

The Adaptive Song Selector

Context class MAS.965 final project proposal
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The AAJ is based on two goals:

1. Background music as ambient information carrier in a public space
2. Adaptive song selection, based on overlapping music preferences of present listeners

1. Background music as ambient information carrier in a public space

The primary idea is that music is played in the background, trying to deliver information without interrupting normal people's activities in public spaces. To achieve that, specific songs are mapped to specific information. This can be either:

- personal information, like weather forecasts and email alerts, specific for one user, or
- public information, like food alerts (kitchen food cam), relevant for everybody.

A certain song gets played to notify one user or the whole community of a certain event or piece of information. The mapping of song to information has to be done beforehand by each user.

Example mapping table of a specific user

<i>Song name</i>	<i>Meaning</i>
It's raining again	If weather forecasts announce rain tomorrow
Living la vida loca	Demo in calendar for tomorrow
Highway to hell	Email from my advisor
etc.	

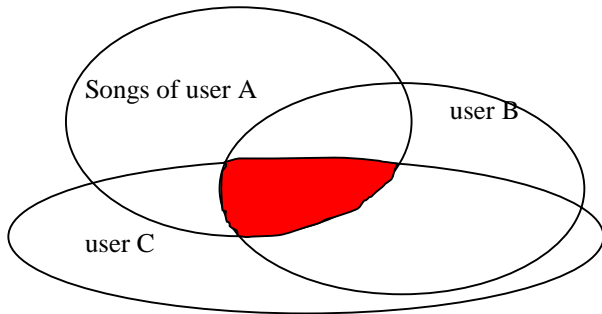
This mapping is done preferably via a Web interface.

2. Jukebox adapts to user presence and their preferred music

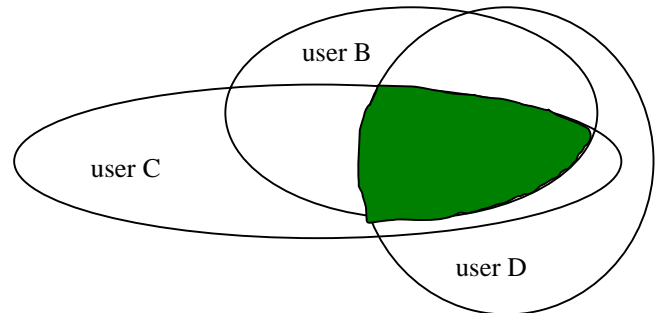
It plays the music that matches the preferences of all present users in a given area.

The users are sensed dynamically by looking at login information. Then their current MP3 collection is loaded and merged to form a play list that consists of songs that are overlapping among the users present. The jukebox dynamically adapts the play list by taking into account users that move in and out of certain public space. The jukebox would be monitoring other information sources or receiving notification from other information sources and when a certain event occurs for a present user, the special song corresponding to that event would be played to notify the user. Only that user will know about the specific event that occurred since the user mapped it to that event.

Example: Situation in a given area at two different times: on the left side, users A, B, and C are present. The AAJ chooses from songs of their overlapping preferences (red area). On the right side, at some time later, user C has left the area (logged out of the machine in this area), but user D arrived with a different set of preferences. The set of songs that can be possibly played changes to the green area.



Red area: most preferred songs when users A, B, and C are present



Green area: most preferred songs when users A, B, and D are present

Required elements

- Spaces with distinctive music environments where multiple people work, e.g., 2 - 4 person offices, open office areas like Garden or Cube. Each of them has their own sound system. The music is played either from a local MP3 jukebox player, or as streaming audio over IP.
- Each user has her MP3 files in a publicly available Web directory.
- User sensing: who is present in a certain area. Options:
 - ❖ login information (from UNIX finger info and possibly a Windows network utility)
 - ❖ wireless LAN transceiver information (mapping wireless LAN info to certain locations)
 - ❖ any kind of active badges or IR beacons
- Explicit user profiling. User will be asked to provide the following data via a Web site
 - ❖ Where are your MP3 files? They have to be publicly accessible.
 - ❖ Mapping between certain songs and certain information sources. E.g., user is presented with the list of her MP3 files and asked which song means what alert.
- Location profiling: which computer is where (in which audio environment).
- Access to external public information sources, like weather forecasts
- Possibly access to external private information sources, like email (for email alerts)

Integration of the two goals

The jukebox plays primarily the songs that match most of the users preferences. Additionally, it occasionally plays certain songs that might be only part of one user's list if a certain event occurs and this user has to be notified with this special song.

Note that if only one user is present in a given area, the jukebox would simply select the songs of this user only. It would play all of them, except the "notifier" songs, which are played only when the specified event occurs.

Note also that in the special case that a "notifier" song happens to be part of the matching songs of a current set of users, the system would ignore it and would play this specific song only when the corresponding event occurs.

Future work

- From the song names, the system could extrapolate to the artists and music genres by looking up information on the Web to increase intersecting music matches. It would therefore first match song names; but if there are not enough matches, it would also find matching artists and play back their songs preferably. If there are also not enough matching artists, it could try to find matching music genres and play back songs of these genres.
- If the playlists of a set of present users are too small and contain not enough overlapping songs, the system could retrieve additional songs from the Web based on preferred artists and genres of the present users.
- Since the music is intended to be background music, each song is automatically checked first for its overall energy level by analyzing the power spectrum of the MP3 file, and the volume levels are adjusted automatically. Furthermore, the BPM (beats per minute) is measured. Based on this information, if a song appears to be too distracting (e.g. "violent"), it might be ignored for public playback.
- Taking in account that users have different amounts of MP3 files, the system could ask users with huge amounts of MP3 music to specify the most current songs, or measure which songs the user played back himself recently. Additionally, users with very few MP3 files might be given the opportunity to further specify their musical preferences manually by specifying, either songs, artists, or genres.