AR-Based Gamified Point System with Pet Design

Boyang Liu, Jiro Tanaka
（Graduate School of Information, Production and Systems, Waseda University）

1 Introduction

Point system is to encourage consumption and maintain the current customers by allowing them to get a sense of satisfaction from accumulating points. However, the unattractive redemption rate increases the difficulty of accumulating points, which leads to a low user interest. New user-centric design is becoming important to motivate user participation [1, 2, 3]. The goal of our research is to build a point system framework to increase user engagement. This paper calls for a multi-player approach based on augmented reality pet-raising game design [4, 5] to engage users.

2 System Design

2.1 System Overview

We design an augmented reality based gamified point system deployed on mobile devices. Our system is designed based on current point system structure.

Our design builds the emotional connection between the user and the system by combining the pet raising game design. In addition, we design user interaction methods to facilitate communication between users to increase user experience and interest. A theme of raising a pet is chosen because of the following considerations: 1) pets can be used as feedback for users' shopping behavior; 2) users can gain motivation and establish emotional connections with the system from the process of raising a pet; 3) pet can be used as a bridge to build channels for communication between users; the theme of pet raising can create a relaxing and enjoyable game environment for user interaction.

2.2 System Structure

Our system contains two modules. The basic module is the individual module. In the individual module, input (mission) and new feedback including value points, pet and food as output are designed.

The other module is the user interaction module. The design of new feedback increases user engagement by leveraging user interactions including competition and non-competitive interaction. Value point and food are designed to motivate the non-competitive interaction between users. Pet is designed for user competition.

2.3 Element Design

Mission: The mission is designed to remind users of value creation in shopping. The mission could be completed in the purchase. At checkout, mission will be confirmed.

New Feedback: After the mission is confirmed, our system will give feedback to participants to reward them. In our system, users can still earn points as

current point system. In addition, the following are new feedback we designed:

1) Value Point: Users can get the value point after they complete mission. Value points can be used to buy virtual food to feed pet in virtual world. Value point is the feedback for mission.

2) Pet: In our system, the user can feed a virtual pet. Pet will gain EXP if user completes the mission. If the EXP of pet reaches threshold, the pet will level up. The energy of pet will gradually decrease. It is designed to motivate users to complete mission continuously as the pet reflects the status of the user.

3) Virtual Food: In the system, the user can use value points to buy virtual food. The food can be used to help pet recover energy. User needs to get value point to keep the pet in good condition. Virtual food can also be given to other players as a gift. The design of food not only motivates users to accumulate value points, but also encourages communication between users.

2.4 Individual Module

Each user has a point card that can be used as an identification in the game. In this game, the user with point card can summon a virtual pet using the gamified point system. The user can view the statue of the value point and the pet through the mobile device, as they are augmented on top of the point card (see Figure 1).
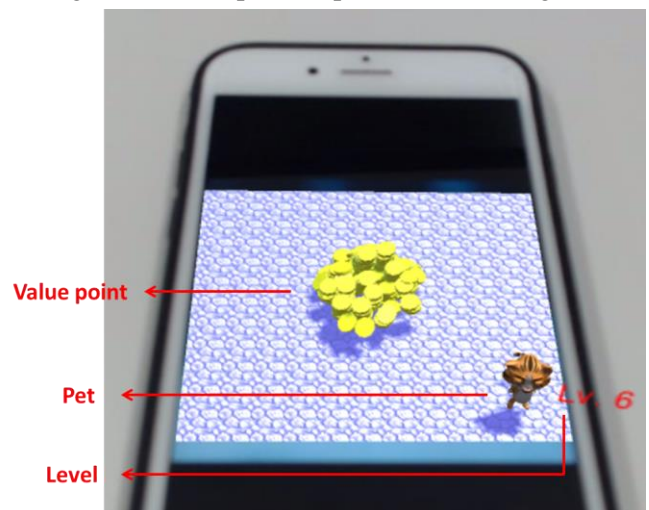

Fig. 1: Value point and pet interface.

2.5 User Interaction Module

The user interaction module is designed to strengthen the connection between the user and the system since social desires can increase the user's motivation in the game. In the user interaction module, we explored different types of user interaction: competitive and non-competitive.

Competitive Interaction

In the competitive interaction, the user can use the pet to compete with other users. When co-located users want to compete, they can use the gamified point system on the laptop together. Every user has a smartphone with a point card inside. When users start the competition, they put their digital point cards together on the table. The gamified point system deployed on the laptop runs and captures the video stream through the web camera. Based on the level information obtained from the database, the results of the competition will be displayed on the competitive interface.
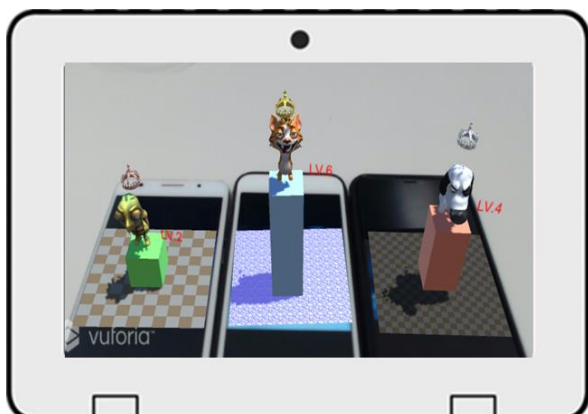

Fig. 2: Competitive interaction interface.

Non-competitive Interaction

In non-competitive interaction, users can interact with other users by sharing foods. Users can give gifts to and receive gifts from other users. Mobile devices are the platforms between users.
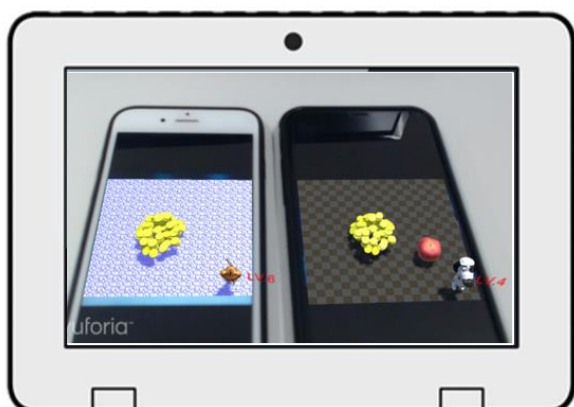

Fig. 3: Non-competitive interaction interface.

3 Preliminary Evaluation

We asked several participants to do experiment. Participants were randomly divided into two groups, the Basic Group and the Full Group. In the Basic Group, users used the current point system. In the Full Group, users used the gamified point system.

From the preliminary evaluation, we found that the usage time of point system increased greatly after adding gamification design.

The System Usability Scale (SUS) was selected as a measure of system effectiveness and satisfaction. We administered the SUS for both the Basic Group and the Full Group. The mean SUS score for the Basic Group was M = 70.83, on a scale from 0 (worst) to 100 (best), and M = 79.58 for the Full Group.

4 Related Work

Li et al. [6] designed a multiplayer software tutorial system. Their study showed that their system resulted in better performance over pre-authored tutorials through competition. Hwang et al. [7] proposed a competitive gaming approach to support AR-based learning activities conducted in real-world contexts. The results showed that the AR-based gaming approach can improve learning performance and inspire user interest.

5 Conclusion

We offer a novel approach to utilize the point system in mobile devices through gamification and AR games. One important advantage over the current point system is that users can participate in a game experience, interacting with others through different interaction modes. In the future, we will continue to focus on the user interaction and explore more ways to enhance interpersonal communication in the system.

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