

# BluetunA: music sharing through mobile phones

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## Abstract

BluetunA represents a follow up of the tunA project, originally developed at Media Lab Europe. tunA was a pioneer system in the field of mobile music technology, combining aspects of music sharing on the move and mutual awareness of people in physical proximity. Drawing from the experience of design, implementation and evaluation of tunA, we suggest now the development of a new application that will run on the most recent Bluetooth-enabled mobile phones. BluetunA will allow users to share playlists, stream songs and communicate over Bluetooth. In addition to this, BluetunA will help people in finding others with similar tastes in music through a profile-matching system, and it will enable users to purchase songs via their mobile phone.

## Keywords

Mobile music, peer-to-peer sharing, profile-matching.

## Introduction

The future is now. Almost three years after tunA was first conceived mobile music sharing is ready to become a reality. At Media Lab Europe with tunA [1] we explored the possibilities of a system which enables people to share their music and to communicate with others nearby while they are on the go. The main questions the project addressed were the following: can the Walkman become a social experience? and can anyone become a mobile radio station? The increasing miniaturization of computational devices and the recent development of short-range wireless technologies has allowed for the creation of a second generation of portable music player. The isolating experience of listening to music on the move was enhanced by adding awareness of other music listeners in physical proximity. However, we still face the lack of a clearly ideal platform for the development of such an application. After numerous discussions we decided to implement tunA on WiFi-enabled PDAs, the H4150 version of HP iPaqs. As it

was designed and prototyped, tunA consists of an mp3 player that can be also be used to browse other users in WiFi range, access information about them and their playlists, and connect to their devices to listen to the same song in a synchronized way. tunA can also be used to bookmark songs and users' profiles, and it provides instant messaging functions, in order to encourage the start of virtual communications that can lead to face-to-face ones because of the proximity of users. While tunA has received good press coverage, especially within the computer science and HCI communities, it has not yet developed into a tool suitable for actual use. Apart from the need to further test the stability of the technology used (such as service discovery and streaming via Wi-Fi), PDAs appear not to be the ideal platform to achieve mass penetration. As it was shown by the tunA evaluation that we conducted at a local college in Dublin, people need to know that others are using the application before deciding to invest in the technology. According to the students who used tunA, while the application seemed fun and interesting, the use of PDAs turned out to be a difficult experience, because of the fragility of the device. PDAs are in fact mostly used by business people to organize their calendars and keep their contacts, but not as a popular consumer technology to run multimedia applications.

## Related work

tunA is not the only example of a research project related to mobile music. SoundPryer [2] for instance is an ad hoc system developed on WiFi-enabled PDAs that works as a car radio allowing users to listen to music coming from other cars. Push!music [3] is also a software developed on PDAs, which focuses on the concept of 'media ecology', using agents to make songs migrate from one device to another in accordance to users' music consumption habits. In the commercial domain, Nokia recently conducted a trial in which coffee shops offered streaming music for users' mobile phones via Bluetooth. Finally, the Potato System, which has introduced a new model for buying and re-distributing music online, has developed a music messenger for mobile phones, through which users can also pre-listen to songs owned by other Potato System users. However, the features of this system are not described in details.

## BluetunA

Following the results of tunA's user study and considering the opportunities presented by technological progress we decided to implement a new version of the software for Bluetooth-enabled mobile phones. The project is still at a conceptual level. Just as tunA did, BluetunA will allow users to listen to their own mp3s, create a personal profile and browse the list of other users in Bluetooth range. Envisioning a scenario where a high density of people will use the application, we decided to give the users the choice of adopting an active or passive attitude for browsing the music available in the network, expanding on tunA which only supported active browsing of others' playlists. In addition to this, BluetunA will allow users to see to what extent others' music profiles matches theirs, and if there are songs in the network that might be of interest to them. While tunA allows users only to listen to the songs that are currently being played by others within the network, BluetunA will also let users preview other songs in people's playlists. As it was confirmed by our user study, individuals might want to send each other messages commenting on the music they share. Similar to tunA, BluetunA will give the possibility to users to send SMS to each other via Bluetooth. Another new feature that people could appreciate, according to our study, is the ability to check how many users are connected to others at any given time. It is likely that this awareness will influence the usage of the application. Because of the dynamic aspects of the network formation, having the possibility to bookmark songs and users seems a helpful feature to keep.

Finally, tunA was lacking consists a proper business model. Despite the fact that the system only performs music streaming within a local network, like iTunes does, the act of sharing music in certain ways can infringe on copyright law; a possible solution could be a cooperative business model that still financially supports artists, producers and distributors. BluetunA will therefore allow users to buy the songs they have previously bookmarked via their mobile phone.

### Music Profile matching

Sharing musical taste is a well-known impetus for social interaction between like-minded people. From a research point of view the development of musical taste is a lifelong process. In [6] we have built a personal recommendation system taking such background knowledge into account. Within BluetunA, our starting point is the fact that people store MP3s and playlists representing their current preference on their mobile phones. It is possible to use such profiles to compute similarity metrics either by using the audio content or by relying on the ID3 tags which offer metadata about the artist, album, song and genre. We will start to apply the distance or similarity metrics which have been introduced in Music Information Retrieval (MIR) to compute the similarity between to songs. Such metrics have

to be expanded in order to aggregate the one-by-one confidence values into meaningful results on entire sets [5, 6]. For the moment it is questionable if the processing power of cellular phones is sufficient to perform these tasks in an ad-hoc network. As a consequence we have to consider batch strategies using idle times. Furthermore the trade-off between the limited Bluetooth bandwidth and the size of the profiles must be considered. For playlists with a few dozen songs the problem is manageable, but scalability must be considered for ambitious future computation on large-scale lifetime collections.

### Implementation

Details of the BluetunA interface and implementation have not been defined at this stage. Nevertheless, initial ideas have been discussed. There are currently two models of mobile phones that have been specifically designed for music consumption: the Motorola ROKR, running a version of iTunes, and the Sony Ericsson Walkman. The latter seems to be an ideal platform for BluetunA, as it comes with a 512Mb memory stick, it presents a functional and aesthetically satisfying user interface and it provides support for the development of music applications (Mobile Media API). However, because of the smaller size of the screen, changes will have to be made to the original tunA interface. And finally, although research is being done on music streaming via Bluetooth, further investigation on the technical feasibility of this project will also have to take place.

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### References

1. Bassoli, A., Moore, J. and Agamanolis, S. (2005), *tunA: Socialising Music Sharing on the Move*, in K. O'Hara and B. Brown (Eds.), *Consuming Music Together*, pp 151-172.
2. Håkansson, M., Jacobsson, M. and Holmquist, L.E. (2005) *Designing a Mobile Music Sharing System Based on Emergent Properties*. In Proceedings of AMT 2005, Takamatsu, Japan.
3. Östergren, M. and Juhlin, O. (2005), *Car Drivers Using Sound Pryer-Joint Music Listening in Traffic Encounters*, in K. O'Hara and B. Brown (Eds.), *Consuming Music Together* pp 173-190.
4. Baumann, S. (2005), "Artificial Listening Systems", *Ph.D Thesis, German Research Center for AI*.
5. Logan, B. (2004) "Music Recommendation from Song Sets", *Proc. of the ISMIR2004*, Barcelona, Spain.
6. Pohle, T. (2004) "Extraction of Audio Descriptors and their Evaluation in Music Classification Tasks", *Diploma Thesis, ÖFAI/German Research Center for AI*, 2004.

