

# Encouraging Co-located Players Social Interaction

Sofia Reis, Nuno Correia  
CITI, DI, Faculdade de  
Ciências e Tecnologia  
Universidade Nova de Lisboa  
2829-516 Caparica – Portugal  
se.reis@campus.fct.unl.pt, nmc@fct.unl.pt

## ABSTRACT

This position paper presents our ongoing work for stimulating co-located social engagement among players with a game that resorts to face recognition and another game where players are accompanied in their daily lives by virtual projected imaginary friends. We suggest interaction between imaginary friends of different players that will work as a bridge for interaction among their respective human companions. In the context of the games and of the initial results obtained a framework for encouraging social interactions in large groups of players is outlined.

## Author Keywords

Games; Social interactions; Co-located.

## ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI):  
Miscellaneous; K.8.0 [Games].

## 1. INTRODUCTION

For centuries, social experiences have been part of games [14]. Social contact can be remote or co-located, but co-located interaction contributes more to player enjoyment than remote interaction [1]. Social contact in games may involve players or even strangers to the game [8].

Here we present our proposals to stimulate social engagement among players that are in each others' physical presence. This interaction may be among players who were acquainted before the game or the game may act as a platform for strengthening or building new social links.

The next section addresses previous related work by other authors. Section 3 describes how we encouraged social interaction. Section 4 outlines a framework for stimulating social engagement among co-located players. Finally, the conclusions and future work are presented in Section 5.

## 2. RELATED WORK

Other authors have already presented interesting results in what concerns motivating players for social co-located

engagement. In MobiComics teams of users in a common space cooperate to create comic strips, in their mobile phones, that are afterwards shown in public displays. MobiComics managed to encourage social interaction, in the form of discussion and laughter, especially when users vote for the comic strips [7]. However this strategy is aimed at small groups of players. We intend to create a strategy that may be used by large groups.

Other authors present a Pong like game where two players sit face to face, across a table, and use mobile phones as a shared display. They reached the conclusion that when sitting in front of each other, oral communication was significantly higher than when sitting side by side. However this game is designed for groups of only two people [4].

Schminky is a musical game designed to be played at a cafe or bar environment. Users listen to a melody and four tracks and have to identify which track is not playing. As people who were playing the game were easily identifiable by the headphones and portable computer that resulted as motivator for people to interact with strangers sitting at other tables [11]. In our proposal we intend to take this side effect, related to the visibility of the players, one step further and turn it into the core of our proposal, instead of being just a consequence.

Another work connected two night clubs with two interactive tables where people could draw and use pre-made symbols and actions. Even though some results are presented about people who drew locally together, the main emphasis was on the joy of communicating with people in another location [17].

Capital Music is an application that allows users to share songs with co-located strangers. Even though this application may create a sense of a link with other people nearby, all social user interaction is anonymous [15].

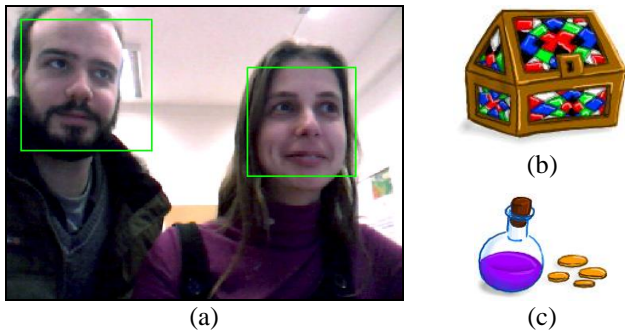
## 3. ENCOURAGING SOCIABILITY

Our objective is to promote social co-located interaction in online videogames. We intend players to be in each others' physical presence and not competing or collaborating remotely as often happens in MMORPGs games. Furthermore, we are aiming for that social interaction does not occur only during the game, but also after the game, so that social connections among players may be strengthened

or eventually the game may be an instigator to form new social connections.

The Enchanted Moor browser game [13] was one of our attempts for promoting social engagement among players. Enchanted Moors are mythical characters that have been trapped by spells for centuries in the Iberian Peninsula. According to legend brave heroes who manage to break the spell and free the enchanted moor will be rewarded with vast treasures [2,10,16].

In our browser game the player wanders through a forest until she finds an enchanted moor princess. The princess will then tell the player that she needs two people to look at her magic mirror so that the spell is broken and she is set free. We resorted to Javascript, HTML5, and to an Haar Cascade Classifier [5,6] coded in AS3 to detect how many persons are looking at the camera. Figure 1 (a) shows the game’s video capture with the players’ faces that are highlighted, in real time, by the outline of a green box. After the two saviors join their efforts the princess is released and offers the player a safe (Figure 1 (b)) filled with gold coins and a magic potion (Figure 1 (c)). This particular game is incorporated in a larger organized frame of games where we stimulated remote social contact via publication of stories authored by players, forums, creation of in-game objects by players and player union via brotherhoods. However, here we focus only on co-located interaction.



**Figure 1. In the Enchanted Moor game (a) after two players join their efforts to save a princess they are rewarded with a (b) safe filled with (c) gold coins and a magic potion.**

With our game we ensured that there would be social contact because the player has to convince someone else to assist her so that the camera from the device where the game is running can detect two players. Mutual physical presence of the player and the helper in front of the same camera is therefore essential to win.

To recruit players we resorted to mailing lists and social networks. Players tested the game in their own computers without interference from the researchers. 49 players answered our online survey about the game. From the 49 answers, 6 were discarded because we found out, through those players answers to the survey that they had not allowed the game access to their camera. Without the

camera it is not possible to play and consequently these respondents were not in a position to evaluate the game. The characterization of the players who turned in valid survey responses is presented in Table 1. Answers from respondents who denied access to the game were considered invalid.

Enchanted Moor Survey		
Number of valid survey answers		43
Gender	♂	34.9%
	♀	62.8%
	No answer	2.3%
Age	Average	20
	Range	10-35
	Standard deviation	6.9
Countries	Brazil	46.5%
	Portugal	41.9%
	Other countries	9.2%
	Did not answer	2.3%
Who helped the players free the Enchanted Moor	Friend	37.8%
	Mother	20.0%
	Father	8.9%
	Sibling	8.9%
	Work colleague	8.9%
	Others	15.6%
Where the player was	Home	74.5%
	Friend’s house	10.6%
	Work	8.5%
	School	4.3%
	Relative’s house	2.1%

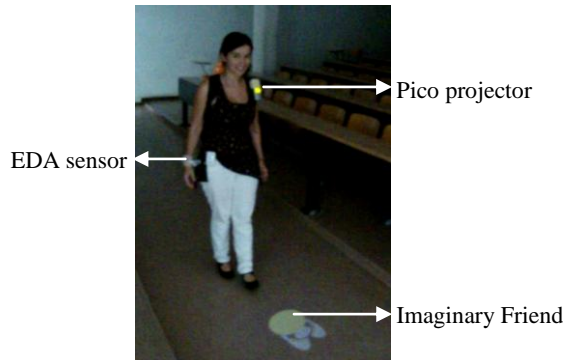
**Table 1. Enchanted Moor game survey respondents characterization and results.**

By resorting to face recognition it was our intention to motivate users for social contact. However, three players confessed us that they had cheated by showing an image to the camera. Still, these answers were considered in our analysis because these respondents, contrary to the ones who denied access to their camera, actually played the game, though not in the way we expected. This also shows that even if a game forces players to socialize, still some of them may find a way to bypass that requirement and still be able to win.

The Enchanted Moor game encouraged interaction mainly at home and with friends (Table 1). However we intend to stimulate wider forms of interaction. For example, how could interaction be encouraged, not only between friends and family, but also among people who are hardly familiar? How it is possible to more easily trigger social contact for shy people in social events?

In one of our projects we developed an Imaginary Friend that is projected on the floor via a pico projector. This virtual companion shares a link with the user and can sense her emotions. As the user walks around, in her everyday life, the Imaginary Friend follows and collects the emotion cookies that the user leaves behind. Previous emotion cookies can be consulted inside a jar or in a map. The Imaginary Friend helped players to think about their past emotions and take decisions about their lives [12].

In Figure 2 a user is pictured with her Imaginary Friend. The pico projector is positioned on the user's left shoulder. The user is also wearing an electrodermal activity sensor on her right wrist that is connected to a PLUX device [18]. The Imaginary Friend resorts to variations on the electrodermal activity to know when to question the human companion about what she is feeling.

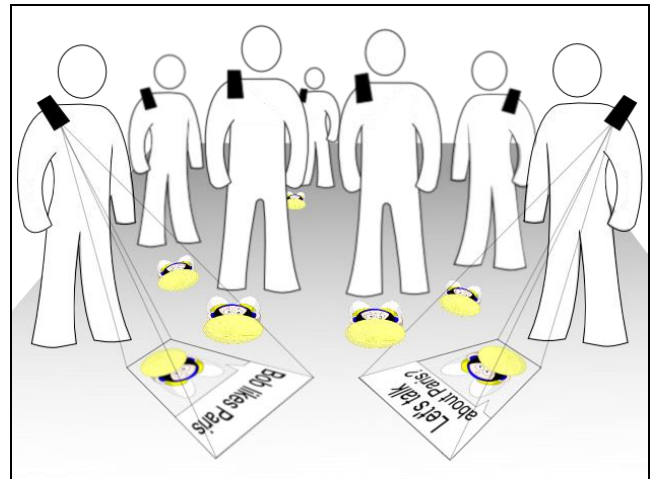


**Figure 2. User with the Imaginary Friend.**

The game was not initially designed to test sociability but the Imaginary Friend may serve as a social trigger for timid people because other people, who are looking at the projection, may feel the impulse to talk with the user. Eventually, in social events, the projected Imaginary Friends may even pull together their human companions based on the human companions' similar interests or personal characteristics. The Imaginary Friend may even assist by suggesting the initial conversation topics. In Figure 3 a party where the users each have an Imaginary Friend is represented. Eventually, in parties people may tend to talk only with the people they already know. However, in the situation depicted in Figure 3 one of the Imaginary Friends discovers that another person at the party also enjoys the city of Paris. The Imaginary Friend then tries to pull the human companion for a conversation with this still unknown person about the city of Paris. Besides parties, the virtual companion can also be helpful for

example, with children, at the beginning of the school year, so that students may more easily know others based on similar hobbies or preferred activities. In professional events, such as conferences, Imaginary Friends could pull together people who work on similar areas.

For this strategy to work, it is necessary that people, gathered at an event, have pico projectors. There are already several commercially available pico projectors, as standalone devices or embedded in mobile phones, so pico projectors may become quite common in the near future.



**Figure 3. Imaginary Friends suggesting possible social connections.**

#### 4. SOCIABILITY FRAMEWORK

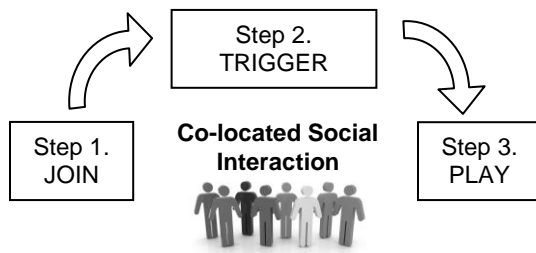
We intend to expand our efforts and to create a sociability framework (Figure 4) that can be applied to encourage social contacts resorting to games.

This framework will, firstly, focus on joining the players. To assure a common place it is possible to appoint a latitude and a longitude. Currently smartphones are usually equipped with GPS and location can also be determined via the Geolocation API Specification, thus enabling their owners to head themselves towards a determined position.

After assembling the players, step 2 is to trigger social interaction for the game. It is not enough for players to simply be at the same place, but unaware of each other and to bypass the chances for social connection. GPS suffers inaccuracies and location via the Internet is even less accurate so players may be several meters apart. In the Enchanted Moor we resorted to face detection to assure that players are effectively side by side and looking at the camera. However, interaction was mostly with people familiar to the player. We intend to stimulate this engagement even among strangers or people who scarcely know each other. Flash mobs have already demonstrated that it is possible to join crowds just for the sake of entertainment. Projected multimedia via pico projectors may also function as a way for players to spot one another.

After the initial inertia is overcome, players enter the magic circle [3,9] and actual gameplay begins.

In step 3 it will be important to evaluate how immersed the players were in the game, how engaging and fun was the social interaction and how the game affected social relationships between people. Our objective here is that the game functions not only as a way to join people and pass the time but also to check how an entertaining activity can influence how close people feel to one another and even help forge new social links.



**Figure 4. Outline of a sociability framework for co-located interaction in games.**

## 5. CONCLUSIONS AND ONGOING WORK

In this paper we presented our results for a game that encourages social co-located interaction among players resorting to face detection. We intend to extend this approach to large groups. A strategy for creating or strengthening social connections via Imaginary Friends that act as a bridge between their human companions was also proposed. Virtual companions are projected on the floor and walk by the side of their users. The virtual companions will rely on the users' characteristics and will propose engagement between them based on common similarities. A sociability framework was outlined that addresses the steps necessary for joining players at the same location, triggering the social interaction and finally engaging in play.

## 6. ACKNOWLEDGEMENTS

This work was partly funded by FCT/MCTES, through grant SFRH/BD/61085/2009, and by Centro de Informática e Tecnologias da Informação (CITI/FCT/UNL) - 2011-2012 through grant PEst-OE/EEI/UI0527/2011.

## 7. REFERENCES

- Gajadhar, B.J., Kort, Y.A., and Ijsselsteijn, W.A. Shared Fun Is Doubled Fun: Player Enjoyment as a Function of Social Setting. In P. Markopoulos, B. Ruyter, W. Ijsselsteijn and D. Rowland, eds., *Fun and Games*. Springer Berlin Heidelberg, 2008, 106-117.
- Goberna, B., Dacosta, T.O., and Mosquera, J.M.L. Myths, legends and beliefs on granite caves. *Cadernos do Laboratorio Xeolóxico de Laxe* 33, (2008), 19-34.
- Huizinga, J. *Homo Ludens*. Beacon Press, 1971.
- Kauko, J. and Häkkinen, J. Shared-screen social gaming with portable devices. *Proceedings of the 12th international conference on Human computer interaction with mobile devices and services*, ACM (2010), 317-326.
- Klingemann, M. Quasimondo - Mario Klingemann's Flash Blog: Optimizing Flash Based Face Detection. 2009. <http://www.quasimondo.com/archives/000687.php>.
- Libspark. mash/Marilena - Spark project. <http://www.libspark.org/wiki/mash/Marilena>.
- Lucero, A., Holopainen, J., and Jokela, T. MobiComics: collaborative use of mobile phones and large displays for public expression. *Proceedings of the 14th international conference on Human-computer interaction with mobile devices and services*, ACM (2012), 383-392.
- Montola, M. and Waern, A. Participant roles in socially expanded games. *Third International Workshop on Pervasive Gaming Applications, Pervasive Conference.*, (2006), 165-173.
- Montola, M., Stenros, J., and Waern, A. *Pervasive Games: Theory and Design*. Morgan Kaufmann, 2009.
- Parafita, A. *A Mitologia dos Mouros*. Gailivro, 2006.
- Reid, J., Hyams, J., Shaw, K., and Lipson, M. "Fancy a Schmink?": a novel networked game in a cafe. *Comput. Entertain.* 2, 3 (2004), 11.
- Reis, S. and Correia, N. An imaginary friend that connects with the user's emotions. *Proceedings of the 8th International Conference on Advances in Computer Entertainment Technology (ACE '11), Lisbon, Portugal*, ACM (2011).
- Reis, S. and Correia, N. Enchanted Moor. <http://schoolofmagic.net/florestamoura.asp>.
- Salen, K. and Zimmerman, E. *Rules of Play: Game Design Fundamentals*. MIT Press, 2003.
- Seeburger, J., Foth, M., and Tjondronegoro, D. The sound of music: sharing song selections between collocated strangers in public urban places. *Proceedings of the 11th International Conference on Mobile and Ubiquitous Multimedia*, ACM (2012), 34:1--34:10.
- Vasconcelos, J.L. *Volume V - Etnologia (Parte I)*. Imprensa Nacional, Lisboa, 1938.
- Åkerman, P., Puikkonen, A., Huuskonen, P., Virolainen, A., and Häkkinen, J. Sketching with strangers: in the wild study of ad hoc social communication by drawing. *Proceedings of the 12th ACM international conference on Ubiquitous computing*, ACM (2010), 193-202.
- edaPlux | PLUX. <http://plux.info/EDA>.