EXPLORING SOCIAL MUSIC BEHAVIOR:
AN INVESTIGATION OF MUSIC SELECTION AT PARTIES

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ABSTRACT

This paper builds an understanding how music is currently listened to by small (fewer than 10 individuals) to medium-sized (10 to 40 individuals) gatherings of people—how songs are chosen for playing, how the music fits in with other activities of group members, who supplies the music, the hardware/software that supports song selection and presentation. This fine-grained context emerges from a qualitative analysis of a rich set of participant observations and interviews focusing on the selection of songs to play at social gatherings. We suggest features for software to support music playing at parties.

1. INTRODUCTION

Our experience of music includes both individual and group settings. When music is heard in social situations [1] the question which follows is: who selects the music?

In this paper we explore issues of social music selection in the context of small private gatherings such as parties. The portability of digital music, on devices such as iPods, enables people to easily bring their own music but the selection of music to be played is largely based on the social roles of the participants. Ethnographic methods are used to understand these settings and so inform the design of systems for supporting shared music experiences.

Section 2 outlines previous work on social music systems. We then describe our methods and discuss the support provided by media players. Section 5 outlines the collaborative nature of music selection and we conclude by comparing our results with existing systems.

2. EXISTING SOCIAL MUSIC SYSTEMS

There is "little in the literature to suggest how to design new and unique tools that facilitate social music use within and between the different contexts in which people work, play, and otherwise live their lives" [2]. Rentfrow

and Gosling [3] show that music plays an important part in many peoples' lives. Music is a conversation topic, "individuals' music preferences convey consistent and accurate messages about their personalities" and music-genre stereotypes are used when forming opinions of others [3]. Further, "synchronized music consumption among people in physical proximity, as it happens in clubs or during parties, can create a strong emotional connection, more than what an asynchronous download of music over distance could provide" [4].

However, North et al. [1] note that a "lack of ecological validity" constrains much of the research on the social and psychological impact of music in everyday life. North et al. also report that their "data indicate that the great majority of listening episodes occurred in the presence of other people". Several systems have been designed to enhance this shared experience of music.

Several social music systems (e.g. SocialPlaylist [5], tunA [4], Push!Music [6]) use personal mobile technology, such as iPods, PDAs and mobile phones, reflecting the increasing portability of music collections [7]. Liu and Reimer [5] recommend that such systems provide smooth integration between personal and social modes, as inevitably users will occasionally prefer individual selections. In tests of Push!Music the "sharing of music became a prompt for social interaction, but this happened only between users who already knew each other and were socializing face-to-face" [6]. Nettamo et al. [8] note that even though mobile music is widespread, music in the home is often played via computers and that the "home PC acted as music hub".

An alternative to these person-to-person mobile forms of shared music is to allow voting or collaborative recommendation in public spaces. Deployment of the Jukola system [9] allowed users to express their musical preferences and this encouraged "debate, conversation and negotiation around music." [9]. Pering et al. [7] used interviews and observations of music in shared spaces to identify four key types of stakeholders: providers, contributors, proprietors, and listeners. Pering et al also note that the use of audio in shared spaces today may well soon be generalized to other media such as photos and video [7].

The MUSICtable system is designed for a further context of use, the "private social gathering" [10]:

> The user interface of the PC-based digital music player clearly does not support music selection by multiple people in a social situation. One manifesta-

tion…is…"separate party syndrome," wherein a small number of people tend to gather around the desktop computer … dominating the selection of music.

The PartyVote system [11] takes the voting concept from Jukola and applies it in small group situations such as parties. Both PartyVote and MUSICtable also include visualizations to provide awareness feedback to the voters. The Smart Party [12] reflects the preferences of users by dividing a party into several rooms, where each room's music adapts to the preferences of the people present, changing as guests move around the party. Bluemusic supports the same idea, personalization by being there, using Bluetooth from portable devices [13].

Many of these systems are designed without an obvious grounding in the detailed behavior of users with current music technology in social situations [2]. In this paper we investigate the use of music in these "private social gatherings" through ethnographic methods. We also compare our findings with those from other social music settings and consider the interaction between the setting, the users' roles, the technology and the resulting experience.

3. DATA GATHERING

Our research uses data collected in a third year university HCI course. The course focuses on qualitative and quantitative techniques for gaining an understanding of user needs, goals, and preferences, and using these insights to inform the user requirements and initial prototyping stages of a user-centered software development effort. This course adopts the 'practical approach' to incorporating ethnography into software design, as advocated by Randall et al. [14]. Students work individually over the semester to design and prototype a system based around the given focus application, where their designs are informed by a series of ethnographic investigations into behavior associated with the application domain.

In 2008, the students explored the problem of designing a system to support groups of people in selecting and playing music. They began by performing participant observations of social gatherings that included music, with the observations focusing on how the music is chosen for playing, how the music fits in with the other activities being conducted, who supplies the music, and how/who changes the songs or alters the volume. The students then explored subjective social music experiences through interviews, both of themselves ('auto-ethnographies' [15]) and of a friend. These interviews explored aspects of a social gathering that made it more, or less, likely for attendees to participate in selecting the songs, and the social factors that made attendees feel more, or less, comfortable in selecting and playing music. The students also critiqued the usefulness of existing systems for collaborative music selection and playing in social situations.

Thirty student investigators gathered ethnographic data (Table 1). The students were encouraged to construe 'social gathering' very broadly, and so performed participant observations in a variety of settings (including car trips, bars, café's, private homes, and religious institutions) and with a range of size (from two friends in a dormitory room to a hundreds at a rave). For this paper we focus on small- (10 or fewer attendees) and medium-sized gatherings (from 10 to 40 attendees), that are not professionally organized or occur in commercial settings (e.g., informal parties in student flats, birthday parties, a Friday night get-together, a computer gaming session, etc.). Music might be the primary focus of the event (e.g., a gathering to listen to a friend's new CDs) or be a part of the background (e.g., a quiet evening of conversation). This focus often shifts—a party may begin with a meal accompanied by soft music, move to louder music and dancing, and cycle back and forth through the evening.

A set of 43 participant observations met these criteria: 29 small- and 14 medium-sized gatherings. The observations lasted from a minimum of 15 minutes to a maximum of 4 hours, with an average of a little over 2 hours (113 minutes). A total of 88 interviews provided deeper interpretations of the observation experiences. In the following sections, the investigators are identified by a letter/number code (e.g., Participant K, Participant A2).

Table 1. Characteristics of student investigators

Male	Female	National Origin	Count
34	6	NZ/Australia	14
		China	9
		Mid-East	5
		Other	2

Grounded Theory methods [16] were used to analyze the student summaries of their participant observations, interviews, and system critiques. With Grounded Theory, the researchers attempt to generate theory from data, through an inductive analysis of the data. This present paper teases out the behaviors and social issues that influence how songs are selected for playing at parties.

4. MEDIA AND MUSIC PLAYER SUPPORT

The participant observations reference a staggering array of music media and players. While the majority of social gatherings were supported by digital media and players, as was expected, two included cassette tapes and several included 'old school' music CD players with only the rudimentary play, pause, and skip controls. The limitations imposed by cassettes and basic CD players are significant: it is not possible to browse through a cassette or a CD on a simple player; the songs must be played in the original sequence; both contain a limited number of songs, and skipping past songs that are disliked or that do not fit the developing atmosphere of the party further re-

duces the play time. Physically changing a cassette or CD introduces silences that may break the mood (though in practice it can be faster to physically swap out a CD than for an inexperienced user to wrestle with selecting songs using an unfamiliar piece of software).

An advantage of the cassette and simple CD player is that they can highlight musical knowledge or expertise in their owner. A carefully compiled party-themed mix cassette or mix CD can showcase the creator's ability to establish and sustain a mood—though at the cost of not being able to fine-tune the songs or their sequence of play as the event unfolds.

Portable MP3 players and computer–based music systems feature in the majority of gatherings reported in the participant observations, some quite elaborate (for example, [D] describes a setup in which 'the music was on a computer in another room and being streamed to the X-box 360 via a wireless network. The TV and X-box are connected to an amplifier that powers the surround speakers and the sub-woofer'). Similar home computer based music setups are described in [8]. The MP3 players, laptops, and portable hard drives can support extensive music collections, but is there ever enough storage space? ('Music was provided by me, but it was limited because I had a selection of songs on a 250GB hard drive …' [U]).

An MP3 player is not ideal as the primary device for selecting and playing songs; the limited physical controls (in particular, the lack of a keyboard) and the small or non-existent display ('the information you can see at one time is limited' [X]) make it difficult to search or browse through a collection to select songs. The larger display of a laptop or desktop computer affords music organization software that includes a larger set of searching and browsing facilities, but these more busy interfaces can be confusing to unfamiliar users. Further, there is no standard music organizer (Winamp, Windows Media Player, iTunes, and the command line MPlayer are mentioned in the participant observations and interviews), so the likelihood of a party-goer encountering an unfamiliar setup is high. As will be discussed in Section 5, fear of making mistakes while selecting music can deter people from participating in the selection of songs in a social situation.

5. COLLABORATIVE SELECTION OF MUSIC

We describe patterns in the social setting and expectations for playing, choosing, and changing music.

5.1 The Host, Guest of Honor, and Guests

A social gathering generally includes at least one Host (who may provide the venue and initiate implicit or explicit invitations, and who feels a sense of responsibility for creating an enjoyable occasion), and one or more Guests (attendees at the event). If music is a part of the event—and it commonly is—then the host can be ex-

pected to provide the initial stock of songs for a party and the hardware/software needed to play them. Choosing appropriate music is a significant responsibility: the set of songs played at an event and the order of play can have a dramatic impact on the atmosphere (Section N) of the event. Poor selection can have social repercussions: for example, Participant D reports of an interviewee that, '…she likes to host parties and have friends over and if they thort [sic] she had crap music or played crap music then they would not come over any more.'

Before the party, the Host creates the initial party playlist. This preparation may occur at the beginning of the party itself ([D]: 'me and one of the others spent about 30 min on the computer in the other room creating a play list of songs to be listened to'), or begin well in advance ([C]: "downloading music for the party a few days beforehand"). Frequently the playlist is crafted specifically for the event, but a Host may also develop a generic, reusable Party collection.

Sometimes Guests contribute to the party collection, beforehand or at the beginning of the party or as the party progresses--though the latter might be a bit of an insult to the host, as the unsolicited provision of supplemental music implies that the host's selections are not suitable ([D], of interviewee: 'if [the music at the party] 'sucked' then she would bring a CD or something so that she could change it.'). The Host is more likely to invite Guests to contribute songs to a party if the Host is unsure of their musical tastes or if it is a formal or commemorative occasion (for example, a 21st birthday party). The Host retains responsibility, however for selecting the final party playlist from the pool of contributions.

Some parties (eg, birthday) feature a special Guest. The Guest of Honor may or may not also be the Host, but the Guest of Honor assumes a similar role. Where the Host's song selections might be later altered by Guests (Section 5.2), the Guest of Honor's usually are not—changes to a Guest of Honor's playlist would constitute a more serious breach of party protocol. For example, Participant G reports, 'The music was selected by one person only, throughout the entire night. This person was the birthday girl. … The ipod was sitting on the stereo during the party, but it was made clear that nobody else was to adjust the music, except for the birthday girl.'

5.2 The Invitation

The Host normally assumes initial control over the music selection; as the event progresses, the Host may maintain control throughout the occasion, or may pass control to others. Permission to alter the gathering's playlist is passed through The Invitation: the Host explicitly or implicitly invites others to browse available collections and select songs. A Host might overtly encourage Guests to add, delete, or re-order songs on the playlist ('As host I will always make a short play list, long enough to last un-

til most people arrive, then encourage anyone who comments on the music to change it.' [X]), or might more subtly indicate that alterations are acceptable by leaving the control to the music playing device in an easily accessible spot.

5.3 Maintaining the Atmosphere

While music is generally not the main focus for the gatherings described in the participant observations, it was an integral part of the occasions. Awareness of the music naturally ebbs and flows. When conversation flags, Guests are more attentive to the songs playing (music 'is there because during the breaks when people are not talking, the atmosphere feels awfully quiet so music helps lighten the mood' [K]). A song can spark new conversation by serving as a reminder of earlier occasions ('Participant A mentioned on more than one occasion a song's significance in his life, e.g. "When I was at school we used to play this song on our stereos at lunchtime"' [L]). Guests frequently show an interest in discussing unfamiliar songs (eg, [L] reports that Guests would 'occasionally ask questions or make comments about a certain song like, "who sings this song, I really like it" or "we should get this song"'). An interest in learning more about new music is expected given that the music was selected in anticipation that it matches the Guests' tastes.

A common pattern is for a gathering to begin with quieter or less obtrusive music during an initial 'socializing' phase, move to 'faster, louder and less organized' [A] songs, and then end the evening with 'chilling out' music. A skilled Host monitors the Guests' interest in the music and its affect on the gathering's ambiance, and modifies the music when necessary to create or enhance the appropriate atmosphere ('During the night there were a number of situations where the music and the mood needed to change' [I]).

5.4 Skipping, Sampling, Searching, and Browsing

Changes to the party playlist are of two types: deletion of undesirable songs and insertion of new songs. The usual case for deletion is to stop the current song that is playing and move to another song—*skipping*. The simplest strategy for choosing a replacement song is simply to skip sequentially through the playlist, playing a few moments of each song (*sampling*) until an acceptable one is encountered. The audio effect is less than ideal, given the abrupt ends of skipped songs, but one benefit for the user is that the interaction is selecting a new song involves simply clicking a single 'next song' button. Skipping is also the strategy of choice for Guests who are unfamiliar with the unfamiliar with the searching/browsing facilities of the music software ('…people will feel uncomfortable [if they] stand in front of the computer for a long time, while they are finding the music they want to listen [to]' [T]), and/or Guests who do not want to expose their ignorance of the gathering's preferred music genres:

> '…when I get told [to] change the music I will simply skip enough songs until I find an improvement … For me this is mostly because I do not

remember song names or even mainstream artists. If I have to chose music I have to resort to one of the limited number of artists I know or pick randomly.' [X]

Sampling may also occur outside the context of skipping, when a Guest or Host attempts to identify desirable songs from a pool of potential additions to the party playlist. If the individual cannot identify songs by the available metadata, then a 'good' sample is needed to decide whether to include a song on the playlist (where 'good' probably includes the chorus or other characteristic section of the song, rather than the beginning; 'often they want to skip to the chorus of a song to find out if it is the song they actually want' [G]).

Searching and *browsing* to select songs are more rarely reported in the participant observations than skipping and sampling. Searching for a specific song requires some confidence that that song is actually accessible, and possibly knowledge of its approximate location on the physical device ('Participant B requested that another song she knew to be on the laptop be played. Participant A then queued up the requested song (which resided in a different directory)' [L]). Effective browsing (in the absence of sampling) require a deep familiarity with the specific songs in the collection: [X] reports of one successful browser that 'he has a much broader knowledge [of music] … he is able to scroll through large number of music titles and understand what many of them sound like based on the artist and title given and decide if they would be appropriate.'

6. SUPPORTING SOCIAL MUSIC USE

The specific music organization and selection software mentioned in the participant observations and interviews include Winamp, Windows Media Player, iTunes, and the command line MPlayer. Given that music is frequently an integral part of social, festive occasions, it is surprising that only iTunes avoids a clinical, 'somewhat dark' [X] appearance. It seems appropriate that interfaces should enhance the enjoyment and entertainment that people experience when listening to music and interacting with music collections—interfaces should be attractive and playful, appropriate to an enjoyable social gathering.

Existing music organization software was found to be adequate for supporting the Host in developing the initial party playlist—which is not surprising, given that the Host is usually interacting with his/her personal system and music collection. Difficulties arise when Guests or multiple Hosts contribute to the pre-party development of the initial party playlist (Section 5.1). Songs arrive on a variety of media (flash drives, MP3 players, CDs, external hard drives, downloaded from the Web), and in transferring them to the Host's system it is easy to lose metadata (artist, title, genre, etc.) or to discover that metadata values and schemes are incompatible (particularly genre). Better support is needed for creating a pool from multiple

sources, and integrating them into a single (possibly ephemeral) collection.

As contributions are pooled, event-specific information is easily lost (eg, who contributed a song, which party Guests it might appeal to, and so forth)—further stressing the Host as s/he makes the final decisions on which songs to eliminate. Additional support for merging contributions into a draft playlist would be welcome—perhaps by encouraging contributing Guests to annotate groups of songs with a justification for its inclusion (for example, whether the songs have a strong beat for dancing, are suitable for chilling out at the end of the evening, etc.). An annotation facility is particularly important because inclusion criteria can be complex, idiosyncratic, and not well-matched to conventional metadata; eg, songs 'that a lot of people would know so they would sing along' [D], or songs suitable for both high school age and 'old(er) guests' [I]. It could be helpful to allow pre-party contributors to view the draft playlist and cast votes for the retention / deletion of songs, with the Host retaining ultimate responsibility for setting the initial playlist.

Creating the initial party playlist requires a great deal of insight into the musical tastes of the Guests and the anticipated atmosphere of the party, and a great deal of skill to match those to the available songs. It is difficult to see how this can be automated effectively. Smart Party [12], for example, automatically builds playlists from party attendees' personal music devices—a strategy that initially appears reasonable. But music in personal collections may not be suitable for public listening. An earlier study reports that subsets of a personal collection may represent 'guilty pleasures' (music that does not fit the public persona of the collection owner) [17], and it could be awkward to have those songs appear in a public party playlist. More fundamentally, personal favorites may not be suitable for a given social occasion: 'music in a group situation that is good for that occasion can be vastly different than music I would usually listen to normally. … music that is listened to with other people and when you are less focused on it can be different to your usual tastes or that you will put up with it even if you don't like it that much to not distance yourself from the group you are with.' [R]

Voting systems such as Jukola [9] and Party Vote [11] may finesse the potential social minefields of correctly interpreting when The Invitation has been given (Section 5.2), by providing an impartial mechanism for suggesting alterations to the music lineup without offending the Host (Section 5.1), and generally foiling 'pushy people, someone who just plays their own music and wont [sic] take any consideration for others' [E]. These systems, like the old-fashioned jukeboxes they derive from, clearly give permission to choose music—that is their primary function. [F] explicitly makes this connection, commenting that he particularly likes jukeboxes because 'the fact that the whole system is set up just so party goers can select

music made me feel totally comfortable with using it to select the music I wanted to hear.'

As social gatherings are an opportunity to be exposed to new music (Section 5.3), it should be easy for Guests to access further information about the songs that are played. At a minimum this should include an easy-to-read screen that features basic song metadata (artist, title), with access to more detailed records (eg, lyrics, genre, 'maybe a little trivia associated with the song/artist' [L]). A few participant observations report Guests attempting to use the party's music software to learn more about a song, but an inexpert user can too easily select a song to play when intending to view its metadata ('This would cause people to get annoyed as they would be listening to a song and then someone would skip to a different one part way through [D]). Ideally there would be a clear differentiation between the interface elements that support playing music and those elements that support browsing/searching collections.

The skipping strategy for moving past songs that are disliked or that are inappropriate to the gathering's mood can itself disrupt the party's atmosphere; it is annoying and disconcerting for the song to stop abruptly ('People will have a notice when the song was changed in the middle…' [T]). The availability of a crossfade effect to smooth song transition would not completely solve the problem, but would be an improvement.

Sampling, or listening to brief portions of a song to make a play / no play decision (Section 5.4), could be made more efficient by allowing the user to skip to the chorus or other readily identifiable song extract (e.g., [18]). Alternatively, though aurally not as satisfactory, the system could support skimming through a song by increasing the speed of play ('allows them to quickly listen to the feature of the song' [P]).

A common scenario for sampling involves using it to build up a sequence of songs to play. But for the music management software encountered in the participant observations, it was difficult to 'stack' selections, so the person choosing plays samples until a single acceptable song is identifies; that plays, and then sampling begins again. If this occurs during the party, the mood can be significantly disrupted. Ideally, the user would be able 'to (privately) listen to previews of songs, … to make informed decisions on the music they select' [L], similar to the 'previewing' of tracks in professional DJ software.

Effectively supporting music searching and browsing (Section 5.4) remains an open research problem. Several student investigators suggested the inclusion of lyrics metadata would be the simplest and most straightforward way to support both direct search and browsing (by allowing the user to 'skim' a song without hearing the audio). Lyrics would also be helpful for gathering attendees who wished to sing along to the music.

The clearest directive that emerged from the participant observations was the importance of a simple, clean interface design, preferably with large, clearly labeled controls whose operation do not require fine motor movements. Interaction sequences should be brief and each step in a sequence should be clearly signaled, in large font ('normally the University student would absolutely drink beer while having a party' [Y]).

7. CONCLUSIONS

This study presents a rich picture of collaborative music selection among a large group of (primarily) university students in New Zealand. As such, the insights gained must be treated cautiously—a logical next step is to 'triangulate' through further studies involving participants with different backgrounds.

The environmental conditions revealed in the party observations differ significantly from the austere, controlled environment of a usability laboratory—and so lab testing would be likely to miss significant issues. Testing of a collaborative music system should occur in authentic environments and real social situations, to ensure that the interface is usable with, for example, limited lighting, a noisy setting, and intoxicated users.

8. REFERENCES

[1] A.C. North, D.J. Hargreaves, J.J. Hargreaves: "Uses of Music in Everyday Life," *Music Perception*, Vol. 22 No.1, pp. 41–77, 2004.

[2] F. Bentley, C. Metcalf, G. Harboe: "Personal vs. commercial content: the similarities between consumer use of photos and music," *Procs of CHI '06*, pp. 667-676, 2006.

[3] P.J. Rentfrow, S.D. Gosling: "Message in a Ballad: The Role of Music Preferences in Interpersonal Perception," *Psychological Science* Vol. 17 No. 3, pp. 236-242, 2006.

[4] A. Bassoli, J. Moore, S. Agamanolis.: "tunA: socialising music sharing on the move," In K. O'Hara and B. Brown (Eds), *Consuming Music Together: Social and Collaborative Aspects of Music Consumption Technologies*, Dordrecht: Springer, pp. 151-172, 2006.

[5] K. Liu, R.A. Reimer: "Social playlist: enabling touch points and enriching ongoing relationships through collaborative mobile music listening," *Procs of MobileHCI '08*, pp. 403-406, 2008.

[6] M. Håkansson, M. Rost, L.E. Holmquist: "Gifts from friends and strangers: a study of mobile music sharing," *Procs of ECSCW'07*, pp. 311-330, 2007.

[7] T. Pering, R. Want, L. Gardere, K. Vadas, E. Welbourne: "Musicology: Bringing Personal Music into Shared Spaces," *Procs of Fourth Annual International Conference on Mobile and Ubiquitous Systems (MobiQuitous 2007),* pp.1-8, 2007.

[8] E. Nettamo, M. Nirhamo, J. Häkkilä : "A cross-cultural study of mobile music: retrieval, management and consumption," *Proceedings of the 18th Australia Conference on Computer-Human Interaction (OZCHI '06)*, pp. 87-94, 2006.

[9] K. O'Hara, M. Lipson, M. Jansen, A. Unger, H. Jeffries, P. Macer: "Distributing the Process of Music Choice in Public Spaces," In K. O'Hara and B. Brown (Eds), *Consuming Music Together: Social and Collaborative Aspects of Music Consumption Technologies*, Dordrecht: Springer, pp. 87-109, 2006.

[10] I. Stavness, J. Gluck, L. Vilhan, S. Fels: "The MUSICtable: A Map-based Ubiquitous System for Social Interaction with a Digital Music Collection," *Procs of International Conference on Entertainment Computing (ICEC05),* pp. 291-302, 2005.

[11] D. Sprague, F. Wu, M. Tory: "Music selection using the PartyVote democratic jukebox," *Procs of AVI '08*, pp. 433-436, 2008.

[12] K. Eustice, V. Ramakrishna, N. Nam, P. Reiher: "The Smart Party: A Personalized Location-Aware Multimedia Experience," *Procs of the 5th IEEE Consumer Communications and Networking Conference (CCNC 2008),* pp.873-877, 2008.

[13] H. Mahato, D. Kern, P. Holleis, A. Schmidt: "Implicit personalization of public environments using Bluetooth," *Extended Abstracts of CHI '08*, pp. 3093-3098. 2008.

[14] Randall, D., Harper, R., Rouncefield, M.: Fieldwork and Ethnography: A perspective from CSCW, *Proceedings of EPIC 2005*, pp. 81-99, 2005.

[15] Cunningham, S.J., Jones, M.: "Autoethnography: a tool for practice and education," *Procs of the 6th New Zealand Int. Conf. on Computer-Human Interaction (CHINZ 2005)*, pp. 1-8, 2005.

[16] Glaser, B., and Strauss, A.: *The Discovery of Grounded Theory: Strategies for Qualitative Research*, Chicago, 1967.

[17] Cunningham, S.J., Jones, M., and Jones, S.: "Organizing digital music for use: an examination of personal music collections". *Procs of the ISMIR04*, Barcelona (October 2004), pp. 447-454, 2004.

[18] Goto, M.: A chorus section detection method for musical audio signals and its application to a music listening station. *IEEE Trans on Audio, Speech, and Language Processing*, 14(5), pp. 1783-1794, 2006