Cassino Musical: A Game with a Purpose for Social Recruitment and Measurement of Musical Talent

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Abstract—Identifying and measuring a musical talent is not a simple task that could be performed by computers. In addition to the technical challenges, it also involves social, emotional and cultural issues. This problem is aggravated when the task needs to be performed taking as input the huge amount of music content available on the Internet today. In this paper we report work in progress on a social interactive Game with a Purpose using fun as a key motivational factor to assist in recruitment and measurement of musical talent.

Keywords—mass collaboration; crowdsourcing for music; games with a purpose; crowd computing; wisdom of crowd; social recruitment

I. INTRODUCTION

The production, promotion, distribution and consumption of music have been radically changed by the Internet and the digitization of music [28]. Thus, producers (composers, performers, publishers), consumers (listeners, participants of musical events) and investors (sponsors, record labels, distributors) need to understand and adapt to the new context of the digital age. In this context, access to digital recording technology has allowed anyone to produce quality music from home computers. This has resulted in increased sprouting of new bands and artists who can write their own songs and albums without the need for large financial resources. Moreover, they can make their work known to a large number of people at a cost close to zero, through Web 2.0 tools such as blogs, forums and social networking services [1].

The end of physical barriers due to the virtualization of the world music commerce, the fact that the cost of distribution is low and that the potential impacts of failures are irrelevant allowed the market to offer not only products with a large consumer audience, but also lesser known products. Anderson [2] defines this new music market in the virtual world as a long tail market, where consumer demand has slowly shifted from big hits that are topping the sales to the infinite possibilities of lesser-known artists.

For music consumers, the rise of the MP3 format, file sharing through Peer to Peer (P2P) platforms and Web 2.0 tools provided easier and faster access to a wide variety of music on the virtual stage [1]. The popularity of portable media devices was also important so that the music could be more present in daily life. With these devices, people can hear music anywhere and any time and thus the time devoted to music increases and hence its consumption.

However, the huge volume of data generated by millions of users makes this growing demand for music still find difficulties to reach new content that suits their interests. Moreover, it is still difficult for little-known artists to find a good place in the market without the help of major investments and have a chance to stand out on their own talent and on the quality of their work. For investors, this great mass of information also makes it difficult to find new artists on the Internet so they can invest and get a good financial return. [3]

In this scenario, we can see the difficulty of recruiting and measuring musical talents of unknown artists in a very large volume of music content in such a way that this information could be used by consumers and music investors in decision support and contribute so that unknown artists could be recognized according to their talents. This is a complex task to be done by computers, because besides the technical issues, measuring the musical talent of an individual or group involves emotional issues [4].

At the same time, in the last years we have seen the affirmation of the business model coined by Jeff Howe as crowdsourcing to describe “an idea of outsourcing a task that is traditionally performed by an employee to a large group of people in the form of an open call” [5]. In this paper we propose a crowdsourcing application called Cassino Musical to foster mass collaboration in recruitment and measurement of musical talent from unknown artists using videos available on the Internet. This approach follows the dynamics of a game with a purpose (GWAP) [6] that extracts the collective knowledge through the interactions of the players. We also believe that due to the fact that musical talent depends heavily on public interests [7], this application can be a good solution for achieving this goal.

II. BACKGROUND

A. Crowd Computing

Being a relatively new area of research, the definition of Crowd Computing is still in a state of flux. However, our research group has been using the following definition: “an umbrella term to define a myriad of tools that allow human interaction to exchange ideas, non-hierarchical decision
making and full use of the mental space of the globe” [8]. This is a very broad area and encompasses other areas of computing represented in a Venn diagram [9] in Figure 1, which are:

- **Social Computing**: "An area of computer science that is concerned with the intersection of social behavior and computational systems" [10];
- **Human Computation**: “Channeling the vast internet population to perform tasks towards solving difficult problems that no known efficient computer algorithms can yet solve” [11];
- **Audience-Computer Interaction**: “An area of HCI which involves the use of Crowd Computing technologies to obtain useful feedback from the crowd in the context of audience” [12];
- **Crowdsourcing**: “Tapping the perceptual, cognitive or enactive abilities of many people to achieve a well-defined result such as solving a problem, classifying a data set, or producing a decision” [13].

### B. Crowdsourcing for Music

Thanks to new information and communication technologies, supporting tasks involving mass collaboration in different contexts of society is easier. In the field of music, it is increasingly common to see artists using the participation of fans to compose songs, make videos, make decisions about albums, songs, concerts, publicity or even to raise funds for some initiative. In the Internet, a number of different platforms have emerged offering services that apply the crowdsourcing model in music to reach a certain goal.

In [9], our research group proposes a taxonomy, represented in Figure 2, that groups online platforms in the context of music and classifies them according to the purpose of the use of crowdsourcing. The six categories of crowdsourcing for music platforms found during the investigation are:

- **Co-creation**: Crowdsourcing for music platforms that provide features that support the co-creation in the music production process, allowing crowds of people from anywhere in the world to collectively produce music without having to be professionals in the area.
- **Decision Support**: Platforms that offer services to extract the opinion of the crowd for decision support.
- **Crowdsourced Music Collection and Management**: Platforms that seek to achieve this goal from social interactions, reviews, ratings and any other information that adds value to existing content on the Internet.
- **Marketplace**: This category includes platforms that aim to provide services that create connections between the crowds of vendors and the crowds of consumers.
- **Release**: Crowdsourcing platforms in which the crowd is used to propagate information to promote products, services and professionals.
- **Crowdfunding**: Platforms that support crowdfunding projects and ventures. In this type of crowdsourcing, the contributions of the crowd are the financial resources that will be used to achieve a goal, not intellectual assets, as happens with most of the platforms.

### C. Games with a Purpose (GWAP)

Game with a Purpose (GWAP) is defined by Luis Von Ahn as “a game in which the players perform a useful computation as a side effect of enjoyable game play” [15]. This type of system fits in the area of Human Computation as users'
interactions in games are used to solve many problems that computers are still not able to solve alone, as image annotation [16] and audio annotation [17].

According to Ahn [15], the three motivational factors that characterize this approach are: a growing proportion of the world’s population has access to the Internet; certain tasks are impossible for computers, but easy for humans; and people spend a lot of time playing games on computers. These systems shall have elements that make the tasks a bit fun. At the same time, their computational goal should be fundamental in the structure of the game but the most imperceptible as possible to users.

Games with a purpose where the crowd performs tasks to solve problems in the context of music are already available on the Internet. Among them we can mention Tagatune [18], Listen Music [19], Moodswings [20], Herd It [17] and MajorMiner [21]. These games are used for annotating videos and music in which players must enter a tag, the musical genre or the mood expressed through music.

### III. RELATED WORK

According to Amaral [22], the user pages in social networking services have proved to be vigilant and also effective towards forming a database of consumption, musical memory, social organization around the music, music review, classification of genres, and also the formation of reputation for knowledge on the subject. This makes them extremely useful in managing the knowledge dispersed in the Internet.

The Last.fm website [23], for example, is one of the leading online social music platforms that uses crowds in managing the music library and builds knowledge about the musical interests of users. Another example is Youtube [24], a very popular social networking service whose focus is sharing videos. Youtube also allows users to make reviews, comments, and add tags to videos providing social information for analysis of popularity and audience, for instance. The Voices.com [25] is a platform focused on business in which people show their vocal talents to enable companies to choose their services, or companies request some service to the crowd of suppliers.

TastemakerX [26] is social platform that allows users to build portfolios of personal tastes and share it to their social graph. It was built as a game, like prediction market for music. The game simulates a stock market for artists considering fans as investors. The value of the bands is calculated using an algorithm that captures data about them, such as likes, the number of fans, music executions and albums.

### IV. PROPOSAL

Given the situation in which we have a large volume of information on the Internet that requires organization, we saw the need to help consumers and music investors to find unknown talented artists. To make this possible, we need to find ways to measure the musical talent of each individual. However, this is a complex task to be performed by machines, because besides the technical, cultural and emotional issues are also involved.

Volz [4] states that most of the definitions used to measure talent includes the ability to hear, recognize and play rhythm, technical skills, intonation, musical intelligence and sensitivity. And yet, these variables are inaccurate and require individual tests of each person. On the other hand, Caves [7] argues that finding out about the talent of someone in the entertainment market is more about discovering the tastes and whims of the public than on any objective measure of quality.

This paper proposes an approach to crowdsourcing for music called Cassino Musical that applies the principles defined by Surowiecki in his book "Wisdom of Crowds" [27]. This approach follows the dynamics of a game with a purpose that extracts the collective knowledge through interactions between people in the game. Recently, there has been much interest in using games as a means of motivating people to perform tasks that are currently difficult for computers [30]. In our work, the main goal is achieving a wise mass to assist in recruitment and measurement of musical talent, but the requirement that the game be fun also contributes to reaching this goal, as the results rely on the achievement of a critical mass of users playing the game.

Players will have the task of recruiting unknown artists on the Internet to compete with other artists in duels (matches). In these duels, a group of players who will not communicate with each other will have to choose the most talented artist between the two competitors - and the victory will be given to the players who choose the most voted artist. By aggregating the results of the matches and other variables such as the number of sponsors and number of fans, it will be possible to measure the musical talent of each artist from the standpoint of the public, and not of a few experts.

#### A. Game Dynamics

1) Dueling musical talents

The game works with several rounds happening concurrently with a limited number of people. The intention of breaking into several simultaneous rounds rather than a single round at a time is that players do not know who are the other players of the match (this prevents them to combine with each other to enter the game at the same time). The players are allocated in the rounds randomly by the system and will only be introduced to each other after the aggregation of the results - so that there is independence in decision making. There is no communication between the players nor access to the answers before the aggregation of the results of the match is complete.

Each round consists of two videos from different artists of the same level to be executed in sequence. The execution of the videos can be interfered with by the user and the player has a pre-defined amount of time to make his decision. Players who choose the most voted artist among them earn points and win the match. The intention is not that the player simply choose his favorite artist, but figuring out who will be the favorite of the majority of the players.

In a round, the player can report one of the videos or both of the match as invalid. If the majority of players do the same, those who denounced win the match. A video is considered invalid if it is a video clip of a famous artist or if the video does not match the artist, for instance.
2) **Admiration of artists/videos**

Another feature that extracts information from the public about the uploaded videos is "admiration". The option to admire a video does not require financial expenses in the game environment, but the reputation of a video influences their admirers. For instance, if the player admires a video and after that, this video gets more wins than losses, it will influence the reputation of the admirers of this video. Similarly, if a video is deemed invalid by the denunciations or has a greater number of wins than losses, admirers lose reputation points in the game. The high number of admirers also contributes to the rise of video level and also so that it is protected from denunciations.

3) **Sponsorship of artists/videos**

Players have the option to invest virtual game money in videos or artists they believe will have many victories (and level up in the game). After the player invests in an artist, he earns a sum of money in every round that the artist wins and loses money in every defeat. Players can cancel their sponsorship at any time. The amount of sponsorships also helps the artist earn points and be valued within the game.

4) **Talent recruitment**

After reaching a certain score, the user earns permission to upload videos and recruit artists for the game as shown in Figure 3, which illustrates the dynamics of the game Cassino Musical. If the player is the first to register a video of an artist, he becomes the godfather of the artist. The godfather is the player who earns more with the evolution of the artist through the wins and sponsorships. If a video receives a considerable number of complaints, the video will be removed from the system and the user who registered the video will be penalized.

B. **Leveraging the Wisdom of Crowds Principles in Project Design**

Surowiecki [27] called the wisdom of crowds the group's ability to circumvent the rational limitations and faulty assessments, which contradicts the thinking of most people about knowledge and its concentration in a few minds. He argues that the errors that occur in individual estimates end up cancelling itself in a large number of opinions.

In order to have a wise mass it is necessary to satisfy the following conditions: diversity of opinion, independence of judgment, decentralization and aggregation. If these requirements are not met, there will be no random errors, but a bias, where opinions are not truly independent and individual.

In this study, we built on these four conditions to define the dynamics of the game and the process of aggregating opinions to manage and measure the musical talents available on the Internet. We will better describe below each of these conditions and how they are attained in the approach proposed in this work.

1) **Diversity**

This requirement stipulates that individuals in the crowd must be diverse in their roots, formations, opinions etc. In order to have a wise mass, the goal is not to achieve consensus, but just the opposite: the dissent. The disparity of individual opinions will ensure an intelligent collective opinion because each individual will have a different view on the subject encompassing useful (information) and useless (noise) portions. On average, the information will be summed up, while the noise will tend to cancel itself out.

In the proposed game dynamics, we seek to meet this requirement in the selection of players for each match. Players are randomly allocated regardless of musical tastes or hierarchy in the game. Additionally, players can not be allocated in matches where there is already a connection between the video and the player, either as a sponsor, admirer, denunciator, godfather or who registered the video so it does not influence the evaluation.

2) **Independence**

Independence is the condition that the individual opinions should not be influenced and/or influence the other members of the group. The individual tends to think differently when in private and in groups, as he tends to adapt his views to see himself as part of a group. Failure to comply with this condition directly influences the first premise of diversity and will make the information generated reflect the opinion of a few.

To meet this requirement there should be no group activity during the matches of the game or any communication between players that enable them to know the opinions of others, before the aggregation of results. This is essential so that the players can give their opinion without direct influences from competitors and it does not generate a herd behavior. Especially because the essence of the game is to predict what
the majority will respond, being aware of the opinions of other competitors does not make sense in this case. To avoid any communication risks, the decision of allocating players in matches will be taken by the system. Matches can occur simultaneously and players only know their competitors when the aggregation of the results has already occurred.

3) Decentralization

According to Surowiecki, the decisions that a group produces are smarter when there is no coordinating or centralizing force influencing the opinions of others. Collective opinions are intelligent as individuals are free to think locally, taking into account only the nuances of their region, work area or field of knowledge to form an opinion.

As already mentioned, in the dynamic of the game, neither the competitors in a duel will have any social proximity, nor will they know the identities of the contestants until the aggregation of the results of the match is complete. Moreover, even if there is some kind of hierarchy among the participants in the game, during matches, this hierarchy does not influence neither the aggregation of results nor the actions of other competitors. That is, a response from a player with higher hierarchical position in the game will not have more weight than others with lower position and the anonymity of the participants of the game will allow no influence on player action.

4) Aggregation

This assumption establishes the need for a good mechanism to make individual judgments in a collective decision. Once produced and explained the views of the components of the crowd should be aggregated to generate a collective opinion. This aggregation process is responsible for the process of filtering or noise cancellation that actually result in the wisdom of crowds. The aggregation of useful information and removal of useless (noise) can be observed by the dynamics of the matches. The information provided by the majority shall be considered relevant, while those with few citations will be discarded. In the inclusion of content (videos and artists) made by users, this sorting is done by limiting the permission to be included only for experienced users who managed a degree of confidence in the system, and by the denunciation of the players of the games. Moreover, punishment of players - when they submit invalid content - and awards for complaints deemed valid are important elements to motivate the management of content and noise removal through the crowd of players.

V. CONCLUSIONS AND FUTURE WORK

In this paper, we introduced the Cassino Musical, a game with a purpose for social recruitment and measurement of musical talent. At the time of preparing this paper, the application was in the implementation phase. We intend to deliver Cassino Musical as a Facebook app to take advantage of the features offered by the latter in the process of social contagion of the game, like invitations to friends of the players and publications on the murals with scores and the individual milestones in the game. We expect with this application to build a great collection of artists categorized by the level of talent and musical genre and additionally to organize players for their ability to identify musical talents. As the individual interacts with the game, important information is collected for: 1) social recruiting – through the registering of musicians made by players to get money and confidence in the game; and 2) measurement of musical talent - with the amount of fans, sponsorships, complaints, victories and defeats.

After implementing and testing the proposal of this research, future work will include using the game to collect new information from the music community such as the interests and talents of the players by geographic region and prediction hits. We also intend to implement the game in such a way that it can be used as a mobile application. The answer to these issues as well as the results of the current implementation will be reported in follow-up papers.

REFERENCES


