Familiars: Representing Facebook Users' Social Behaviour through a Reflective Playful Experience

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ABSTRACT

In this paper, we describe the design and development of a social game called *Familiars*. Inspired by the *daemons* in Pullman's "Dark Material" trilogy, Familiars are animal companions that sit on your Facebook profile and change into different animal forms based on your social activity within the social network of Facebook.

Familiars takes advantage of the powerful capabilities of the developers platform of Facebook to build a multi-dimensional picture of a player's state based on social activity, facial expression analysis on photographs and suggestions from friends. This rich information is then distilled and presented to the player in the form of animal that the familiar chooses to take.

We show how the types of animals and personalities were associated in a cross-cultural user study, and present quantitative results from the social behaviours of the players within the game in addition to qualitative data gathered from questionnaire responses.

Categories and Subject Descriptors

K.8.0 [**Personal Computing**]: Games; J.4 [**Social and Behavioural Sciences**]: Psychology;

General Terms

Design, Experimentation, Human Factors.

Keywords

Social Games, Social Networks, Representation.

1. INTRODUCTION

It is hard to overstate the explosive growth in popularity that Online Social Networks (OSNs) have experienced in the last few years. In the UK, connections to OSNs account for nearly 10% of all web requests and in both the UK and the USA, social networking sites are the most popular class of website except for search [4].The two most popular OSNs, MySpace and Facebook [4], both reach out to 3rd party developers by exposing interfaces (via *OpenSocial* [7] and the *Facebook API* [3]) that can be used to develop applications that integrate with the social graph maintained by each service. This has allowed thousands of developers to create applications that take advantage of a "ready-made" community. The platforms handle necessary services such as user management and verification, and in return the developers can provide highly integrated and socially useful applications that seamlessly integrate with the user experience on the site.

For Facebook, games are the most popular class of application that is available on the platform. The top games include applications such as "Pet Society", "Texas HoldEM Poker" and "Mafia Wars", where each attracts over 1.6M daily active users [1]. The massive success of these games is arguably due to them taking full advantage of the social nature of the platform – playing with friends rather than strangers adds a compelling social dimension to what are otherwise fairly pedestrian games.

1.1 Application Classification

Sharabi [9] proposes that applications built on social network platforms such as Facebook can be classified based on their *social purpose*.

Phatic Communication Tools are about maintaining social contact through small one-way interactions, such as sending gifts, hugs and pokes. This is a form of social touch that reinforces the importance of a relationship in a small but meaningful way. It isn't a grand intervention like a phone call, but rather a small reminder that the relationship has value.

Self Presentation Tools allow people to define their *identities* from their perspective. This includes applications that allow people to post their current mood, and also applications such as *iLike* that allow users to post lists of movies or bands that they like. The act of choosing these artefacts and displaying them publicly on their profile is used as a way to present aspects of their personality to friends.

Collective Identity Formation applications are those that ask other people to define a person's identity – For example, ``Hot or Not'' style games or applications that ask users to pick adjectives

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to describe their friends. These are used to find out what other people think about them as a person in a playful way.

In this paper we explore applications used for identity presentation, but autonomously based on behaviour in addition to peer-review.

1.2 Identity Presentation Games

The Facebook API exposes a wealth of social information about application users that can be used to create powerful social tools. The main issue is with presentation – there is so much interesting data on the social behaviour of the user, but how can we present this complex data in an intuitive and meaningful way?

So far, there have been very few automated presentation tools, including the "Friend Wheel" application[1], which shows the connections between your friends and the mutual acquaintances within a person's immediate social network. There have also been many simple quiz applications of the sort "What kind of X are you", where players fill out short questionnaires which are used in simple calculations to work out which character from the cartoon *He-Man* or the TV series *The Wire* your answers most closely match.

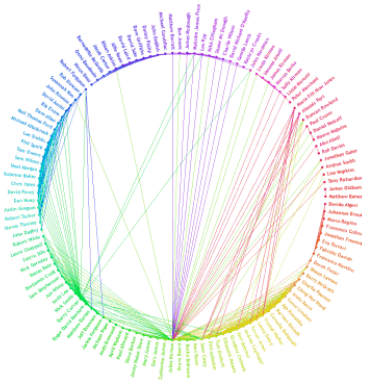

Figure 1 - "Friend Wheel" Visualisation

By developing *Familiars* the intention was to create an identity presentation tool that reflects the real social activity of the players on Facebook in a simple and meaningful way. *Familiars* takes great advantage of the capabilities of the Facebook Developers API and uses analysis techniques from many fields, including facial expression recognition and social network analysis, to build a complex multi-faceted picture of the status of the player. This is then distilled and represented to the user as a holistic reflection of their current socio-emotional state.

2. *FAMILIARS*

Familiars is based around the concept of each player owning a companion animal –a virtual sprite or creature similar in concept to Pullman's *dæmons* [8] – which take an animal form that represents the personality of the owner. The pattern of a players interactions and behaviour in the social network of the game and Facebook itself is used to directly decide what animal form a player's familiar should take. For example, a player who has many friends and is very active in the social environment of Facebook, the familiar may choose to take the form of a highly social animal (e.g. a Rabbit) to reflect this aspect of their personality. Similarly a relatively less socially active player's familiar may choose to be a solitary creature such as a Bear.

In terms of Sharabi's classifications [9], *Familiars* can be considered a *self-presentation tool*. The key difference is that the player has very little direct impact on the form the familiar will choose, since analysing the actual behaviour of the owner makes this decision. For example, allowed to define their own identity, players may choose to represent themselves as highly social. However, in *Familiars*, by analysing the observed social activity of the player, this may not prove to be an accurate representation.

The *Familiars* application was developed on the Facebook Developer's Platform [3] and made available to all Facebook users to install on their "profile"[2]. By agreeing to install the application, a small box would appear on their profile page showing the current animal form of the familiar and a link to show more details.

Within the application itself, users can see the current familiar (and the reasons why it has chosen this form), the social status of any groups the player is a part of, and may also suggest the familiar runs facial expression recognition on specific photographs in order to learn more about their owner.

2.1 Autonomous Behaviour Analysis

The primary method a familiar uses to determine an appropriate form to take is through a process of automated behaviour analysis based on data provided by the Facebook Developer's API.

When a Facebook user installs an application, they must accept an agreement that permits Facebook to pass on details about personal behaviour and status to the application. It is through this process that *Familiars* collects behaviour data for analysis.

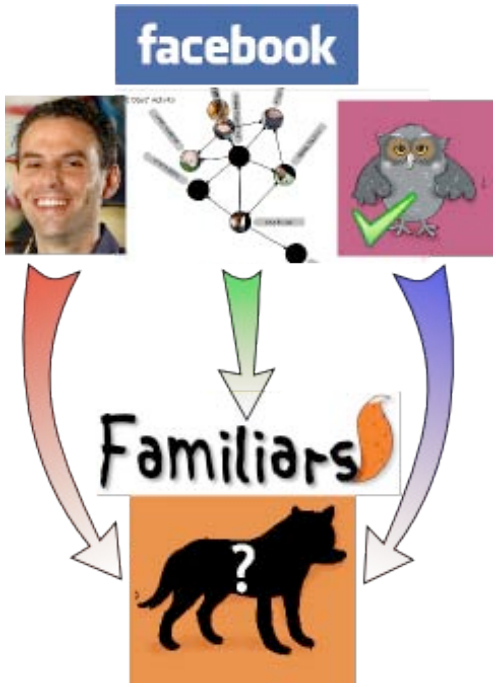

Figure 2 - Using Photographs, Social Network Analysis and Activity to determine form

[1] http://apps.facebook.com/friendwheel

[2] Available at http://apps.facebook.com/familiar

From the data provided by Facebook, we classify behaviour based on three dimensions: **Sociability**, **Attitude** and **Activity**.The data is collected from all these sources and combined in order to determine the type of animal the familiar should be.

2.1.1 PASION Augmentation Services

Familiars is a part of the EU PASION project (Psychologically Augmented Social Interaction Over Networks), and uses several PASION technologies [2] in order to facilitate the analysis of social and emotional data.

The main technology used is in the analysis of social behaviour using Social Network Analysis (SNA). PASION offers a remote software component that is able to calculate social indices for both individuals (Degree Centrality, In and Out-degree Centrality, Reciprocity) and groups (Centralization, Group Reciprocity, Density) based on interaction data provided by an application such as *Familiars* [6] [11].

Secondly, *Familiars* uses a Facial Expression Recognition service (FER) to distil emotion from the input of static images [10]. These are harvested from Facebook by the game and passed on to the remote FER service for analysis.

2.1.2 Sociability

The sociability measure is based on the social activity of the player within their peer group and the application itself. Facebook provides powerful tools for analyzing the "social graph" that is built around the activity of the user. *Familiars* accesses data on the number of friends a player has, and whether they themselves are *Familiars* players. The group membership data is analysed in terms of the number of groups a player is a member of, the shared group membership with friends and the changes in this data over time. The value for sociability is normalised across the player community in order to provide a wider range of values for sociability.

Familiars uses PASION Social Network Analysis (SNA) tools to analyse the relationships between players in Facebook groups. The two main calculations are for player Centrality (how central they are in the community) and Reciprocity (how likely a player is to reciprocate any social interaction). The combined factors provided by the SNA calculations and the normalised social activity of the player within Facebook provide a rich set of inputs that are used to calculate the dimension for sociability.

2.1.3 Attitude

The attitude measure is a vale that represents the current temperament of the owner. The main method that attitude is calculated is through analysis of the facial expressions of the photographs of the player.

Facebook gives application developers access to image data for every photograph that has been *tagged* with an application user. This provides a powerful capability so that any photograph containing that person can be accessed by the system so long as they have been tagged as appearing in the photograph using the normal Facebook photograph tagging mechanism. For example, a photo containing person X could have been uploaded by person Y, and tagged by person Z, and the application could have access to this photo regardless of whether persons Y or Z are application users or not.

The photograph data is analysed using a remote Facial Expression Recognition (FER) engine (provided by PASION) that is able to extract the facial features found in the picture. Based on the measurements between the various facial features, the engine is capable of associating an expression and a value for confidence. This in turn is distilled into a positive or negative value for "valence" or temperament, which is used to adjust the value for attitude for the Familiar.

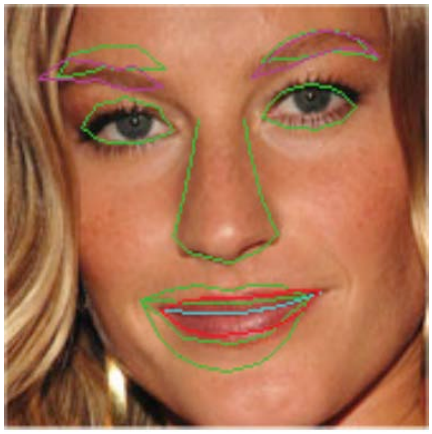

Figure 3 - Analysing Facial Expressions on Facebook Photographs

2.1.4 Activity

The activity measure is calculated based on the recent activity of a player within the application and to an extent within Facebook itself. Any page view within the *Familiars* application and each action taken within the game is recorded as part of the player activity. Also, activity with Facebook such as numbers of wall posts, and group membership changes are recorded as activity.

The activity dimension is time-based so only activity that occurred within the past 7 days is considered.

2.2 Voting

The *Familiars* application is capable of analysing personality in a completely autonomous manner. However, a facility for voting is provided so that players are able to adjust the form an animal takes manually if they don't feel it is appropriate.

An owner of a familiar, or a friend of an owner, may suggest that a familiar changes form to a different animal. This suggestion is given by simply clicking the animal form they think it should take. At the point of voting, a player is able to see the various attributes for Sociability, Attitude and Activity in order to make an informed choice about the most suitable animal that should be picked.

When a vote is received by the game, the appropriate adjustment is calculated based on the current profile of the owner, the suggested form and the number of suggestions a player has made. A vector is calculated between the current emotional profile of the player as understood by the game and the suggested form. The current emotional profile is adjusted based on the angle of this vector and weighted by the number of recent interactions. The weighting prevents people from "spamming" the system by repeatedly making a suggestion in order to force the familiar to change form.

Players are permitted to suggest their own familiar changes form, although the weighting for this change is very low to ensure that their friends always have the biggest input into the type of animal that the familiar chooses.

Voting as an additional input to the system adds a level of user power into the mix – while the familiar is for the most part autonomous, players still have the ability to use the voting system to "nudge" the decision in a different direction. This also allows for the familiar to take into account more nebulous feelings from friends that cannot be captured automatically. For instance social activity outside Facebook is invisible to the familiar, so having this data provided in a coarse way by friends through voting helps smooth over this limitation.

The voting process also allows players a manual mechanism with which they can correct perceived errors in the familiar's analysis. For example, if the Facial Expression Recognition service gives an inaccurate response, the error can be corrected by an appropriate vote.

Suggesting a form for a familiar is also used in the viral spread of the game. Rather than inviting people to use the application as is normal for Facebook games, players may send an invitation via a vote for friends that do not have *familiars* yet. The recipient receives an invitation message along with text such as "Joe Bloggs thinks your familiar should be a Wolf!" Should the player then install the application, their new familiar uses this initial vote as a baseline for it's initial calculations.

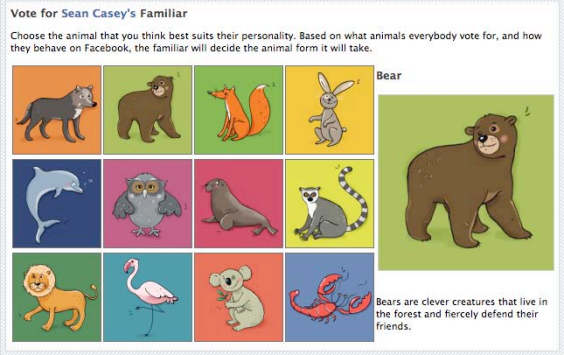

Figure 4 - Familiar Voting Interface

2.3 Facebook Group Analysis

The Facebook Developers API exposes a wealth of information about the groups of which an application user is a member. These data are used extensively in the calculation of the Sociability dimension, but are interesting enough to present to the users in it's own right.

Users within Facebook are able to create and join arbitrary groups within the website. These are usually used for social groups, clubs and common interests, but also for fun reasons (e.g. "When I was your age, Pluto was a planet"). As such, the group feature is very much a part of the Facebook user experience.

By collecting information about the groups a player is a member of, and the group membership of friends, we are able to generate interesting visualisations that expose the social behaviour within the groups in a way that is not available through the normal Facebook group interface.

Using Social Network Analysis, the PASION services can calculate indices for the groups and members to expose the nature of the social interactions that occur within the group.

Indices calculated for groups include Centralisation, which shows how tightly knit the members of a group are, Density that shows the volume of intra-group interactions and Group Reciprocity that shows how likely group members are to reciprocate social interactions within that group [6][11].

Indices calculated for individual members within a group include personal Reciprocity that shows how likely an individual is to reciprocate social interactions, and In-degree and Out-degree Centrality that shows how important a member is to a group based on interactions initiated and received. Figure 5 shows the interface within *Familiars* that shows connections between users within a Facebook group.

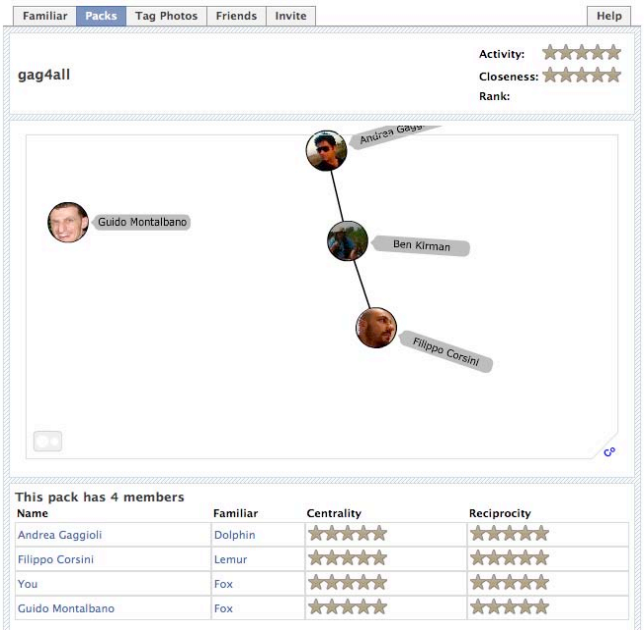

Figure 5 - Interactions in Facebook Groups

Of particular interest is the *Familiars* group connection visualisation, which shows users the group memberships in the context of their peers – it is easy to see which of their friends belong to different groups and how the memberships of these groups overlap in the social network. This creates a powerful discovery and exploration tool for finding new groups a player may wish to join.

3. ANIMAL REPRESENTATION

Between the autonomous behaviour analysis engine and votes or suggestions gathered from application users and their friends, there is a huge amount of data gathered. The main objective of the *Familiars* application is to provide a simple, playful experience that reflects the complicated behaviour data in an intuitive way.

In the case of *Familiars*, we chose to use animals as the way to present this information to the users since the concept of animal personalities is simple and easily understood. Recent literature such as the "Dark Materials" trilogy from Philip Pullman [8] rely heavily on the idea of animal companions that take different forms based on the personality and emotional state of the owner.

Obviously the choice to use animal representations for the game was only one of many possibilities. It would be trivial to "re-theme" the game with any other presentation layer, for example "types of car" or even "characters from *The Simpsons*".

The decision of which animals should actually be used in the application was a difficult one and took several brainstorming sessions to decide.

The three dimensions of sociability, activity and attitude define a 3D space in which the different types of animal should reside. We decided that there should be a limit of 12 types of animal in order to not confuse players with variety, yet provide enough different types to show clear changes between positions.

This enabled us to build a coordinate system with 12 items evenly spread around the 3D space, which were filled with animals of an appropriate type.

The 12 animals we settled on (Wolf, Bear, Fox, Rabbit, Lobster, Lion, Flamingo, Dolphin, Sea Lion, Lemur, Koala and Owl) were chosen based on our own cultural associations and assumptions about the personalities of the creatures.

Figure 6 - Familiar appearance on Facebook Profile Page

It is very important that the animal representations meet the cultural values associated with their position within the 3D personality-space we had constructed for *familiars*. For example, even though a Fox may be a highly social creature in reality, the common conception of the fox is as a solitary scavenger, therefore the personality within the game was recorded as such. After all, the aim of the game is to provide representations of human personalities rather than those of the animals themselves.

Based on our initial list of animals and personality associations, we conducted a short user study in order to validate our assumptions.

4. PILOT STUDY

A short study was conducted ahead of the release of the game to investigate people's perception of different species of animals and specifically the 12 animals used in *Familiars* (bear, wolf, fox, rabbit, dolphin, owl, sea lion, lemur, lion, flamingo, koala and lobster) with a view to informing the descriptions of *Familiars* and the basis for assigning them to users.

The game engine describes each familiar as a point in the 3D space of the game. The 12 animals used in the game were investigated in order to select those animals for which there is the greatest consensus. The association between the animal and the point in 3-D space was then modified to reflect the opinions of the participants.

4.1 Methodology

A questionnaire was developed in order to understand how people describe animals in terms of specific characteristics related to the PASION augmentation data and the *Familiars* game.

The questionnaire was composed of five sections, each containing both open/free response and closed questions. In order to make the study more complete, the investigation involved not just the 12 animals already used and implemented in *Familiars*, but also animal species more widely.

The first section of the questionnaire, in fact, elicited free-responses about the animal species most associated with activity, communication style, positive and negative emotions aroused, and sociability.

The second section was the most important one as it focused on the 12 animals already used in *Familiars*, investigating how they are seen in terms of activity, attitude and sociability, the three measures that determine the personality type of each animal. The first dimension, 'Activity', was investigated using questions assessing the level of activity and passivity attributed to various animal species. For 'Attitude', questions were developed in order to measure the positive and negative emotions commonly associated with each type of animal. The third dimension, 'Sociability', was the most complex to analyze, firstly because the two SNA indices taken into account (reciprocity and centrality) are calculated together in a single algorithm and secondly because it would be difficult for people to answer questions about 'reciprocity' or 'centrality' in animals. However, because both reciprocity and centrality concern the level of involvement that the user has in the game with the other players, and because of the players' social aspects taken into account in this measure (number of friends, views or suggestions for other friends' *familiars*, etc.) questions were asked in order to understand the extend to which each animal was described as social or passive.

The third section, aimed to identify people's preferences among the 12 *Familiars*. The data collected could complete those coming from the previous section, giving more information about peoples' willingness and preferences to be labelled as specific animals.

The fourth section looked at which words/adjectives people use to describe the 12 animals from *Familiars*. Findings from this section could be used to inform the description provided in the game given for each type of Familiar, but results will not be broadened in this article.

The fifth and final section collected participants' background information.

4.1.1 Participants

The questionnaire was distributed to 14 people, 9 females and 5 males with an age between 24 and 44 years old. Participants included European (English, Scottish, Italian, Spanish, German) and African (Nigerian) nationalities. This is significant as associations with different animals are likely to vary from culture to culture and *Familiars* is available on the Web.

4.2 Findings

For the purposes of clarity, only results coming from the second and third section of the questionnaire will be explained, these sections being critical for the deciding the assignation of the animals to the 3D space.

4.2.1 Animal Classification

This section investigated attitudes towards the activity level of each animal, on a scale from 'Very Active' (5) to 'Very Passive' (1). We found that wolves were the animal people described most frequently as very active, followed closely by rabbits, dolphins and lions. Lemurs and lobsters obtained a score of just over 3,

while Koalas and owls obtained the lowest score, equal to 2.6, which places them between 'Neither active nor passive' and 'Passive' on the rating scale.

Dolphins were indicated as the happiest animals among the 12 listed, followed by rabbits, both obtaining a score that places them between 'Active' and 'Very active' on the rating scale. Koalas are at the third place followed closely by flamingos. Owls were again at the bottom of the list, obtaining the only score lower than 3 – which places them between 'Neither happy nor unhappy' and 'Unhappy' on the rating scale.

Dolphins emerged as not only the happiest but also the most social animal. Together with rabbits, their score places them between 'Social' and 'Very social' on the rating scale. Flamingo, wolf, koala, sea lion, lemur and lion obtained, in order, a score that places them between 'Social' and 'Neither social nor isolated'. The owl was again at the bottom of the list with a score equal to 2.23, the lowest rating for any animal on all the questions.

4.2.2 Animal Preference

The third section of the questionnaire investigates participants' preference to be labelled as one of the 12 animals, with first, second and third choice responses (scored as 3, 2 and 1 point respectively). The top-scoring animal was the dolphin, with a score of 17, followed by the lion and the fox, both scoring 12. Koalas also obtained a noteworthy score, 9, as did wolves, 7. In the middle of the list were rabbits and sea lions, followed by bears and owls. Very few participants chose flamingos and lemurs as the animal they would like to be labelled as, while no preferences for the lobster were registered.

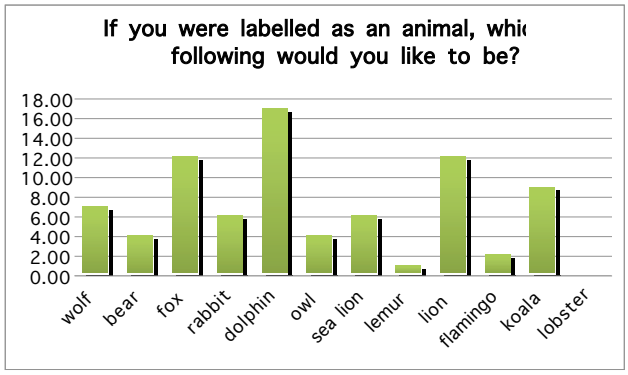

Figure 7 - Animal Preferences

4.3 Study Conclusion

The results reported above allow us to map the 12 *Familiars* onto each of the 3 dimensions considered in the game. The layout of the 3D space is a 3x2x2 matrix, with Attitude along the axis with three points, while Sociability and Activity have 2 points each. The level of activity, happiness and sociability that the study attributed to each animal was here translated to a specific location in the 3D space. In order to follow this structure, 6 animals were assigned to the 'social' part of the 3D space and 6 to the 'non social'. Within each of those 6, three animals had to be described as 'active', three as 'non active', all distributed along the 3 points of the attitude axe. Assigning the animals to a specific cell in the table was mainly based on the results obtained from the second section of the questionnaire. In order to make this selection closer to people's preferences, we also exploited the data collected from the third section of the questionnaire that sampled the animals for which people prefer to be labelled.

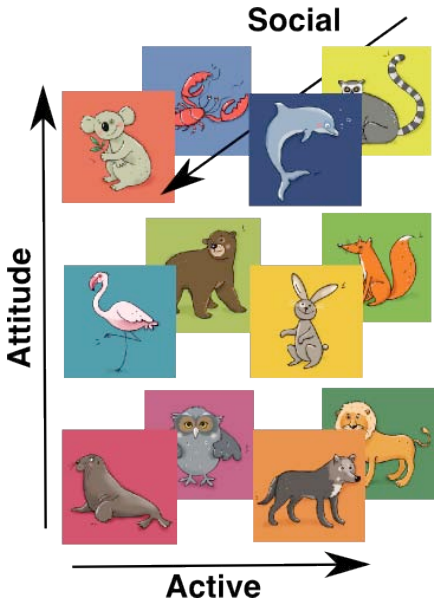

Figure 8 - Animals in 3D Space

Table 1 - Animal Coordinates

SOCIAL			
Activity\Attitude	**0**	**1**	**2**
0	Sea lion	Flamingo	Koala
1	Wolf	Rabbit	Dolphin
NON SOCIAL			
Activity\Attitude	**0**	**1**	**2**
0	Owl	Bear	Lobster
1	Lion	Fox	Lemur

This study aimed to improve the game by ensuring that active players are rewarded in the game. Specifically: knowing what animal people prefer to be labelled as allows us to assign these animals (dolphin, fox, koala, etc.) to a social or active position while taking into consideration how these animals are commonly perceived. By doing so, the more actively people play the game, the more likely it will be that the image represented by their Familiar is an animal seen as active and also one that they like being identified with.

Based on the personality analysis, a player is assigned a point within the continuous 3D volume delineated by the extremes of the animal types. The familiar takes the form of the animal whose coordinates are nearest within the space. Thus, while it is possible your familiar takes one form and stays that way (your coordinate firmly close to the coordinate of that type), it is also possible for a player to be halfway between two animal coordinates and

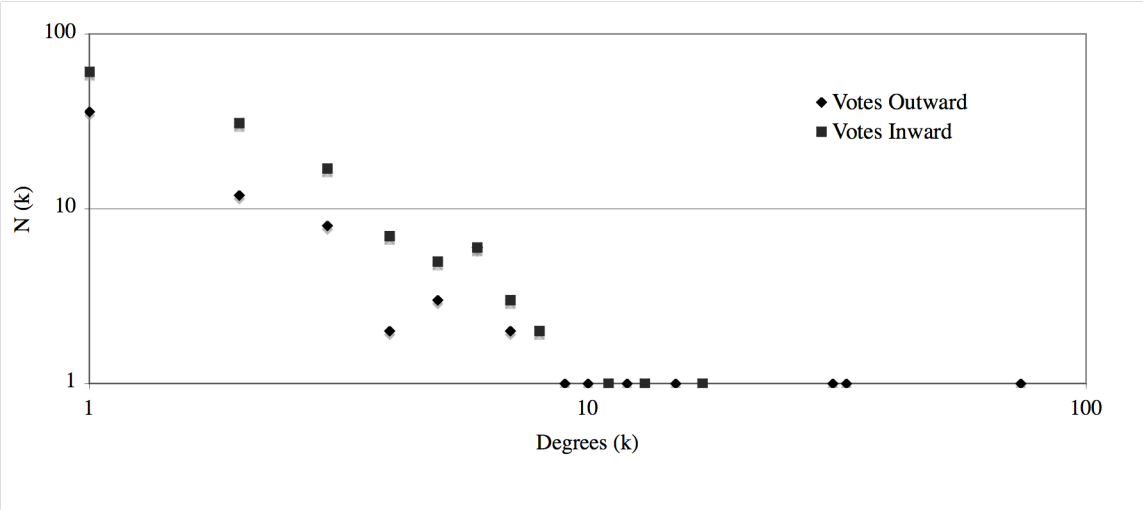

Figure 9 - Distribution of Interactions (log-log)

therefore have a familiar that flips between the two types based on small changes in behaviour.

Figure 8 shows the distribution of the 12 animals in the 3D space resulting from our analysis. For the reasons explained above, we can not say this is the only structure possible, but we are confident to say that it is the one that can better answer our research objectives.

5. SUMMATIVE EVALUATION

Familiars was trialled in a two month long study between April and June 2009. The game was made open to the public on Facebook and added to the Facebook application directory so it would appear as any other Facebook application does within the site. Invitations were sent out to acquaintances and colleagues both in the UK and in Italy, with the expectation that there would be some natural viral growth through Facebook itself.

Figure 10 shows the growth of the player-base (n=268) over the summative evaluation in comparison with the players removing the application. The growth of the game community is characterised by the "stepped" appearance of sharp increases in registrations followed by periods of slower spread. This is perhaps a result of the underlying nature of the social graph upon which the game is built. Periods of rapid growth indicate the spread into new groups of friends via mutual acquaintances. Due to the data protection policy of Facebook, it is not possible to gather detailed information on the relationships between players so it is not possible to confirm this observation.

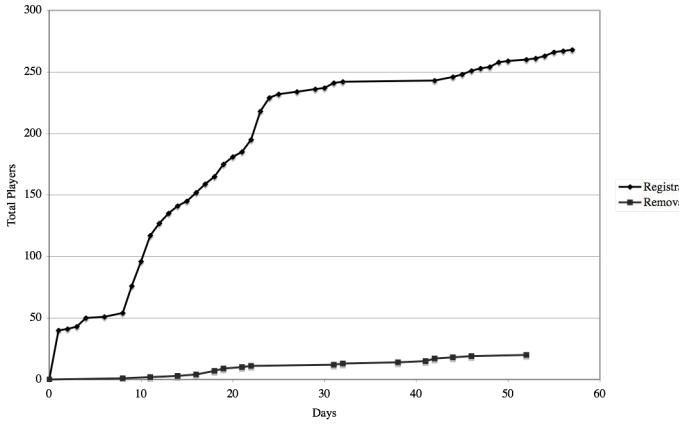

Figure 10 - Growth of Player-base

Figure 9 shows how the voting system was used by players to suggest forms for each others' familiars. The interactions are split by *degrees*, which is the number of distinct players a vote was made for, or received by, against the frequency of that number amongst the whole player base. As can be seen, a small minority of players interacted with a large number of different players and were responsible for most voting interactions within the game, which follows with previous work that suggests that social games are held together by this minority of highly active "hardcore" players [5].

5.1 Player Feedback

As part of the summative evaluation, an online questionnaire has been developed and launched during the last week of the trial in order to collect peoples' opinion about the game.

As part of a larger questionnaire,, including questions that give a general overview of the population, the questions investigate: ease of play, "enjoyability" and privacy issues of *Familiars*.

5.1.1 Methodology and participants

All those that took part in the trial were invited to fill in the questionnaire. A notification message was sent them through Facebook, with the direct link to the questionnaire.

16 people took part in it, 7 males and 9 females. The majority of the participants (14) were equally distributed between 18 and 35 years old, while only 2 were between 36 and 60: a sample that seems representative of the Facebook population.

The educational background was also quite differentiated, including participants representing all levels of education, from secondary school to doctorate degree.

As regards the Nationality, the majority of the sample (9) resulted to be English, while 2 of them were Irish.

5.1.2 Results

A 1-5 Likert scale from 'Disagree' to 'Agree' was used to collect the data for the first 2 questions, while the third provided a yes/no/don't know answer modality. Data from an open question on how to better protect the privacy of the users were also collected.

The first research question that we investigated regards the ease of play of *Familiars*. Results show how the 37% of the subjects agreed that *Familiars* was easy to play, 44% of them somewhat agreed, while the remaining 19% chose the middle option

'Neither agree nor disagree', showing a rather shared opinion about the simplicity of the game.

The second question investigated the "enjoyability" of the game. When asked to indicate their level of agreement with the statement 'I enjoyed playing *Familiars*', the majority of the subjects agreed or somewhat agreed with it, the 19% disagreed or somewhat disagreed, while the remaining 12,5% chose the middle option. Despite being less positive that the previous question, with almost a fifth of the subjects giving a negative opinion, the results show again a general appreciation of the game, with almost the 70% that claimed to enjoy playing *Familiars*.

The important last question concerned the level of privacy protection that players perceived felt was given them by the game. The 69% of participants answered positively, 12% felt a lack of privacy protection, while the remaining 19% wasn't sure. When asked which changes participants would suggest to better protect the privacy of users, the use of a username rather than the actual name of the player was mentioned. Another participant recognised that the insecurity was due to lack of privacy protection in Facebook platform rather than in the game.

6. DISCUSSION

In this paper we have presented the social game *Familiars*, which we have developed to explore the opportunities and limits of developing social games on top of a social platform such as Facebook. Traditionally, social games have been self-standing social experiences between strangers, but OSNs such as Facebook allow developers to take advantage of the real social links between people to enhance their games.

Specifically, *Familiars* is an example of an identity presentation tool – rather than being a self-contained experience, it is directly linked to the identity of the player and how they present themselves to their friends within the social network.

Familiars uses the capabilities of the Facebook platform to a great extent, and gathers a wide range of information about the social behaviour, activity and attitude of the user within their normal usage of the site. This information is distilled and presented to the user in the form of an animal companion, whose animal form is based directly on their personal behaviour.

Presenting the rich social and behavioural information about the player in the form of an animal companion is intended to create a playful interface to the complex underlying data. The types of *familiars* available within the game were carefully studied to make sure the cultural associations fit with the personalities each type represented, even across different cultures.

While each individual player may not agree with the distinctions between the different animal types available in the application and their relation to the players, it does provide a contained and consistent "game world" that invites players to see how changing their real behaviour within Facebook as a whole can be reflected in a playful way through the form of their familiar.

One of the strengths of the application is the ease with which it can be repurposed for other player-types who may not be comfortable or interested in the animal theme of the game. For example it would be easy to replace animals with types of cars or characters from films or television.

6.1 Limitations of Social Network Platform

Despite the power available to developers using an OSN as a platform for an application, it must be noted that by choosing to rely on a third party so heavily has its issues.

Mainly there is the issue of lack of control – for most applications, all game interface elements need to be presented within the interface of the OSN itself – this is handled transparently but the developer doesn't have control over what advertisements, etc. are shown and your design must carefully match that of the OSN itself.

Access to data is also highly restricted for good reason, for example spam is prevented by disallowing access to users' email addresses. Even where data access is granted it is with limitations – Facebook allows you to access a user's real name, but it is forbidden to store this on your server. There are many such pitfalls and conditions that developers must be aware of.

7. ACKNOWLEDGMENTS

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