query he/she had made. It was measured by the user in the post-task questionnaire over a 5-point scale ranging from "Less relevant" to "Very relevant". The goal of this measure was to identify that whether use of tags based on user's preference resulted in song results that the user expected.

Another criteria that was measured was the Mental effort the user experienced while using the system. This was measured by the user in the post-task questionnaire where the user measured the effort he experienced in a particular task and how complex the task was for the user. This was measured over a 5-point scale as well. The mental effort was also judged in the post search questionnaire wherein the user measured over a 10-point scale that how tough it was to select relevant tags for the query. The goal of this measure was to judge whether use of tags made it easier for the user to query relevant music playlists.

The third criteria that was measured was the user's satisfaction with the system. This was measured by the user in the post-task questionnaire over a liker scale that how satisfied was he/she with the playlist results that reflected after the query. The user also measured his/her satisfaction of searching music over the system over a 10-point scale in the post search questionnaire. The goal of the measure was to realize that whether the use of tags to search music increased user's satisfaction with the system.

The fourth criteria that was measured was the emotional affect on the user while using the system. This was measured by the user in the post-task questionnaire of whether he found interesting songs in the playlist he/she chose to listen. This was measured over a 5-point scale of "No interesting songs" to "Many interesting songs". The user also measured the amount of adventurous emotion he felt while using the system over a 10-point scale in the post-search questionnaire. The goal of this measure was to determine whether the application of tags to search for music made the user more anxious about finding new songs that he/she had not heard before but was pleased to listen to them.

Data Collection

An informed consent form **(Appendix A)** was used where the user was clarified the scope of the study and it's outcomes. A copy of the form was given to the user and another was kept by the experimenter.

Before the study, users were asked to fill a Background questionnaire **(Appendix B)** to get an understanding of their online system usage, music interests and experience of using internet radio.

After each task the users answered a post-task questionnaire **(Appendix C)** that comprised of questions that used a 5-point scale to assess the mental effort they faced during the task, how complex they felt the task was and how satisfied were they with the results that displayed based on each query.

After the three tasks the user was asked to fill a post-search questionnaire **(Appendix D)** that comprised of questions relating to the user's satisfaction with the system and it's approach to search relevant music tracks.

The user's were asked few questions in an Exit Interview **(Appendix E)** where they were asked open ended questions about their experience with the system and whether they see themselves using such a search technique over different kinds of content platforms like video based systems or image-based systems.

Pilot Test Results

Participant Demographics

The study comprised of four participants out of which one user was a novice internet radio user, one was somewhat experienced internet radio user and two were highly experienced internet radio users. Out of the two highly experienced internet radio users, one user was an avid music listener and one user was an experienced musician having good knowledge of music and experienced with playing musical instruments. All the users were comfortable using computers and browsers and highly experienced in searching content online.

Effectiveness Measures

All users reported a low effectiveness **(Figure 1)** of the system wherein they did not feel that the songs that played in the playlist were very relevant to their search query. It was interesting to notice that most users reported a higher effectiveness for Task 2 compared to other tasks. This was probably due to the manner the task was designed, wherein they were asked to make a linguistic preference and then add tags to that based on their interests. In Task 1, all users reported a lower relevance rate because as part of the task they were asked to choose an individual artist of choice and they expected tracks to belong to only that artist whereas the playlist comprised of tracks of different artists with few songs from that particular artist.

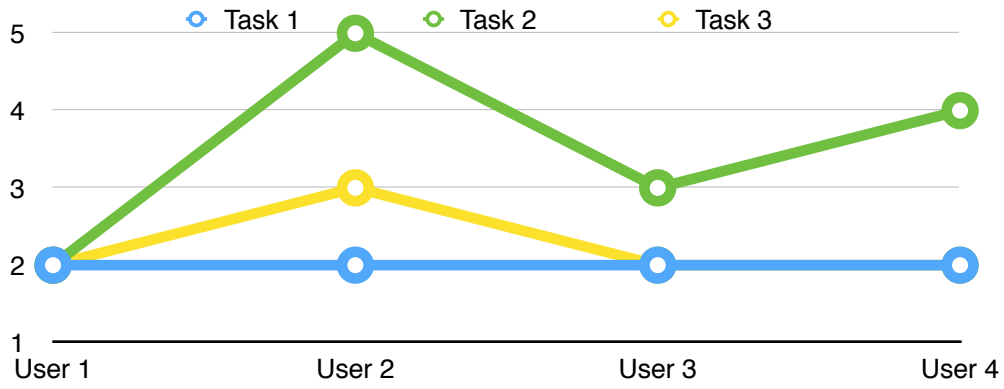


Figure 1: Effectiveness of search results [1-Less Relevant 5-Very Relevant]

Mental Effort Measures

All users reported a low mental effort in using the system across the three tasks **(Figure 2)** except User 4 who reported a very high mental effort in Task 1 and 3. The User 4 was an experienced musician and in case of Task 1 and 3, based on the tasks the user ended up choosing tags that were very specific and hence, the system was not able to reflect good results according to his preference. Hence, User 4 had to reformulate the query several times by using a different combination of tags each time.

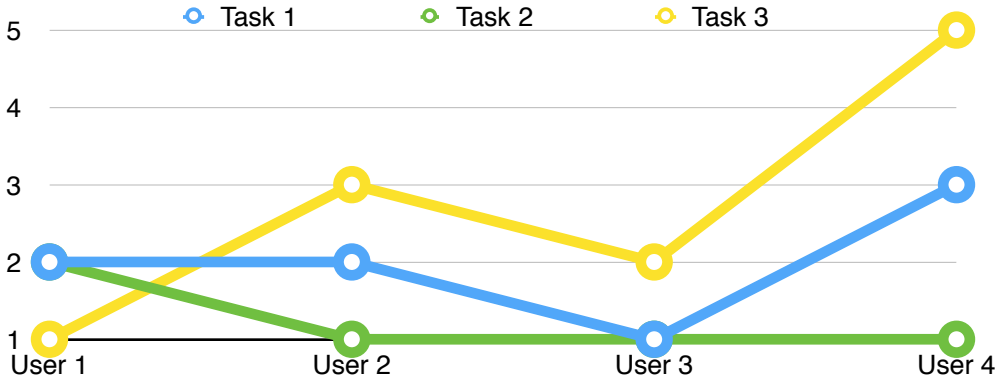


Figure 2: Mental effort [1- Less effort 5- Lot of effort]

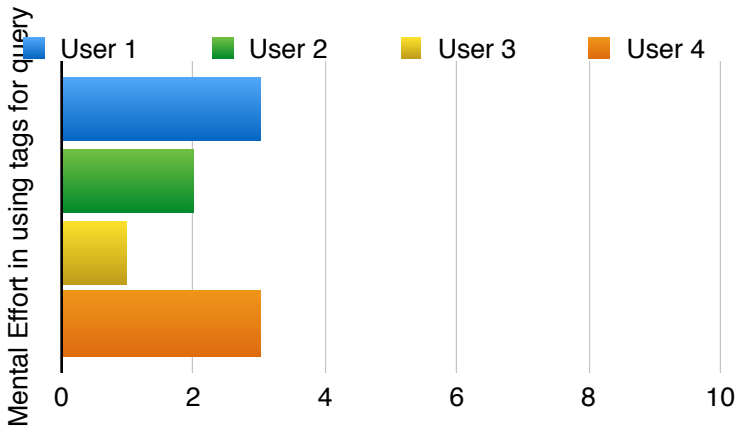


Figure 3: Mental effort in using tags to perform query

Also, in the post search questionnaire,**(Figure 3)** User 1 and User 4 reported a higher mental effort in using tags to perform their query compared to other users. This was because User 1 was novice to internet radio systems and hence, found it difficult to select tags for the query while User 4 was an experienced musician and hence, ended up searching for tags that were very specific for the system to reflect relevant playlists with. Though all the users reported the mental effort to be very low over the 10-point scale.

User Satisfaction Measures

Although all the users reported a lower effectiveness of the system **(figure 1)**, all the users reported a higher value of their satisfaction with the results as they found the results interesting to listen to. The satisfaction increased further in tasks 2 and 3 for most users because in these tasks they had more freedom to combine several tags wherein in the first task they were confined to use tags that were related to the artist they had searched for.

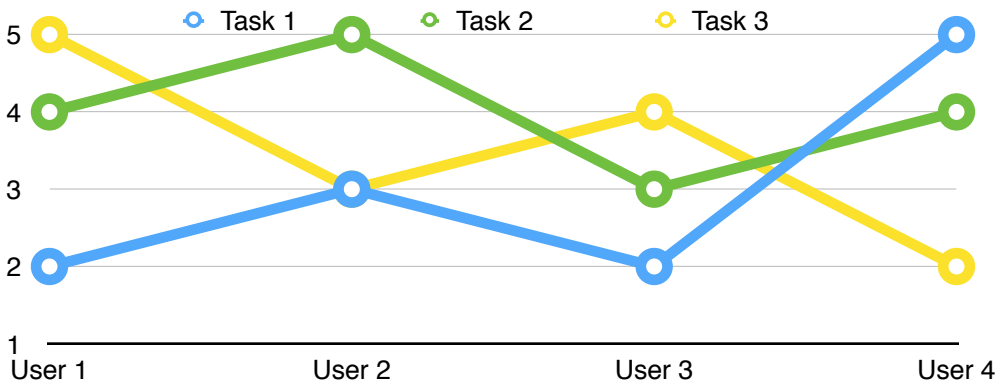


Figure 4: Satisfaction with Playlist results
[0- Less satisfied 5-Very Satisfied]

Also, in the post search questionnaire, all the users reported a high satisfaction in searching music over the system wherein all the users reported a score of 7 or 8 on a 10-point scale ranging from Less satisfied (0) to Very satisfied (10).

Affect(Emotion) Measures

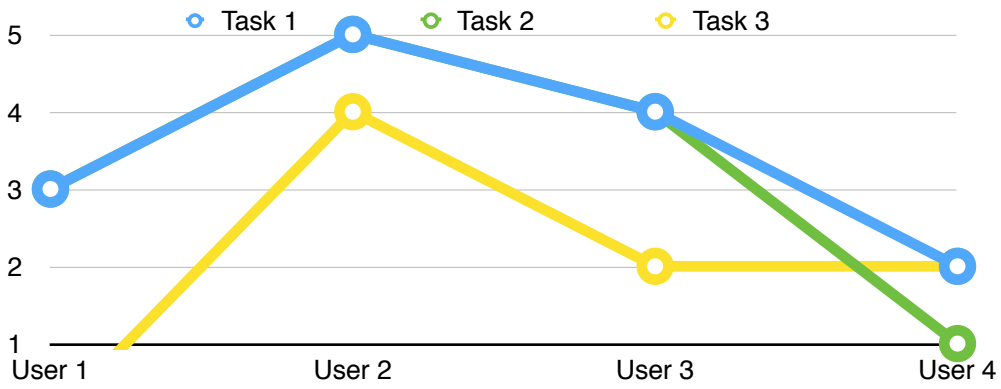


Figure 5: Finding interesting songs
[0- No interesting 5-Many interesting]

All the users in the study reported an average to high value on finding interesting songs **(Figure 5)** in all the tasks except user 4. User 4 because of his high experience with music was looking for very specific songs in all his tasks and was extremely particular about his listening choices that made him disinterested with most of the songs.

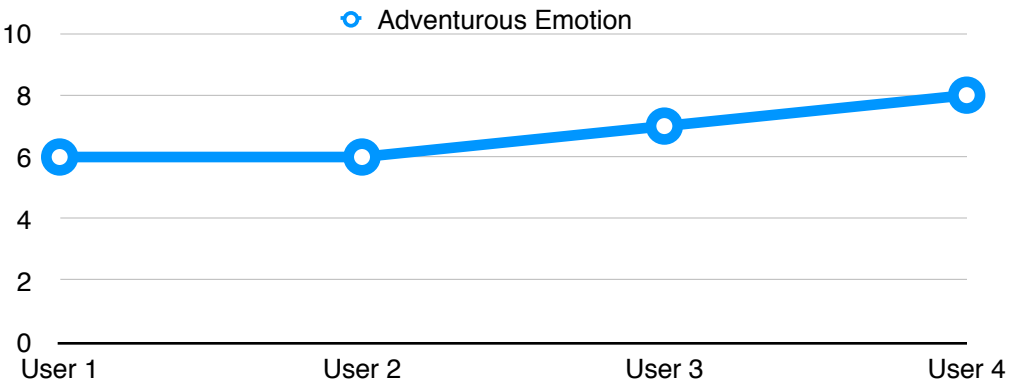


Figure 6: Adventurous emotion while using the system
[0- No adventurous emotion 10- Very High adventurous emotion]

In the post-search questionnaire, all users reported a high score on the amount of adventurous emotion **(Figure 6)** they felt while exploring the different tracks across the system. It was interesting to see that though User 4 was disinterested with most of the songs he discovered, he reported the highest value of 8 on this factor, among all the users.

Revisions

The small sample size of the study made it very difficult to draw inferences about the user behavior. It was extremely difficult to figure out common behavior not only among all the users but also between users within individual groups. The users within the two distinct categories of users, the expert and novice also showed varied behavior in several circumstances, which made it cumbersome to decide on common behavior.

All users that were recruited were university students of a similar age bracket and hence, it would be very fruitful to recruit users of different age categories. It would be interesting to draw out inferences about such users regarding their comfort with the system and their involvement with the system to search songs in this manner. The number of users that fit the experienced and novice category were also very less and hence, there is an important need to recruit more users in both the categories.

In terms of the manner the study was conducted, it would be more fruitful to do the entire study together with all the users. It would also be important to have a specialized setup that is already set for users to use. To add to this, it would be more useful to give a more detailed overview about the system to it's users before asking them to perform the tasks. While I was satisfied with the tasks and and it's outcomes, there is still a need to make the tasks more generic, so that it can cater to a wider variety of people.

It would also be more interesting to notice that there is a parallel experimental system which uses the same approach but in a different context like video, images or products which is used by the users to perform a task and then report their experience of using it in a different context. This would help us notice if users truly appreciate this approach and it's application in other areas.

Conclusion

This pilot study revealed that most users were satisfied with using such a system based on the individual questionnaires and the exit interview. Most users felt adventurous while using the system and were happy about it's approach. Most users confirmed that they would interested in using this system in future for their music interests during the exit interview. It was interesting to see that most users felt that the presence of three tags for their query was sufficient enough and they mostly ended up using two tags at maximum.

All users reported that such a system allowed them to focus more on the content than focusing on how they should search for content. It was also interesting to understand that most users felt that this approach of searching was not very different from text-based search because they use text-based search as a combination of keywords. Though, all users were little skeptical about the application of this technique to other domains like video-based systems and news systems, they felt that they see themselves using those systems in the future as well.

The results of the study are surely not at a quantifiable level to judge trends from it. The users showed varied behavior which made it difficult to understand that as a common trend in that category of users. More data collected by using a large set of users and a varied set of users, would surely offer more insights about the usage of such a system.

Appendices

Appendix A: Informed Consent form

Date: _____ Subject #: _____

Informed Consent Form
School of Information Course 531
Human Interaction in Information Retrieval

This project in which you are invited to participate is part of the course requirements for the SI 531,"Human Interaction in Information Retrieval", at the School of Information at the University of Michigan taught by Professor Soo Young Rieh. We would like to have you as a participant for a study to investigate people's searching behavior.

This study aims to describe the relative ease that users have when using tags to perform their music search over a system. The tasks would be performed over the system 8Tracks (www.8tracks.com) . The evaluation will focus on user experience during search of specific songs in known item search tasks in order to find how well the website supports the information needs of diverse users.

The data collected will be reported anonymously both on an individual level and an organizational level. If you are willing, the study interactions will be screen recorded for clarity and posterity. Only research group members and the instructor will have access to identifying information. Findings will be used for class demonstration purposes only, and will not be used in other venues.

Participation in this study is entirely voluntary. You have the right to withdraw from this project at anytime. The confidentiality of your responses will be protected at all time when the results are reported in class presentations and papers.

I, _____, have read and understood the above descriptions of the study and agree to participate in the study.

_____ _____
Signature Date

Should you have questions regarding your rights as a participant in research, please contact:
Soo Young Rieh, Associate Professor
School of Information University of Michigan
105 S. State Street, Ann Arbor, MI 48104-1285
Email: rieh@umich.edu

If you have any other questions or concerns, please contact Mayank Khanna at mayankk@umich.edu

Appendix B: Informed Consent form

Date: _____ Subject #:_____

Background Questionnaire

Please mark the highest level of education you have completed:

_____ Some high school

_____ High school graduate/GED

_____ Associate

_____ Some college

_____ College degree

_____ Some graduate or professional school

_____ Graduate or professional degree

_____ Other (trade or service school):
_____

What is your current (or most recent) occupation or job title?
_____

Do you use online music streaming services to listen to music? (Yes / No)
_____

If yes, how many hours **per week** do you spend on listening to online music?
_____hours

Which online music streaming service do you regularly use or have used in the past?(Tick the appropriate ones)

__ Spotify

__ Soundcloud

__ Rdio

__ Shazam

__ SoundHound

How satisfied are you or were with your preferred online radio service?

__ Very satisfied

__ Somewhat satisfied

__ Not satisfied nor dissatisfied

__ Somewhat dissatisfied

__ Very dissatisfied

__ Don't know / Not sure

Do you compose your own music or have some experience playing an instrument?

__ I am a music professional

__ I am an amateur musician/composer

__ I have some knowledge on music

__ I am just a passionate music listener

__ I listen to music occasionally

Any particular music theme or genre you are interested in or listen to frequently?

__ Rock

__ Electronica

__ Jazz

__ Classical

__ Trance

__ If any other, please specify _____

Appendix C: Post Task Questionnaire

Date: _____ Subject #:_____

Post-task Questionnaire

How easy/difficult did you find this task?

1 (Very easy)/ 5(Very tough)
1 2 3 4 5

How much mental effort did you feel while doing this task?

1 (Very less effort)/ 5(Lot of effort)
1 2 3 4 5

How relevant were the results based on your search?

1 (less relevant)/ 5(Very relevant)
1 2 3 4 5

Did you find the song you were expecting in the result?

1(Not find any)/ 5(found several)
1 2 3 4 5

How satisfied did you feel with the songs based on your query?

1(not satisfied)/ 5(Very satisfied)
1 2 3 4 5

Did you find any interesting song that you did not hear before?

1(not any)/ 5(Many interesting)
1 2 3 4 5

Appendix D: Post Search Questionnaire

Date: _____
Subject# :_____

POST-SEARCH QUESTIONNAIRE

In this questionnaire, you will use a rating scale of 1 to 10 to answer questions. Your answers should be related to the search session that you just completed. Please check off on numbers or between numbers. If a question does not apply to your search experience, check off NA (Not Applicable).

1. On a scale of 0 (not difficult) to 10 (very difficult), how difficult was it to use tags to perform your search?

0 not difficult / 5 difficult/ 10 Very difficult

0 1 2 3 4 5 6 7 8 9 10 N/A

2. On a scale of 0 (not relevant) to 10 (very relevant), how relevant were the songs based on your preference and selected theme ?

0 not relevant / 5 relevant / 10 very relevant

0 1 2 3 4 5 6 7 8 9 10 N/A

3. On a scale of 0 (no effort) to 10 (great deal of effort), how much mental effort did you feel while selecting tags for your search?

0 no effort/ 5 some effort / 10 great deal of effort

0 1 2 3 4 5 6 7 8 9 10 N/A

4. On a scale of 0 (not difficult) to 10 (very difficult), how difficult was it to judge the playlist results to be interesting?

0 not difficult / 5 difficult/ 10 Very difficult

0 1 2 3 4 5 6 7 8 9 10 N/A

5. On a scale of 0 (not easy) to 10 (very easy), did your prior knowledge about music themes make it easier for you to select relevant tags ?

0 not easy/ 5 easy/ 10 very easy

0 1 2 3 4 5 6 7 8 9 10 N/A

6. On a scale of 0 (no effort) to 10 (a great deal of effort), how much effort did you feel in using the entire system ?

0 no effort / 5 some effort/ 10 Great deal of effort

0 1 2 3 4 5 6 7 8 9 10 N/A

7. On a scale of 0 (no adventure) to 10 (very adventurous), how adventurous did you feel while exploring the results?

0 no adventure / 5 some adventure/ 10 Very adventurous

0 1 2 3 4 5 6 7 8 9 10 N/A

8. On a scale of 0 (not satisfying) to 10 (very satisfying), how satisfying was your experience of searching music over this system.

0 not satisfying / 5 somewhat satisfying / 10 Very satisfying

0 1 2 3 4 5 6 7 8 9 10 N/A

Appendix E: Exit Interview Questions

The following questions would be asked during the exit interview:

1.) Did you feel the number of tags allowed per query were sufficient?

2.) How satisfied did you feel with the playlist results?

3.) Would you be interested in using such a style of searching in future?

4.) Did the search experience allow you to focus more on the content than focusing on how you should search for content?

5.) Did you feel that such a search technique was better or worse in comparison to traditional text-based search?

6.) Would you like to see such a search style being incorporated in other forms of media based services such as video based systems or news sites?

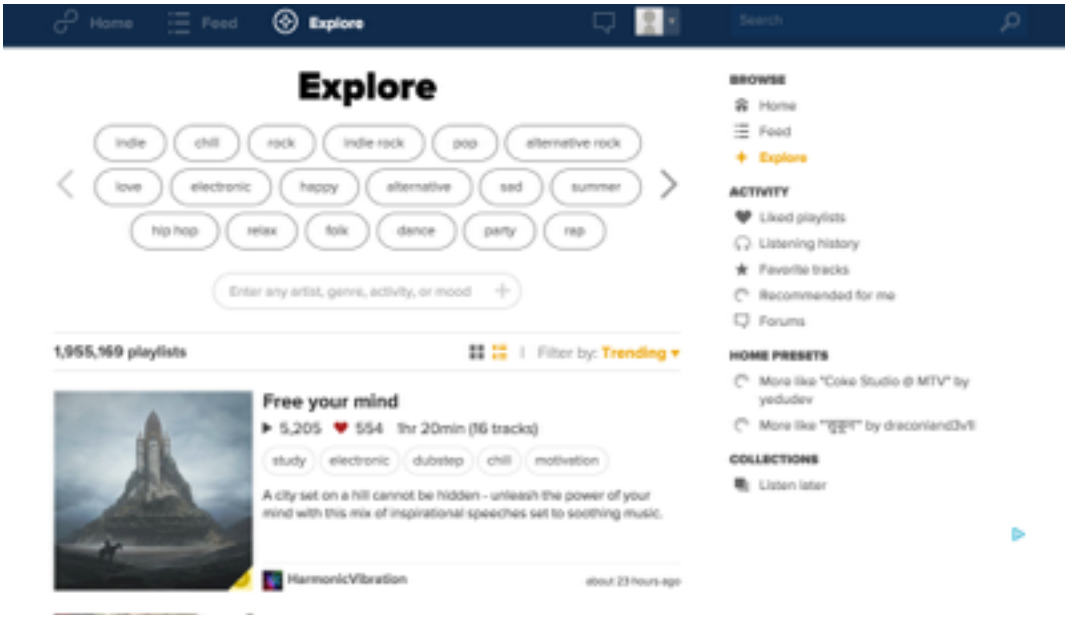
Appendix F: Individual Tasks

I. Recollect your recent favorite music artist. Try to find songs that belong to that artist.

II. Choose a particular language of music which you hear. Select or search that tag and select other tags based on your interests to find playlists of songs of your interest.

III. You are hosting a family event for a celebration of your choice. You need to search music for a performance which you are doing along with friends or cousins. Search for relevant tracks for this performance.

Appendix G: Screenshots of the system



Screenshot of the default interface for selecting tags

How the query evolves by selection of tags and the cloud tags change

The user can click on a particular tag again to remove that tag from the query