

# User Studies: A First Step in Designing an MIR Testbed

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## ABSTRACT

The planning for a music information retrieval testbed must include consideration of the potential users for a music collection and their information needs. In particular, we must have a clear idea of what an MIR system's potential users are looking for, how they describe the object of their search, and how they approach the task of fulfilling their information needs.

## 1. INTRODUCTION

At present, research in the international and interdisciplinary music information retrieval (MIR) community emphasizes the development of basic tools for music retrieval—for example, the creation of 'query by humming' (QBH) interfaces or the investigation of efficient indexing techniques for music documents. Music digital libraries as reported in the research literature are largely developed as proof-of-concept demonstrations for a given tool or technique, or are focused around an available set of music documents. Current efforts at studying MIR system usability issues focus on user behavior exhibited in specific MIR systems, for example by examining transaction logs [8]. This type of study can tell us what actions people take on an existing system, but give no insight into their motivations, their degree of success or failure in their search, or the information seeking strategies that users employ. And, of course, these quantitative studies are limited to describing usage of existing systems—there is no insight gained on what additional search facilities, document media, browsing support, etc. that users might desire.

There is a dearth of a priori research on information behavior as regards to music—that is, how a given group of people prefers to locate music, the strategies that they employ for searching or browsing, and the ways that they use music once it is located. In the absence of a rich understanding of user needs and information behaviors, the MIR community runs the risk of developing systems ill-suited to their eventual users.

A good first step, then, is to seek answers to the following questions: who are our target potential MIR users? how do people describe their music information needs? what strategies do they use to fulfill these needs, and where do they prefer to go looking for music?

## 2. WHO ARE THESE PEOPLE...

The current MIR systems have been created with a variety of different potential users in mind—for example, musicologists [6], or laypeople seeking popular music [7]. Different user groups

will likely have vastly different needs, yet there are few documented attempts to conduct a serious requirements analysis, based on a strong understanding of potential users' music information needs, prior to constructing an MIR system.

Studying relatively small and distinctive potential user groups such as musicologists is less problematic than studying large, amorphous groups such as 'people looking for popular music'. A good starting point for coming to an understanding of this latter set of potential MIR users is the small but significant research literature that examines the relationship between everyday people and music, including examinations of the ways that people use music in their daily lives (for example, [10]).

Studies of musicologists echo similar studies of textual document users such as students, engineers, medical professionals, etc.—that is, people looking for 'serious' (factual) documents that will be used to satisfy a 'serious' (for example, work-related) information need. As people seeking music for recreational use are more likely to exhibit similar needs and behavior to people looking for recreational reading material rather than factual material, it appears likely that the body of research on library patrons searching for fiction (for example, [1]) will provide insights on music searching and browsing.

For many people the music store is their most significant source of music. Another potential source of insight into the music information needs of laypeople, then, is the research literature on shopping—particularly ethnographic studies of shopping behavior, as these offer highly detailed examinations of shoppers' motivations, requirements, and goals (for example, [4] and [9]). While relatively little of this literature focuses exclusively on music shopping, the general insights on recreational shopping for non-essential (luxury) items may help us to understand the motivations of searchers looking for music (whether to purchase from a store, to borrow from a library, or to download from an MIR system).

## 3. AND WHAT DO THEY WANT FROM US?

Where can we go to find authentic music information retrieval queries? Earlier studies of user queries have focused on usage of existing systems—for example, transaction log analysis of a library music collection [5] or a prototype QBH digital library [8]. These types of studies are limited in that they can let us examine a user's query after the information need has been forced to comply with the query interface of that system—the user's 'native' expression of that information need is not available. Fortunately, several rich sources of information needs descriptions exist. Perhaps the most easily harvestable descriptions are the

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information requests that abound on the WWW in music-related newsgroups, in websites, and in archives of mailing lists; at these sites music fans ask each other for help in locating music and express their requests in natural language, unfettered by query syntax or prescribed metadata types.

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From: XXXXXXXXX  
 Subject: Early 80's - Please identify this song! (it's \*very\* difficult, though)  
 Newsgroups: alt.music.lyrics  
 Date: 2000-12-14 09:42:24 PST

Hi,  
 this is so difficult because I only remember those damn FRAGMENTS of it, which can (in combination with possible errors) make it VERY difficult to identify this song!  
 But I'll try my best to make myself clear as possible.

This song MUST be from the period 1979-1984, most likely 1981 or 1982.  
 Tempo: about 120 bpm  
 Sounds VERY close to a SAGA or Asia tune (maybe it is SAGA even! ;)  
 OK here I go...(gonna add the chords for you guitarists out there ;)  
 [verse 1]

F C Bb Bb C  
 Crazy ..... onto the .... café  
 F C Bb  
 I'm drinking coffee, she came away  
 F C Bb Bb C  
 She ordered ..... precious sum of money  
 ???  
 F C Bb  
 deedeedeedeedeedeedeede...  
 C  
 Ohohohoo

[(instrumental) F C Bb Bb C F C Bb]

[verse 2] [...]  
 [chorus]

Dm Bb  
 Another da-----y, in the afternoon  
 Dm Bb(7)  
 my delight (?),  
 F/C C11  
 another da-----y, in the afternoon  
 F  
 my secret delight (?).

[verse 3] [...]  
 [BRIDGE] (b b b b)  
 Ab Eb Db  
 Ooooooh, watch out!  
 Ab Ab Eb Db  
 Someone better listen to him!  
 Ab Eb Db  
 [1st time] Ooooooh, watch out!  
 ???  
 [repeat bridge]

Ab Db Eb (b) F  
 [2nd time] ???? fantasy, yeah  
 Hope that's enough to identify this tune ... :)

**Figure 1. An information request posted to alt.music.lyrics**

As a sample, consider the plaintive request for help in locating a song, posted to the alt.music.lyrics Usenet newsgroup (Figure 1). The poster's request includes a rich set of query attributes: a (fuzzy) release date for the song, a tempo, a guess at the artist (which, even if incorrect, gives an indication of the sound that the desired song is similar to), fragments of the lyrics, and guitar chords. Analysis of information requests such as this can give us a better understanding of the types of attributes that MIR users are likely to want to specify when they describe their information need, and the precision with which people describe the various attributes, and the 'native' query terminology. For this newsgroup poster, a usable query system would permit dates to be specified in ranges, support partial (and fuzzy) matches on lyrics, permit browsing by artist or genre, and support a fuzzy QBH search.

These information requests have the further advantage of allowing us to see what the users want to find, rather than what they think that an IR system will give them. Searches over a formal IR system are often constrained by the user's pre-conception of what types of information or document formats are available—the user tailors requests (consciously or unconsciously) to what s/he thinks could be retrieved from that system. In contrast, people posting to Usenet newsgroups or fan-based websites recognize that their requests could literally retrieve anything—a desired fact, an opportunity to purchase a much-desired album, a pointer to an mp3 file, and so forth.

WWW documents are opportunistic sources for user studies, from which we can glean arbitrary amounts of data—but with varying degrees of comprehensiveness of query description, and of varying quality (for our purposes). As we identify specific target user groups for an MIR system, we can conduct qualitative information behavior studies for those groups, borrowing the techniques in common use for investigating the textual and oral information needs of various professions, organizations, and cultures [3].

Another interesting possible source of 'native' music seeking strategies is to study shopping strategies displayed in music stores, either online or in physical shops. A preliminary investigation of music shopping indicates that shoppers searching for music adopt markedly different strategies than library patrons searching for non-fiction (a common model for textual IR systems); for example, the shoppers exhibit browsing behavior more frequently than direct searching, they frequently rely on CD cover images to locate potentially interesting music, and they often adopt the monitoring information strategy (periodically perusing available music in order to keep up to date) [2].

#### 4. REFERENCES

- [1] Baker, S.L. A decade's worth of research on browsing fiction collections, in *Guiding the reader to the next book*, S.K. Shearer (ed.), New York: Neal-Schuman Publishers, 1996, 127-165.
- [2] Cunningham, S.J. What people do when they look for music: implications for the design of a music digital library, Working Paper, Department of Computer Science, University of Waikato, Hamilton, New Zealand, 2002.
- [3] Dervin, B., and Nilan, M., Information Needs and Uses, *Annual Review of Information Science and Technology (ARIST)*, 21 (1986), 3-33.

- [4] Falk, P., and Campbell, C, eds. *The Shopping Experience*, Sage Publications, New York, 1997.
- [5] Itoh, M., and Shukutoku, A. Subject search for music: quantitative analysis of access point selection, International Symposium on Music Information Retrieval, Plymouth, MA, USA, 2000, <http://ciir.cs.umass.edu/music2000/posters/itoh.pdf>.
- [6] Kornstadt, A. The JRing System for Computer-assisted musicological analysis, Proceedings of the International Symposium on Music Information Retrieval, Bloomington, IN, USA, 2001, 93-98.
- [7] McNab, R.J., Smith, L.A., Witten, I.H., Henderson, C.L., and Cunningham, S.J. "Towards the digital music library: tune retrieval from acoustic input". *Proceedings of Digital Libraries '96*, Bethesda (MD, USA), March 1996.
- [8] McPherson, J.R., and Bainbridge, D. (2001) "Usage of the MELDEX digital music library", Proceedings of the Second Annual International Symposium on Music Information Retrieval (Bloomington, IN, USA; October 15-17, 2001), pp. 19-20.
- [9] Miller, Daniel. *A theory of shopping*. Ithaca, NY, USA: Cornell University Press, 1998.
- [10] Williams, C. Does it really matter? Young people and popular music, *Popular Music* 20/2 (2001), 223-242.