Consideration of the Function to Find Friends in Social Games

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***Abstract*—Recently, social games have been attracting attention. Social games can be enjoyed more by building a relationship with other players. However, many users are playing social games only with their friends. There are functions to find friends through social games and social networking services, but these existing functions are not enough to find friends easily. In this paper, we consider the function to find friends in social game to find friends easily. In addition, we examine the method of visualizing and representing the friend candidates. We find that our visualization method may be effective to find good "like-minded people" easily.**

***Keywords*—social game; SNS; network analysis; community forum; visualization**

I. INTRODUCTION

Recently, social networking services (SNSs) are growing in popularity. SNS are web-based online services that focus on the building and reflecting of social networks among people. The typical SNS in Japan are Facebook, Mobage, mixi and GREE. Usually, these SNS companies sell online advertising on their sites. Their business model is based upon a large membership count. So, it is very important for SNS to assemble a large number of users. In this situation, social games have also been attracting attention [1][8]. It is because interesting social games can gather many users; so, SNS companies have introduced the social games aggressively.

One of the features of social games is in leveraging the player's social network [2]. A player can share his/her game with friends. So, social games can be enjoyed more by building a relationship with other players. For example, FarmVille [15], a farm training game developed by Zynga in 2009, is a very simple and easy game. However, players can share information and their experiences with "like-minded people" and "friends". This game was become popular and has more than 100 million users.

Therefore, in social games, playing with "like-minded people" and "friends" is just as important as the contents of the game. So, it is important for social game developers and SNS companies to provide functions that can support finding "like-minded people" and "friends" easily [7].

Usually, there are two ways to contact unknown users in a social game. One way is through a function, provided by the game, to find friends. However, it is difficult to contact with unknown users through this function, because it is difficult to get enough information to communicate with each other. Another way is a (formal or informal) community forum provided by SNS. We think that this is very good to start new relationships, because it includes a large amount of information. But, this is not enough function to find good "like-minded people" and "friends" easily in a social game.

There has been a lot of research about SNS [3][4][5]. For example, there has been research which focused on the structure of large-scale friend networks [5], analysis of network structures [10][11] and a growth models of SNS [12]. Since users recognize and make friends mutually in SNS, this research is static network research. Moreover, paying attention to the relationships with friends, network analysis using active users and an active link which changes dynamically has been studied [13]. Much of this research used social network analysis (SNA).

The research was also performed on small-scale SNS (Regional SNS). So, the research on social games offered by large-scale SNS has stopped only at the research on a characteristic business model from the height of the novelty.

Social games are attracting a lot of attention in recent years. They have also expanded market size and now service as killer contents of SNS. We think the relationships with friends through social games need to show clearly what kind of influences they were on users. Moreover, we think that it is necessary to examine how to exhibit effectively the function which social games have. In this paper, we observed "the method of finding a new friend through SNS" at the social game which draws cautions in recent years using SNA. But there has been little research about social games.

This paper is organized as follows. Section 2 describes problems of the social game. In Section 3, we consider the characteristics of the functions provided by SNS and social games. In Section 4, we examine our proposed methods. Section 5 summarizes our paper and describes our future works.

II. PROBLEMS OF SOCIAL GAMES

At first, in order to clarify the problems of social games, we carried out a questionnaire to social game players (84 university students). The main questions are as follows.

- What kind of social games do you play?
- What kind of people do you play with?

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Through the results of questionnaires, we found that many of them did not make new friends in social games. Many users are playing social games with already known users. They felt social games are fun, but it is difficult to make new friends. So, we interviewed five social game players (two experts and three beginners) about the difficulty mentioned above. Through the results of these interviews, we found that many players felt anxiety when they made contact with unknown users. Moreover, we found following two problems.

1) *Many players of social games who want friends do not know what kind of information is needed to contact unknown players*
2) *It is difficult to contact to the friend candidates, because there are many candidates who have a wide variety of personal information.*

To solve the former problem, we focused on the community forum about the social game that includes large amount of information [6]. We analyzed the bulletin board for friend on "Bandit Nation" a Japanese social game from Mobage. We also categorized the posts that were written on the community forum. To clarify the information that is needed to contact unknown players, we used conjoint analysis based on the above categories. In the results of this analysis, the following three elements have been important in the bulletin board to contact with unknown players, in addition to basic attributes such as their status and conditions for which a partner is asked (For further information, see [6]).

- Manners: local rules of the game or netiquette
- Merits: mutual benefit (ex. replacing items)
- Communication: The frequency of message exchange, and the method of contact

As mentioned above, although we have examined the former problem, we have not examined the latter problem yet. Therefore, we will now focus on the latter problem and we examine a method that supports contact with unknown friend candidates effectively in this paper.

III. CONSIDERATION OF THE FUNCTION TO FIND FRIENDS

By using an existing function in social games, a player can find the friend candidates. But in many cases, there are many friend candidates. Moreover, they usually have a wide variety of personal information. However, players cannot see personal information of individual candidates easily. So, the player is difficult to find "like-minded people". Moreover, contact with unknown users is usually uneasy. Since the information acquired in the game is restrictive, it is difficult for players to judge whether a candidate is appropriate or not. In order to solve this problem, we think that it is necessary to use information indicating the identity of the friend candidates.

Usually, there are following types of information in SNS.

- User profiles
- User preferences

On Mobage [14], a personal page includes following types of information.

a) SNS friends
b) Game titles which the user plays
c) Communities to which the user belongs
d) Favorite channels linked with video-sharing sites
e) Profile (avatar, areas, jobs, age etc…)

By using the above types of information, we think that it is effective for players to judge whether a friend candidates is appropriate or not. By analyzing personal pages in Mobage, we found that many users do not use *d)* Favorite channels, and users often do not publish *e)* Profile. So, it was difficult to use the above types of information. Therefore, we used *a)* Friends, *b)* Game titles and *c)* Communities in this paper.

Moreover, there are many various the friend candidates. In this situation, we think that visualization is also important finding "like-minded people" effectively. So, we will examine the methods to visualize the relation between the player and friend candidates in next section.

IV. EXAMINATION OF METHOD TO VISUALIZE

In this paper, to examine the methods to visualize the relation between the player and friend candidates, we focused on Bandit Nation a major Japanese social game from Mobage and we set up the following situations (Tables I, II).

TABLE I. PLAYER INFORMATION

Game status	Player's preference
Level: 100 Type: Sexy	Number of friends: 8 Number of registered games: 2 Number of communities: 9

TABLE II. SEARCH CONDITIONS

Required game status	Attributes
Level: 50 or more Type: Sexy	Good manners Can cooperate in the game Can communicate in-game or through SNS Initial avatar: Not OK Items replace: OK

TABLE III. PROPERTIES OF 14 FRIEND CANDIDATES

	Friends	Game titles (Except Bandit Nation)	Communities
Average	60.7 / user	7.2 / user	4 / user
Max	286	35	17
Min	8	0	0
Standard Deviation	75.3	8.4	4.6

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We extracted users that satisfy at least three of the above conditions. As a result of searching, we extracted 14 friend candidates from about 200 users who wrote on the recruiting community forum in Bandit Nation. Properties of the 14 friend candidates are shown in Table III.

In this paper, we considered the following combination of information (case1, 2, 3) in order to find "like-minded people" effectively.

- Case 1: friends, games and communities
- Case 2: games and communities.
- Case 3: games, game categories and communities

To grasp the relationship between the player and friend candidates easily, we visualize the properties of friend candidates using network analysis. In this paper, we used Pajek, a program for large network analysis, to draw network diagrams. The network diagram is drawn in the Kamada-Kawai layout algorithm that uses spring forces proportional to the graph theoretic distances [9]. The network diagram specifications are shown in Table IV.

TABLE IV. SPECIFICATION OF A NETWORK DIAGRAM

Item names	note
Player node	large gray triangle
Friend candidates' (*fc*) node	small triangle
Friend candidates' friends' node	large circle
Community node	small ellipse
Game title node	small square
Game category node	small diamond
Paths to communities and games from *fc*	black path
Paths to friends from *fc*	gray path
Paths to game categories from *fc*	black and dots path
Paths to game categories from Game	gray and dots path

A. Network diagram using Case 1 data

At the beginning, we used case 1 data and we drew a network diagram (see Figure 1).

At first glance, we found that the overwhelming majority of nodes are friend candidates' friends' nodes. Moreover, as mentioned above, the number of friends had a big difference by friend candidates. Therefore, the friend candidates who have many friends tended to be plotted far from the player when using the Kamada-Kawai layout algorithm. But it is not a negative factor for recruiters. If the player and the friend candidates have a large number of mutual friends, the network diagram may be plotted accurately. Therefore, this method may be effective to apply to closed communities (such as university SNS, enterprise SNS, etc.). However, users who wrote in the recruiting community forum had few mutual friends; so, we think that it is difficult to use this method in this case.

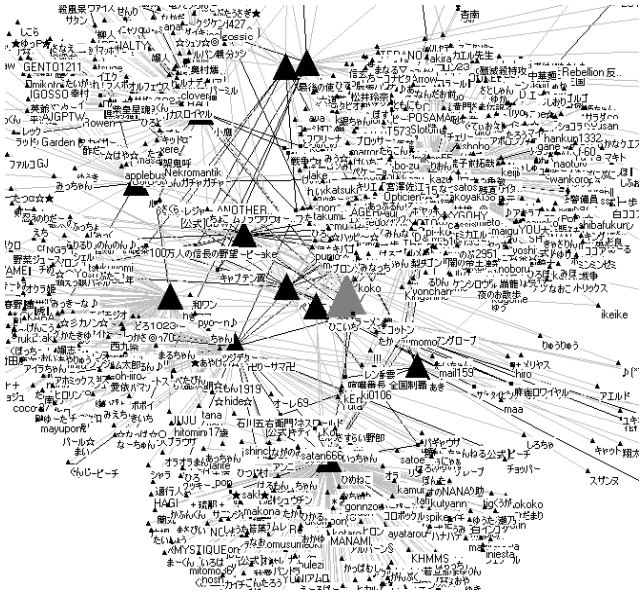

Figure 1. Part of the network diagram of case 1

B. Network diagram using Case 2 data

In case 1, we found that the player and friend candidates did not have mutual friends in the recruiting community forum. Therefore, we thought that it is difficult to use friend candidates' friends' information to draw the network diagram. So, we drew the network diagram by using Game and Community nodes only (see Figure 2).

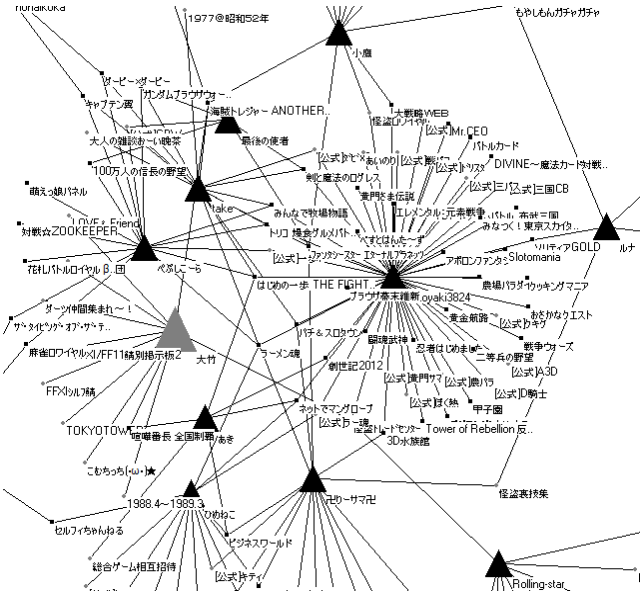

Figure 2. Part of the network diagram of case 2

Although there is a difference in users in case 2, the distance between users is shortened compared with case 1. Users who play the same game or belong to the same

communities are plotted especially near. We think that case 2 can represent an accurate network diagram when compared to case 1. Furthermore, the network diagram of case 2 is easier-to-use than the network diagram of case 1. However, when users are playing many different games, the problem that they will be plotted far from each other in network diagram arises. Playing various games is not a negative factor. If the player and the friend candidates have a large number of mutual game titles, the network diagram may be plotted accurately. But, users who wrote in the recruiting community forum had few mutual game titles, so we think that it is difficult to use this method in this case.

C. Network diagram using Case 3 data

In case 3, we used 10 game categories (RPG, Sports/Race, Puzzle, Action/Timing, Quiz/learning, Simulation/training, Adventure, Board/Card, Gambling, Other) of Mobage to draw a network diagram (see Figure 3).

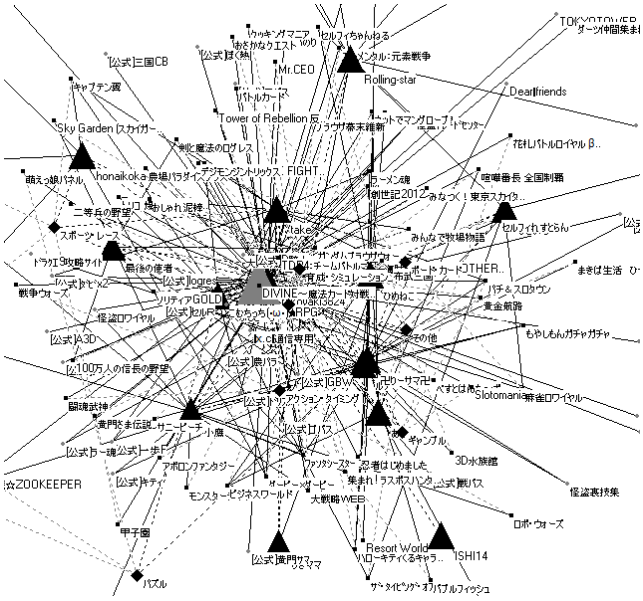

Figure 3. Part of the network diagram of case 3

We think that it is possible to measure the distance accurately by using game categories. Moreover, even if users do not play the same game title, the player can find "like-minded people" in social games easily. We think that case 3 can represent an accurate network diagram when compared to case 2.

To evaluate this network diagram, we judged three users who were plotted nearby the player by analyzing their personal information. Through this evaluation, these three users seemed to be "like-minded people" for the player in this case. So, we think that this method is more effective to find good "like-minded people" easily in a social game than the existing social game's function.

V. CONCLUSIONS AND FUTURE WORKS

In this paper, we focused on social games. Social games can be enjoyed more by building a relationship with other players. However, many users are playing social games with their friends only. They feel that making new friends in social games is difficult. To solve this problem, we focused on the difficulties which arise when a user contacts friend candidates. In order to solve this problem, we think that it is necessary to use information indicating the identity of friend candidates. Moreover, we examine the methods used to visualize the relationship between the player and friend candidates. We considered three cases of combination of information in order to find "like-minded people" effectively. We found that visualization of the relation between the player and friend candidates by using the user's preference information may be effective to find good "like-minded people" easily.

But, we set a same weight to all paths to draw the network diagram. So, there is still room for deliberation. We should research the reasonable weight of the paths. We should also evaluate our proposal. These are our plans for future works.

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