

# *Proposed model for social and collaborative social network of positive reinforcement*

## *Positive Reinforcement Online Social Network: PRSN*

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**Abstract**— In the last years, online social networks (ONSs, online social networks) have grown to become one of the major medias for human beings on the Internet by having a wide distribution and acceptance by users. One of the critical aspects of developing this type of systems is the user interface. For this reason, a model-based approach is used to allow us collect interaction and collaboration aspects of social networks. Moreover, this paper based on ONSs and model-driven development provides a first approximation of social and collaborative model of a new online social network, which we have called PRSN (Positive Reinforcement Online Social Network).

**Keywords**—component; Online Social Networks, collaboration, Model-Based User Interface Development, Positive Reinforcement, Human-Computer Interaction.

### I. INTRODUCTION

Currently, the research shows a clear trend to combine new technologies with social, environmental, cooperation topics and so on. With a common target, these issues are related to improve our environment. Most of the time, humans interact with their environment trying to get some kind of "reward". Taking advantage of this feature, the users, who do actions that positively affect their environment, will be "rewarded" through the proposed system. This system is build using Web technology type which currently has more success in the socialization of human beings through the Internet, OSNs.

This paper gives a possible definition for a novel type of online social network which we have called Positive Reinforcement Social Network (PRSN) and made an initial proposal for its social and collaborative model.

First, we will see the main characteristics of collaborative systems, OSNs (Online Social Networks) in section II. After reviewing these characteristics, a descriptive proposal of PRSNs is presented, section III. The next section IV introduces the social and collaborative modeling of a generic PRSN. Finally, Conclusions and future work will be presented.

It is important to remark that, in this paper we are not taking into consideration the basic characteristics shared by all OSNs, it only presents the characteristics that differentiate our proposal from others OSNs.

### II. SOCIAL NETWORKS SUCH AS ACTUAL CASE OF GROUPWARE TOOL

#### A. Collaborative Systems

For the presented proposal in this paper, it is necessary to note that it is a collaborative system. This has been considered as follows: Groupware: An application or set of tools that covers needs such as communication, cooperation, and coordination. Or, all needs that arise in collaborative work between two or more people by providing a common interface [2]. And, collaborative Systems Collaborative Work (CSCW): A term which combines the understanding of how people work in groups with computer networking technologies potential, associated with software, hardware, services and techniques [6].

#### B. Online Social Networks

While online social networks are gaining more strength, Social networks are classified as "social software". The term "social software", according to [1], emerged in 2002 to describe software systems that support interaction between groups of people. The features most widespread and used by the users are uploading and sharing pictures and videos, comments on other profiles, friends and private messages. At first, social networking sites came from sites that were very popular. To extend its functionality, the Web Masters of these Websites started including them with social networking functionalities.

We can also see how important the type of users is for OSN, those are the ones who invite others to join the Social Network.

### III. POSITIVE REINFORCEMENT SOCIAL NETWORK (PRSN)

Taking the most widely used definition of social network [5], we can highlight the phrase "allow users to share content, interact and create communities of similar interests". We can say that a social network of positive reinforcement allows users to interact with each other and collaborate on actions and/or events that have a positive impact on themselves and their environment. Thus, we could define it as follows: Is a social network in which individuals interact with each other and their environment in an ethical manner. In it, users may propose,

implement and collaborate on actions and/or events that have a positive impact on them, the others and their environment. Also, as a result of doing these good actions, users are rewarded by the system.

Therefore, PRSNs have a number of features added to the existing social networks, controlling these good actions and its respective awards. Positive reinforcement is specified in a virtual currency (which will be backed by real currency environment PRSN) and virtual points (these points do not need financial support). Users can accumulate and eventually exchanged them for real benefits.

### A. PRSN Types

We can distinguish two types of PRSNs:

- Positive reinforcement through points that can be exchanged or through which the user can get some advantages (registration in online book shops, getting free devices, accessories, etc.).
- Positive reinforcement through points and money. In this case, as the option of points, users have the option of being rewarded economically when they do or assist in certain actions. In this type, PRSNs have to take into consideration the issue of security deeply than in the other case.

### B. Interaction in the PRSN

The user interactions in PRSNs are the same as OSNs. In which, the user possibility of interaction is associated with positive actions, the "reward" and how to use or spend it. Therefore, the interaction will be conducted through the Website. However, there will be other possible scenarios of interaction. A possible interaction scenario is the "events scenario" organized by the PRSN users or administrators, in which at the end, organizers could identify the PRSN users, who have participated in this action through the introduction of electronic document of identity in electronic-readers. Once the user is identified, appropriate software might map the "reward" to the user's account.

By identifying the place where the action is performed, through an email delivery, user name or an official document that identifies him, in this case the assignment of "reward" is not automatic. Organizers, later, should enter the user's or attendee's data into the system. By having the option to give each participant a code, and enter it in the PRSN website (previously the user will have to Log), the system will account the good done actions and will "reward" the user. Other possible scenarios of interaction should be taken into consideration, when the user wants to take advantage of his accumulated points or spend part of their "virtual" money. Some possible types of interaction related to this exchange might be:

- Exchange points for some kind of reward;
- Spend the "virtual" money in some kind of reward;
- Participate in an online or an offline event organized by the PRSN to get points or "virtual" money;

- When the user perform some positive actions, the environment will reward him (either by points or "virtual" money);
- Passing the "virtual" money from the user PRSN account to his real account;
- Purchase and sale an object in exchange in the PRSN platform using the "virtual" money (between users).

## IV. SOCIAL AND COLLABORATIVE MODELING OF THE PRSN

This section describes the social and collaborative model of PRSNs. The conceptual model, an architecture that can support the PRSN, is described. After that, the system is modeled using the diagram of entities, the organizational structure, and the co-interaction diagrams. The social aspects of the PRSNs are defined by the conceptual model, the diagram entities, and organizational structure, while the collaborative aspects of the system are expressed in the co-interaction diagrams.

### A. Model-Based Development

The design of computer systems has evolved, not only in appearance, but also in the way it is done. In a groupware application, as in any other system, the interface design is crucial since it lies in the success of development. HCI has been an important area, where methods and techniques have emerged to facilitate the design. In a groupware application the end user can get his own user interface, and these methods are applicable for the design. However, CSCW systems are systems with certain particularities that would be worth taking special care to get an interface design higher quality and closer to the user needs.

In [3] we have a report about model-based development of interfaces (MB-UID). This article presents a set of tools to perform this type of modeling.

### B. Conceptual Model

The following is a conceptual model of a generic PRSN:

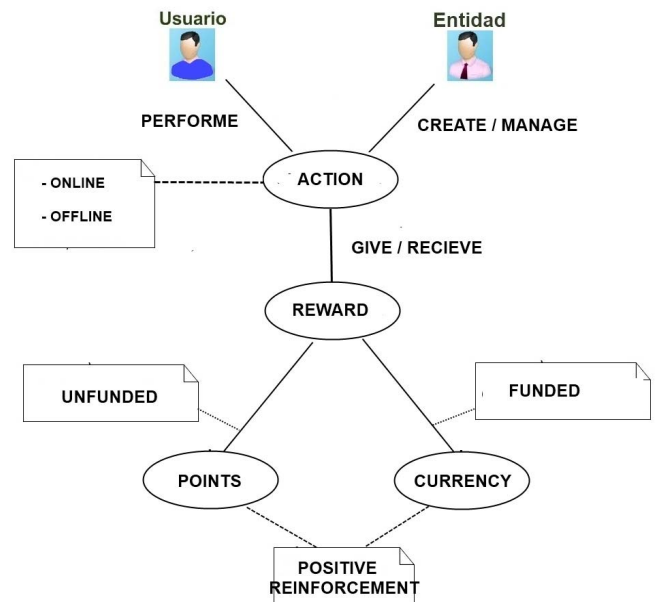


Figure 1. PRSN Conceptual Model

In the conceptual model, Figure 1, two basic types of users are shown: On one hand, we have an entity that creates and manages the actions and rewards associated with them. And on the other side, we find the users who perform and/or participate in such actions. The model focuses on the Action-Reward; by considering the action as a timely event that has a positive effect on the user’s environment, and for that, he will receive rewards as positive reinforcement for his actions. There are two possible types of rewards depending on whether there is a funding behind a certain type of an action or not. The points will serve to increase the ranking, and with this increase in ranking, the user will have certain advantages or possible awards. And when we talk about money the user will get them as a reward, and the real money is stored in the entity that controls the platform, on a bench in a pay-pal account and so on. This "virtual" money may be spent by the user in different ways, like: interchanging objects with other users, by having access to certain shops in internet (sponsors of the PRSN), etc.

C. Architecture

In Figure 2, we can observe the software and hardware architecture (basic version) of a PRSN.

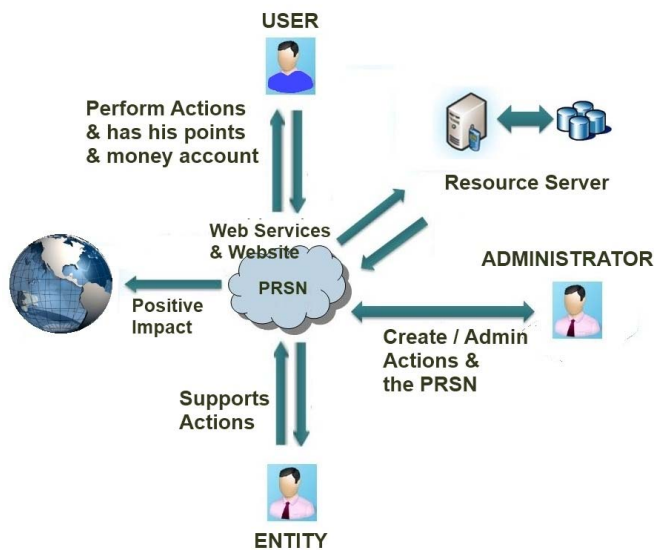


Figure 2. System Architecture

In this software architecture, we see the major stakeholders (user, administrator and entity, each of them has a number of associated features.) and how they interact through the system, which could be implemented as a website or web service, to have positive impact on the environment. The system will also have a resource server where security will be important.

On the hardware side, it will be necessary for the deployment of the system to be the same for any website. The implementation of this software should be directed towards modularity and system scalability and taking into consideration that a basic PRSN may have a number of separate functions in different modules. But for different types of PRSN, it may require different features and therefore new modules, leaving this possibility to add functionality, opens the door to the PRSNs to adapt so many different types of scenarios.

The software architecture of the system is divided into three layers: user interface layer, business or logic layer and data access layer.

D. Diagram of entities

Figure 3 shows the main entities of a PRSN, in it we can observe the main roles (this information is extended in the next sub-section: organizational structure). Transactions are the entities which comprise the receipt of rewards and make use of them. As we saw in the conceptual model, the action can be done in both types online and offline. The last part of the figure represents the resources associated with the PRSN where we have points, money and ranking. These entities are described in section 3 where PRSNs are presented.

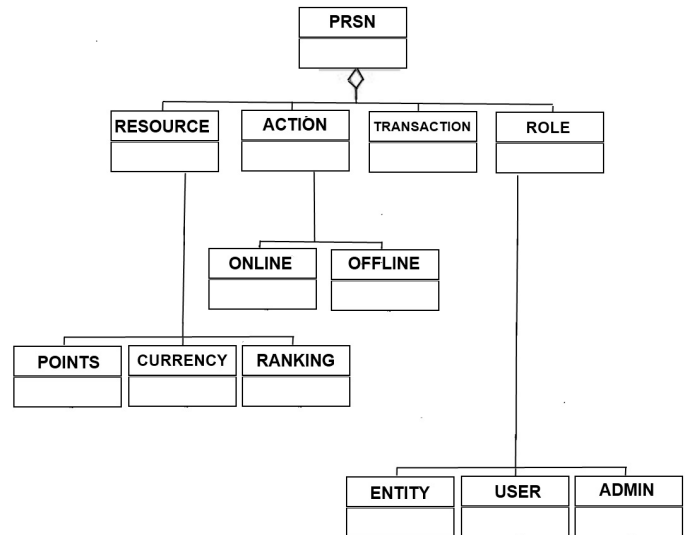


Figure 3. Diagram of entities

E. Organizational Structure

The following organizational structure and the actors shown in Table 1, has been identified in the PRSNs. For the development of this organizational structure we have relied on the work developed in [4].

TABLE I. ORGANIZATIONAL STRUCTURE

<b>Definition</b>	PRSN Description (III)
	Conceptual Model (IV,C)
	Entities Diagram (IV, D)
<b>Groups</b>	Administrator, Entities & users
<b>Individuals</b>	Super Administrator, Collaborating Entity, Entity, Registered User, Anonymous User
<b>Rewards</b>	Points, "Virtual" coin, Ranking, Award, Advantage
<b>Events</b>	Online, Offline
<b>Description</b>	In this table are the main actors in the system and their possible groups. We also have agents in the system and two of the main points of the PRSNs such as reward (positive reinforcement) and the events through which users receive this reward.

Here are the main actors in the system:

- Super Administrator: is the creator of the PRSN and he can administrate the permissions to perform any modifications in the system configuration.
- Collaborator Entity: is the entity that will participate in creating and managing PRSN for both online and offline actions or events. This entity needs to be validated by the super administrator.
- Registered User, the PRSN basic user: he can't create or manage the actions proposed, but he can use the other functions.

#### F. Co-interactions Model

Below are the most important co-interactions diagrams of the system, for its development we have based on TOUCHE [2].

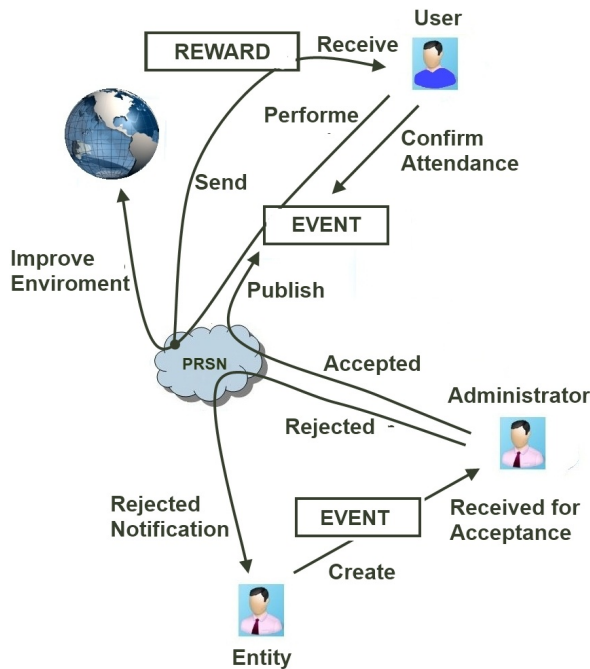


Figure 4. Co-interactions diagram of the events

In Figure 4 we can observe the co-interactions diagram of the PRSNs events, these events can be both online and offline. Participating in online events will be validated automatically by the system; however, in the offline events or actions the user participation is validated through an identification system, managed by the organization, which will have to know the system of the user participation.

The reception of the reward by the user occurs in the system account. It is not taken into consideration in this diagram if co-interactions are rewarded with money or points and it was treated with generic reward.

In Figure 5 we have the co-interactions diagram with respect to rewards. In it, we can see how the entities and administrators are the responsible to "inject" awards and benefits in the system. We also see how the user uses his ranking and rewards for prices and benefits of his environment. These prices or benefits were previously introduced by the administrators or entities.

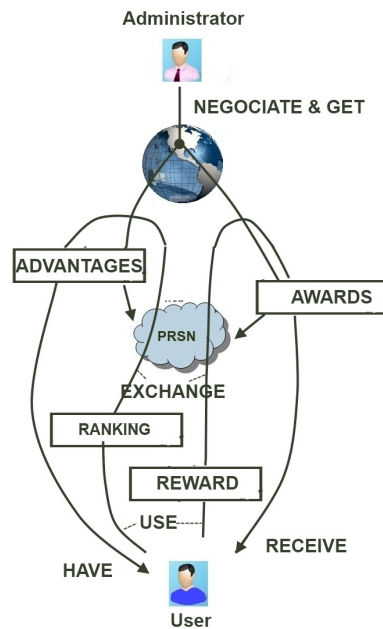


Figure 5. Co-interactions diagram of the rewards

#### V. CONCLUSIONS AND FUTURE WORK

In this paper we present, define and characterize the social networks of positive reinforcement (PRSN). As seen, the proposed model adequately captures social and collaborative aspects of this novel type of social networks.

In particular, the social aspects are covered by the conceptual models, and organizational entities, as they are adequately reflected the private concerns of the PRSN (entity, administrator, user, etc.) and their relationships. The collaborative aspects are collected by the co-interaction diagrams, which model the different tasks and / or activities that differ PRSN from other NSOs. The inclusion of this proposed model allows the development process models based on social networks with a focus on aspects of interaction and collaboration. The interaction, communication and collaboration between different PRSNs are an important issue, which may mark the success or failure in the adoption by the users of such systems, aspects to be considered in future proposals.

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