COUPLING SOCIAL NETWORK SERVICES AND SUPPORT FOR ONLINE COMMUNITIES IN CODES ENVIRONMENT

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ABSTRACT

In recent years, our research group has been investigating the use of computing technology to support novice-oriented computer-based musical activities. CODES (Cooperative Music Prototyping Design) is a Web-based environment designed to allow novice users to create musical prototypes through combining basic sound patterns.

This paper shows how CODES has been changed to provide support to some concepts originally from of Social Networks and also to Online Communities having Music Creation as intrinsic motivation.

1. INTRODUCTION

During the last few years, our research group has been investigating the use of computing technology to support novice-oriented computer-based musical activities. The development of this support has followed an interdisciplinary approach, and involves a multidisciplinary team of experts in Computer Music, Human-Computer Interaction (HCI) and Computer Supported Cooperative Work (CSCW). We are particularly interested in the convergence of technological support for cooperative creative activities, part of the field called "networked music"[20]. Network music allows people to explore the implications of interconnecting their computers for musical purposes. Because networked music works result from the convergence of social and technological aspects of Internet, this area has attracted the interest of the music technology community and the existing applications have evolved towards sophisticated projects and concepts including, for example, real-time distance performance systems, and various systems for multi-user interaction and collaboration. CODES is also a networked music system - CODES is a Web-based environment designed to support music creation by means a process called Cooperative Music Prototyping (CMP) - but with special focus on music novices.

Similarly to other Rich Internet Applications such as YouTube, MySpace, and Flickr – that have turned the

passive user into an active producer of content, bringing into the picture new purposes, like engagement, entertainment and self-expression – CODES makes possible a novice be actor if their own musical experiences in music The main motivation of our work is the belief that no previous musical knowledge should be required for participating in creative musical activities.

The goal of this paper is to present and discuss several concepts developed by our research group concerning how CODES has been changed for coupling social networks services and for providing support to an online community for cooperative music making. Our environment started out as a website that people could use to create their music interactively and cooperatively, but it has grown into a more general online community of people allowing to build an audience around music experimentation, music creation, (music) knowledge sharing, and entertainment.

2. CODES ENVIRONMENT

Differently from YouTube, Flickr, and even MySpace, where people only publish their "already ready" content, CODES is a system for music creation, instead of a system just for publishing music. CODES offers a high level music representation and user interface features to foster easy direct manipulation (drag-and-drop) of icons representing sound patterns (predefined MP3 samples with 4 seconds of duration), combining them to create (new) simple musical pieces – called Music Prototypes (MPs.)

Using adequate support features, CODES users can create, edit, share and publish MPs in their group or on the Web. These shared MPs can be repeatedly tested, listened to, and modified by the partners, who cooperate on MP refinement. Users can start a new MP by choosing the name and the musical style they want. The selection of a musical style allows CODES to filter the sound patterns offered to the user. However, since all styles are available from the sound library, mixing sound patterns from different styles within the same musical prototype is still possible.

Edition in CODES includes actions like "drag-and-drop" sound patterns from the sound library to the editing area, "move," "organize," "delete," "expand" the duration,

and "collapse" sound patterns to listen to the final result – a MP. When sharing a MP, the "owner" user can invite CODES users to use a search engine or may send explicit invitations via e-mail to non-members asking them for cooperation. When someone accepts such an invitation, the user becomes a prototype partner and can edit the MP like the owner does.

The prototypical nature of CODES is designed and built to provide a novice-oriented perspective. At any time users can listen to the musical prototype and link arguments to their decisions. Thus, all prototype partners can discuss and change ideas about each step of the prototype refinement, in order to understand each other's decisions. When someone considers that the resulting sounds are good, a "publication request" can be triggered and the group may discuss and deliberate about the publication of this musical prototype in the CODES home page. This activity is called musical prototype publishing. As an alternative to publishing their music, users may export their musical prototype, and share it at will. Thus, a novice may experiment with music by combining, listening and rearranging pre-defined sound patterns to create the MPs. Furthermore, CODES users may cooperate with partners in a cyclical and collaborative process of prototype creation - the CMP - through customized awareness, argumentation, and negotiation mechanisms until a final consensual prototype stage is reached.

2.1 Awareness Mechanisms in CODES

Through CODES, anyone can draft, test, modify, and listen to MPs. These actions can be done by the first author and their partners that cooperate in the refinement of the MP. This implies a focus not only on community management (i.e., discovering, building, or maintaining virtual communities) but also on experimenting and participating in specific design practices using a suitable interaction vocabulary. This process suggests the existence of noteworthy distinct kinds of cooperation activities. Systems aiming to provide effective support for these different activities have to meet specific requirements. Awareness and conflict resolution are already considered critical issues in general CSCW systems. However, mechanisms existing in other systems need some adaptation to take into account the idiosyncrasies of the CMP context. The ultimate goal is to provide actual cooperation, social knowledge construction, argumentation, and negotiation among the actors of the MP design activities. This type of cooperation is supported by a set of mechanisms borrowed from the Software Engineering and HCI areas and specially adapted for CODES, namely awareness, music prototyping rationale, authorship, version control, and conflict resolution [19].

2.2 Related Work

The most representative systems found in the literature of collective musical creation or music experimentation on the Web concerned with musical experimentation by novices are: Daisyphone [4], PitchWeb [9], Web- Drum [5], Public Sound Objects – PSOs [2], and JamSpace [11]. A brief description of each system and a comparative analysis according to various criteria (categorized as technological and architectural, computer music related, HCI related, CSCW related) may be found at [15]. In summary, the main drawback of existing networked music systems comes from the lack of focus on effective cooperation: in our viewpoint, effective collaboration is directly obtained through adequate adoption of techniques such as argumentation, authorship (allowing users to know their original contributions at anytime), interaction trace, awareness, and group memory. When these techniques are not adequately considered or explored within interaction design (taking into account real needs and tasks of the novice users for cooperative musical interactions), networked music systems do not provide support for effective novice usage [16].

2.3 CODES Principles

CSCW concepts and tools have made more obvious the existence of a more connective, cooperative, and collective nature of creativity rather than the prevailing focus on the individual. The creative processes being highly fuzzy, the programming of cooperative tools for creativity and innovation should be adaptive and flexible.

Creativity models in music have been heavily influenced by general models of creativity such as [10-23]. While some creativity models for music emphasize the cognitive dimensions of music creation [6-7], others consider its material dimension as an integral part of music creation [3-8]. In fact, to assess musical creativity is a very difficult task because social context, physical context, and personal factors shape the creative act and may determine the function and the dynamic of the creative processes involved [14]. Given this complex scenario, to put into practice collaboration, flexibility and multiculturality [18], we have adopted two principles which have been confirmed by findings obtained during CODES development and usage: (a) Music creation by novices should be prototypical; and (b) Music creation by novices should be cooperative [16].

Within prototypical music creation, novices can draft an initial musical sketch (a simple MP) which can be tested, modified and listened to, applying a cyclical refinement process until a final stage is reached. In the music literature, "draft" is the term commonly applied to initial creative products. However, here the emphasis is on the cyclical prototyping process and not on the product itself. Consequently, in this chapter "prototype" and "draft" are equivalent. The prototyping process clearly resembles the incremental software development cycles adopted in the industry. Since music creation can be considered a design activity, it seems natural and straight-

forward to adopt a prototypical process to model this activity.

In cooperative music creation, the refinement of an initial musical idea is a consequence of the collaboration of the author with her partners. In this context, what matters is not necessarily the musical quality of the finished work, but giving the possibility of a creative experience to a larger community of participants. The members build a social network by explicit invitation to cooperate until a final consensual MP stage is reached.

3. FROM CODES TO SOCIAL CODES

CODES was conceived originally to be a Computer Supported Cooperative Work (CSCW) system with a design based on cooperation and interaction concepts, so the evolution towards SNS and communityware is straightforward. Even though support systems for both group types — teams and communities — have developed independently, both areas have something in common: the contact facilitation with unknown and known collaborators [13]. While community support systems concentrated mostly on the building process, i.e. finding people with similar interests, CSCW focused on the collaboration process, i.e. the synchronization and exchange of information in the context of a specific team task. Like [21], we are convinced that awareness can be a common base for community support systems to improve contact building as well as for CSCW to maintain group work at a high performance level. Therefore, we need to address how we extend CODES from traditional CMP support and CSCW perspective towards online human community support.

Successful online communities motivate online participation. An online community provides people a place to come together using the Internet: it is always on and is a more accessible way to keep in touch with people who are geographically far or with those who have conflicting schedules.

Every online community has (sometimes implicit) rules that may specify how to participate and to engage with the community — from peripheral participation ("lurker") to explicitly recognized participation ("leader"). CSCW technologies can provide tools for supporting these roles. In the case of communities, these tools are used in combination, including text-based posts and chat rooms and forums that use voice, video, or avatars.

The community metaphor can create several different functions for encouraging social interaction in communities [12]: 1. Knowing each other; 2. Sharing preference and knowledge; 3. Generating consensus; 4. Supporting everyday life; 5. Assisting social events.

A virtual community is a social network of individuals who interact through specific media, potentially crossing geographical and political boundaries in order to pursue mutual interests or goals. One of the most pervasive types of virtual community includes Social Networking Services (SNS), which consist of various online communities. Nowadays, there are lots of SNS with focus on music listening and sharing, rather than music creation. YouTube and Vimeo are video sites that feature musical contents. Some SNS, as Myspace, have a social character, merging social networks aspects with content distribution. Facebook includes several musical pages and bands profiles. Even Apple tried to foster a musical social network, known as Ping.

Traditionally, a SNS essentially consists of a representation of each user (often a profile), his/her social links, and a variety of additional services. CODES provides a distinct vision of a SNS having music as its intrinsic motivation, combining the traditional features (profiling, social links) to different and specific features related to CMP. Thus, CODES has three different levels of viewing and interaction:

a. *Level 1*: Public level, like an broadcasting channel, as Myspace, where posts are posted on to a "bulletin board" for everyone, without resorting to messaging users individually. Thus, people who do not know each other can check some data (personal information and prototypes) that the users select to publish, making this information available to any visitor;

b. *Level 2*: Restricted one-way level, as on Twitter or Google+, when users may subscribe to other users' posts — this is known as following and subscribers are known as followers. If a user follows someone, this is a non-mutual relationship, where who is being followed does not need to follow back. The follower can see someone else's timeline as an RSS feed and also access MPs and even modify it (if this option is allowed in the MP), but these modifications are just local and temporary. It is also possible to repost a post from another user, and share it with one's own followers;

c. *Level 3*: Partnership level, when two people follow each other, it establishes a collaborative relation, where they can, not only suggest, but also edit the prototypes together. In this case, they are named 'partners.'

CMP is an activity that involves people creating groups and working together on an MP as a shared workspace. In CODES, a cooperative musical prototype is initiated by someone that creates a new prototype, elaborates an initial contribution, and asks for the collaboration of other "partners" by sending explicit invitations.

Partners who accept the invitation can participate in the collaborative musical manipulation and refinement of the prototype. The group can publish the final or partial results of their CMP in the public spaces (level 1 above), in which interested users could discover it and follow

(level 2 above) or join the collaboration as new partners (level 3 above).

In order to avoid undesired dependencies, inconsistencies and conflicts between contributions, preserving authorship among the several contributions of a community, CODES implements a particular layer-oriented version management mechanism. In this approach, each layer represents one partner's view, and the union of partners' contributions (a combination of layers) results in a cooperative MP version. Any partner can browse between the contributions, independently of the creator, keeping the creator's original ideas and authorship. It is also possible to edit another user's contribution, by issuing an explicit "modification request" to a partner. The interested reader can find more details in [19].

The basic idea of our CMP process is that members cooperate not only by means of explicit conversation and explicit actions on a shared object space, but also by interpreting the messages and actions of other actors in accordance with the model of their thinking and acting, which has been built up in the course of their interaction. A shared objects space involves prototype-oriented information, which comprises all information about musical prototypes, including their composition (combination of sound patterns, versions formed by layers) and social-oriented information (including interactions between actors during the process).

3.1 CODES Social: Features and UI Description

In our social networking services version of CODES, we choose to apply several well known HCI interface guidelines to create a dynamic and creative environment, providing SNS for the emergence of communities and enabling knowledge sharing by means of rich interaction and argumentation mechanisms associated with the MPs evolution. Several basic CODES features are similar to conventional features of Social Networking sites. Most often, individual users are encouraged to create profiles containing various information about themselves. To protect user privacy, social networks usually have controls that allow users to choose who can view their profile, contact them, add them to their list of contacts, and so on. Users can upload pictures of themselves to their profiles, post blog entries for others to read, search for users with similar interests, and compile and share lists of contacts. In addition, user profiles have a section dedicated to comments from friends and other members.

CMP is a simple cyclical process including the following activities: (a) MP creation, (b) MP edition, (c) MP sharing, and (d) MP publishing. Through a Music Prototyping Rationale (MPR) mechanism — based on the Design Rationale concept from HCI — each user may associate comments (i.e. an idea or an observation) and arguments (pro or cons) to any action on any MP. The arguments can be addressed to a specific partner or to the whole group. Due to the exploratory nature of CODES usage, MPR is one of its most important characteristics, allowing users to perceive and analyze group members' actions on music prototypes ("to understand WHAT my partners are doing") and the reasoning behind these actions ("to understand WHY my partners are doing it").

The CODES interface was designed to strike a balance between user interfaces that are so easy-to-use that they end up depleting their expressiveness, and others that are so complicated that they discourage beginners. The CODES user interface has three levels of interaction for different user profiles: (a) Public Level, (b) MP Editing Level, and (c) Sound Pattern Editing Level. The lowest level of CODES — sound pattern editing — is a kind of "piano roll" editor, having no social-oriented features. Therefore, we will only discuss the other two levels.

At the public level, anyone (including non-members) can access and explore musical prototypes, by searching and listening. One of the goals at this level is to encourage the potential audience to become CODES members, and encourage members to publish their musical prototypes to foster the formation of a virtual community focusing on music.
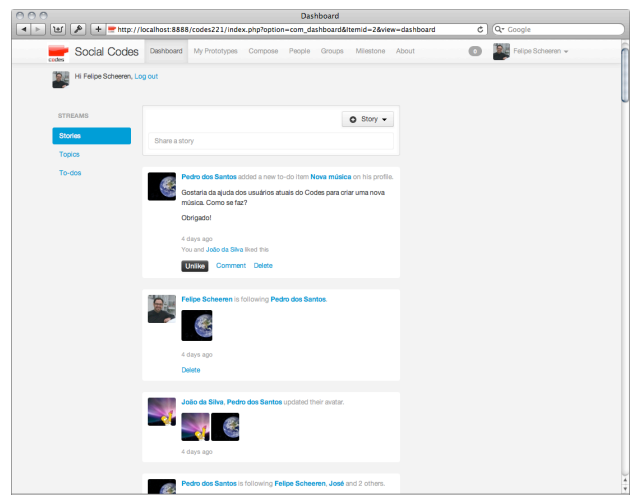

Figure 1. CODES main page

The main page at the public level is divided into four areas (see Figure 1):

• (A) Top Pane: System logo, Dashboard (the main page, with user's timeline, which shows followings updates), My Prototypes (user's MP and the ones user is collaborating with), Compose (opens the CODES MP Editing Level interface), People (shows a list of CODES users and a search box), Groups (where users can choose to follow discussion groups or create new ones), Milestone (where users can create a set of to-dos to each MP), About page, Notification area and a dropdown menu with user settings.

• (B) Left Pane: User's name and picture with logout and three kinds of streams: Stories (the main timeline

view), Topics (users and followings discussions about it's prototypes) and users MP's To-dos.

• (C) Main Pane: where the actions happen. All the things that you can choose in the other panes will appear on this one. Here, users will see and edit their prototypes, following or follower lists, the search results, etc.

• (D) Bottom Pane: Systems' information – not shown.

The user's main view is different of the user's profile view. The left pane has a bigger image of the person, with links for his music gallery and friends list. And the content pane shows new updates, such as new music, collaborations, followings, or followers.

The MP Editing Level is the most important level of the system. At this level, users can create and edit their MPs cooperatively (see Figure 2). The edition of a MP in fact is a simple task. The sound patterns are dragged from the sound library — a region having icons representing music instruments organized in folders named 'rock,' 'funk,' 'jazz,' etc. — and dropped into the MP editing area — the biggest region above. The sound patterns displayed in the editing area are played from left to right. At any time, the user can play the MP existing in the MP editing area using the execution control buttons: Play, Rewind. The basic action at this level is to add or remove sound patterns within the editing area, as well as to change their sequence, size, combination, and position. Each author's contribution in the shared workspace is identified by color: the edges of icons of sound patterns are colorful, with the same color chosen by the user at the registration. A detailed description of all features related to MP edition can be found in [15].
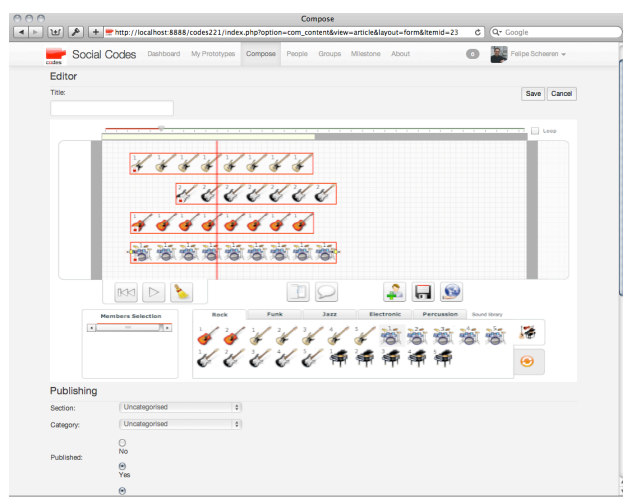
Figure 2. Musical Prototyping editing page

Every new MP is *a priori* private, so without authorization no one is able to see/listen it. However, in "My Prototypes", the user can see all MPs it has created and all the MPs it is collaborating with (as a partner). At the preferences panel for each MP, the user can select the musical style of each composition (multiple tags are al-lowed), as well as one of the following distribution options: *Private* (No one but the owner will be able to edit/listen this MP), *Collaborative* (People will be able to listen and edit the parts of the MP that the owner sets as allowed to edit), *Public* (Everybody can listen, Collaborators can edit it and followers too), *Closed* (Everybody can listen, but only the author can edit).

Several difficulties were addressed in this work for bridging the gap between groups of novice users and the possibility of creating online communities for music making over the Web. Indeed, one of the main challenges was the combination of cooperation-oriented mechanisms (for effective collaboration in a CMP) with community-oriented mechanisms (for effective community management).

4. CONCLUSION

Starting from an environment for Cooperative Activities for musical creation, this work has discussed two main challenges of networked music systems for novices:

a) how to provide support for social network services in CODES environment and;

b) how to create Online Communities having music as intrinsic motivation.

The first challenge is specially relevant with respect to provide different mechanisms — well-known in social networks sites but not known by most of users of networked music systems at all — in CODES environment. The second challenge is important for providing new features and motivations for social relationships. Since people have always found listening, performing, or creating music significant in their lives, whether for enjoyment or for social cohesion, we think such online community related to Music creation by novices is an interesting endeavour because music making in modern life tends to be left in the hands of the professional artists, musicians, and singers.

CODES users does not need to have previous musical knowledge for participating in musically creative activities. Obviously, providing support for non-musicians or for musicians are not the same thing [17]. Musician-oriented systems usually include full and complex information, concepts, and interface functionalities that are part of the "musician's world" and usually not understood by ordinary users. In our work such knowledge-intensive skills are replaced by strong commitment with communication, cooperation and sharing by members of a community.

Through CODES, novices may have the opportunity to be – like experienced musicians are – the actors of their own musical experiences. This means they can draft simple musical pieces that can be modified, and repeatedly listened to, both by the first authors and by their partners that will be cooperating in the refinement of the MP. This implies a focus not only on community management (i.e.,

discovering, building or maintaining virtual communities) but also on experimenting and participating in specific design practices using a suitable interaction vocabulary.

Moreover, this suggests the existence of noteworthy distinct kinds of cooperation activities, and that systems aiming to provide effective support for these different activities should also meet different requirements.

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