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# Sharing Encounters and Music on the Move

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**Abstract**

We present Push!Music, a mobile music player with wireless ad hoc sharing possibilities, and report on some preliminary results from two studies. We further highlight a number of issues concerning shared encounters that we have seen in our work so far.

**Keywords**

Mobile music sharing, ad hoc, shared encounters

**Introduction**

Mobile and ubiquitous networking technologies provide new opportunities to design for enhanced shared encounters between users (and indirectly, devices). In mobile systems using wireless ad hoc networking, a shared encounter could be a 'precondition' for peer-to-peer content sharing or other actions. However, such encounters can take very different forms: from face-to-face (seeing someone, bumping into someone, etc) to seeing that someone is 'connected', i.e. somewhere within the WiFi/Bluetooth range (but perhaps out of sight.) Since these technologies are relatively new and therefore still challenging to study in large-scale studies in real life, it is an on-going process to learn about how we can design for shared encounters and how they can be visible to and understood by users. We here present *Push!Music* ([www.viktoria.se/fal/projects/music](http://www.viktoria.se/fal/projects/music)), a

mobile ad hoc music sharing application, and talk about some results from two consecutive user studies of Push!Music. We then highlight a number of issues concerning shared encounters that we have come across in our work so far.

Push!Music is a mobile music player with ad hoc wireless sharing capabilities that allows music to be shared between users who are in the vicinity of each other [2, 3]. The sharing can be done in two different ways: users can *directly send* songs to other nearby users as personal recommendations, and secondly, songs can *autonomously copy and recommend themselves* to other nearby players (users). With Push!Music, we want to explore what would happen if we could share music with and recommend music to the people we meet in everyday life. It is thus designed to make music sharing possible when users are *on the move*, to open up for making the previously so personal mobile music listening more *social*, and to provide users with new music as *inspiration*. In Push!Music, shared encounters are not *explicitly* designed for, but as users meet other users, these encounters are there, as an intrinsic feature of the system, and can be explored if wanted.

tunA [1] and SoundPryer [4] are two similar systems to Push!Music that also support mobile ad hoc music sharing. In tunA, users can *actively* tune in to eavesdrop on the playlists of nearby users and listen to the same music in a synchronised way (music is streamed, not copied). SoundPryer allows for a similar eavesdropping to happen but between car stereos instead. Drivers can therefore suddenly hear the music that is being played in an approaching car. Users do not

actively choose which cars to tune in to: this happens automatically.

### **The Push!Music Prototype**

The application currently runs on PDAs and uses WiFi (802.11b/g) to communicate in an ad hoc manner between peers [3]. Push!Music has a playlist, basic playback functions and a rating function, where users can optionally rate songs. It further provides users with a list of currently connected and nearby users (listed by nicknames) and an overview of the status of any ongoing song transfers. Any song that is copied to a player will appear as next song to be played in the playlist. While a song is playing, the most recent 'owners' of that song are displayed in the interface.

To enable the autonomous recommendations between players, we have developed a concept called '*media agents*'. A media agent is an augmented MP3-file that consists of 1) the MP3-file itself (i.e. a song) and 2) a data file that contains contextual information about that song. What ever happens to a song is saved as implicit tagging in its accompanying data file: if the song is played often or seldom, what ratings it has, in which music context (playlist) it is played, if the 'owner' personally recommends it to other users, etc. The media agents then use this information to compare with other agents when they recommend themselves. An autonomous recommendation is primarily done to other nearby players that have a similar listening history (but not already a copy of this particular song.)

### **Studies of Push!Music**

We have conducted two consecutive qualitative studies of Push!Music to learn more about mobile ad hoc music sharing among people. The first study ran for two

weeks and involved five male friends who met daily at a local university [2]. The second study ran for three weeks, involved 13 participants (4 women, 9 men; all students at the same university) and had a different set-up: people were recruited in such a way that they knew a few but not all participants. In the second study, which currently is being analysed, we thus also wanted to learn about the personal sharing of music between users who are unknown to each other: does it exist and if yes, what are the motivations for sharing music with people you encounter but do not know? Below we briefly present some results from the studies.

Overall, both studies showed that users appreciated receiving music in this way, and that getting songs unexpectedly could even be compared to receiving small 'treats' [2]. Using Push!Music did not necessarily involve listening to music. They also turned their players on and put them aside while concentrating on other things: "... *you put it there and thought it could exchange music and then when you looked at it you would perhaps have got something... or you had sent something...*"

In the first study, we noticed two different motivations for pushing a song to another user: *dissemination* (the sender liked a song and wanted others to hear it as well) and *recommendation* (the sender sent a song that he believed the receiver would appreciate.) A third motivation was noticed in the second study, namely that of pushing a song as a "Hello, I'm here"-message to an unknown user nearby. This was sometimes done in combination with dissemination, since the sender was likely to choose a song that he/she liked and wanted others to hear.

Both studies further showed that users frequently and happily monitored their PDAs to keep track of songs that were moving between devices and/or users that were nearby and connected. When friends were around, this information was often discussed as well: what was going on, who received a certain song, who could that unknown user be, etc.

What kind of shared encounters took then place when using Push!Music? Running into a friend could mean pushing a song and then straightforwardly approach the friend and explicitly tell that he/she had just got a new song. This could further invite a comment or a discussion about the music being shared. Discovering that someone unknown was nearby (which they would see in their Push!Music player) could trigger users to push a song as a "Hello, I'm here"-message. Seeing someone "online" was very intriguing, but since the participants were shown in the application using nicknames only, it was not easy to figure out who these unknown users were in real life. Encountering someone unknown on a more regular basis was even more intriguing and leading to trying to figure out who the other person could be. Since the participants sometimes used Push!Music without listening to it, they also received songs without noticing them directly. In this way, the *result* of a shared encounter (i.e. the shared music) made them aware of the occasion after it had happened: "...*one time the song started playing when I was riding the bus and I had received it the day before without noticing it and then I heard it, and it was fun...*"

### Shared Encounters in Push!Music

In our work so far on Push!Music, we have run into a number of different issues concerning shared encounters. The list of examples below is not exclusive but point at some things we would like to continue exploring in the future:

**Technical.** An encounter can be a second or as long as it takes to have a coffee at a coffee shop... How to design for shared encounters that make sense to users? How to design these applications so that they “know” when something could be shared and when not because the encounter is too brief? How could this be done in a robust way with the mobile ad hoc technology at hand? How could interruptions in the sharing (because of instable networks or simply highly mobile users) be dealt with technically?

**Methodological.** How could mobile prototypes like Push!Music be studied in everyday situations? How

should these studies be designed so that participants can naturally and spontaneously encounter each other? How to deal with important factors such as mobility of users and critical mass?

**Social.** In our studies we learnt that users did not always use Push!Music as a listening device but also as a tool to “harvest” new music that could be listened to later on a more suitable occasion. In this way, the shared encounters were not always immediately visible, but the result of them was (the shared music) afterwards. Furthermore, an encounter in real life (seeing someone, bumping into someone, etc) is different from seeing that someone is somewhere within the WiFi range (but perhaps out of sight.) Thus, for users of systems like Push!Music, what is a ‘sensible’ shared encounter? Should these be designed for more explicitly? With privacy issues in mind, what would people be willing to share in such encounters?

### References

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