

RETRIEVING MUSIC AND SOUND: THE INFLUENCE OF USER CREATIVITY ON EFFECTIVE DESIGN

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ABSTRACT

Methods of querying audio files pose a challenge to the design of the Music Information Retrieval (MIR) system. Input by humming, singing, keyboard playing, by musical sound excerpt, or by textual description are all ways in which a user may query a potential system. While this type of multimodal input may be comfortable for the musician, how does the non-musician interact with such a system? To accommodate the expert and non-expert in music, an interface effectively combining these various methods of retrieval is necessary and may be successfully created by including this target user group in the design process. This proposal suggests a study to include user input from inception through design, to determine if or how user participation influences an interactive system. Collecting user input for this experiment will utilize a new framework called *remote progressive feedback*. At the conclusion of the design stage, a usability study with a 'new' group of users will be conducted, comparing the user-authored design with a conventional benchmark system.

1. INTRODUCTION

MIR research techniques should be evaluated according to how well they satisfy the needs of the user community [4]. Methods of interfacing with stored data should match user expectations while supporting the various functions of retrieval, such as, musically expressed query formulation, searching and browsing capabilities, and the display of content.

Given the rapidly developing discipline of MIR and the challenges of expressing content-based music and sound searching, the design and development of an effective interface is an essential consideration. This proposal suggests a study to determine if user input from inception through design, influences suitability, functionality, and the efficiency of an interactive system.

Generally, the users of MIR systems have mixed expertise levels, ranging from limited knowledge of music to advanced musical training. Since little

research has been done on the information-seeking behavior of this diverse user group, with the majority of MIR studies that have been done focusing on the use of the system rather than the needs of the user [3], a study involving this target group in the design process may offer insight into user requirements, leading to advancement in supportive interface design.

By involving users in a form of participatory design, a direct collaborative action occurring throughout the design and decision-making stages of interface development is emphasized. Participatory design enables users to move out of the passive role of observers and into active roles as peer co-designers or design co-owners [1].

2. RESEARCH QUESTIONS

Augmenting design with creative user input may impact overall effectiveness, a relevant concern within the progressive domain of music and sound retrieval. This study will address the following questions. Does user involvement, from inception through design, positively affect the functionality of an interactive system? Overall, which query method is preferred by the user and how does this information impact system design? Does participatory design via remote feedback provide a suitable and efficient means of gathering design input from musicians and non-musicians? How does the user designed system compare to the conventional benchmark system?

3. METHODOLOGY

In order to answer these questions, a prototype system will be created using the input from a subject sampling of both experts and non-experts in music. Ten subjects will be recruited to aid in system design. The system will operate as an audio IR system using the 'query by humming' model, along with text query. Representative genres will include audio files of classical, pop, and rock music.

Supporting multimodal input, users may search and retrieve audio files by means of singing, humming, keyboard playing, by means of a sound excerpt, or by text queries. Text queries may contain descriptors such

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as ‘romantic’ or ‘happy’, as well as the standard bibliographic information of title, composer, and lyrics.

3.1. User and user input

This study regards user ‘creativity’ in the broad sense that each individual has the ability to ‘create’ something.

Although there have been attempts to characterize and define creativity [2], this experiment will consider the personal input of each user to represent the individual’s sense of design aesthetic.

The collecting of user input for the prototype system will utilize a new framework called *remote progressive feedback*. This method gathers contributions from the target user group at varying stages of the design process through remote feedback. Online feedback forms and self-reporting logs will serve as the instruments to facilitate the iterative user interaction and design improvement.

With ten subject recruits – five experts and five non-experts in music – each expert will be paired with a non-expert. There will be five teams in total. Team members will be asked for specific design input independent of the other teams. Subjects will be unaware of this pairing and therefore will also be unaware of their own team-mate’s response. A sample feedback form is listed in Table 1.

Team 1	<p>How would you rate the visual properties of the button sizes and labels? ___poor __OK ___good __very good ___excellent_____other (describe)</p> <p>Please identify any confusing terms in the space provided: _____ _____ _____</p>
Team 2	<p>Where would you position the chosen textbox? ___left, top___center, top___right,top _____other (describe)</p>

Table 1. Sample of team feedback form

A high-level online prototype will be used, that simulates what the user will see. The prototype will be interactive to a degree, providing some of the system functionality in its operation. Links for the evaluative measurements will be available on the prototype for user convenience.

While previous efforts involving anonymous remote users in system design elicited questions of credibility

[5], the experiment under consideration will draw background information from each user. This information will provide a suitable means of identifying and categorizing the user group, minimizing the amount of untrustworthy input. Further, this background information will help to assure the attainment of a representative sampling of music experts and non-experts.

3.2. Final testing

At the conclusion of the iterative design stage, further usability testing will be conducted to determine the influence of user creativity on effective design. A ‘new’ representative sampling of users will be selected for the final testing. Twenty subjects (musicians and non-musicians) will be recruited for this stage of evaluation. The usability aspects of both the user designed system and the conventional benchmark system will be tested by the well-defined techniques of Heuristic Evaluation, Cognitive Walk Through, and Think-Aloud Method [6]. The testing at this stage will be conducted in-person at a suitable usability laboratory.

4. SUMMARY

The goal of this experiment will be to determine the impact of user input on successful interface design. The value of obtaining collaborative input as part of an iterative design process will be explored, and a clear need for remote user input will be evaluated.

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