Games as a Facilitator for Social Networking and Team Building

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ABSTRACT

This paper describes the design, implementation, and proposed study for the game Table Tilt. Table Tilt is a multiplayer game written for the iPhone and iPod Touch platforms that facilitates networking in a conference setting. It is one of several team building games that will be developed for the SNAG (Social Networking and Games) games suite. The goal of the system is to increase the players' motivation to participate in conference activities and communicate with other attendees.

1. INTRODUCTION

Table Tilt is a multiplayer game for the iPhone and iPod Touch platforms that facilitates networking in a conference setting. It is part of a larger suite of games within the SNAG (Social Networking and Games) project. SNAG is a two part project; one part facilitates social networking, i.e. long term interactions, and the other part facilitates team building. The team building aspect helps with the initial interactions between people (for instance in ice-breaker situations) as well as helping to develop better communication and cohesion within an existing team.

This project is particularly focused on increasing long-term communication between the members of the STARS Alliance, because currently there is very little interaction between students of different schools outside of the conference setting.

2. RELATED WORK

Thomas et al. [1] discuss the use of computing identity development for college students through the growth of leadership and peer mentoring. They look at the interaction between students in the context of the STARS Alliance, and hypothesize that building networks between students and across schools can increase retention in the field of Computer Science. They show that when students are interacting with one another, they have more means of supporting one another, and therefore have more desire to stay in the department.

A system with a goal similar to Table Tilt that also uses mobile hardware is Scavenger Hunt [2]. This system was designed at the University of Illinois to help with freshman orientation in the Computer Science department, and to help retain the students in the process. Students are divided into teams and given Hewlett Packard Jornada 680 Handheld PCs, which present the students with clues for the scavenger hunt. The system provides students with the opportunity to familiarize themselves with the campus, and to also work together with their other teammates to solve critical-thinking puzzles. They hypothesized that Scavenger Hunt would increase the involvement of the students in departmental activities and organizations, and also measurably improve new students' attitudes toward Computer Science. At the end of the game, the students felt more confident about their knowledge of the campus and the CS department, and most could name one or more of the people on their team. Also, the

use of mobile technology had a large "coolness" factor among the students, which made them feel more involved in the technical aspects of the department. The work was able to show a possible correlation between retention and participation in Scavenger Hunt, although they acknowledged that participation was mandatory, and they could not determine the precise effect that Scavenger Hunt has had on retention within the department.

Table Tilt is designed for use at a conference instead of freshman orientation, and so it is organized somewhat differently. Instead of having set teams for the entire conference, players are mixed differently for every game to maximize exposure, and there are many more game sessions. We chose the iPhone and iPod Touch platforms because of their cultural appeal and their high popularity among students. The goal is to increase the players' exposure to other conference members and also to increase team communication and cohesion. This system lays the groundwork for the players to continue networking further.

3. SYSTEM OVERVIEW
Table Tilt is a multiplayer game for the iPhone and iPod Touch platforms. It supports two, four, or six networked devices, and together all of the screens make up one large game screen (Figure 1). There are ten different levels, and depending on the level, a set number of balls and holes of different colors are randomly placed on the different screens. The basic game mechanic is tilting the device, which causes the ball to roll in that direction. When the ball reaches the edge of the screen, it will roll onto the adjacent device's screen. The goal of the game is for the team to get all of the balls into the holes of the correct color on all ten levels within the two minute time limit.

Figure 1: Six Player Game Board

4. METHOD
4.1 Preliminary Research
We conducted some preliminary research on the iPhone and iPod Touch platforms to determine how to collect touch and accelerometer data, and also to make some performance-based decisions. We created a test application (shown in Figure 2) using the iPhone's implementation of the OpenGL framework, which is rather lightweight and does not have support for quads, glBegin and glEnd calls, etc. Due to poor performance and a lack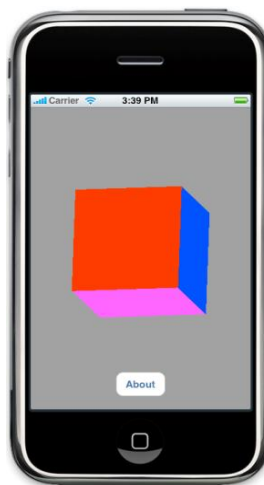 of documentation from Apple, we moved away from OpenGL in favor of the Core Graphics Framework, which is part of the Apple software developer's kit. The CGF did not suffer from performance issues, and was well documented by Apple. The CGF also made it very easy to import art assets, which was important because we

Figure 2: Preliminary OpenGL iPhone Application

needed simple art that could be loaded very quickly.

4.2 System Architecture
The architecture for the system follows the model – view – controller pattern. The model contains all of the game engine logic; it handles all of the state machine information, physics updates, etc. The view

displays the game screen to the user, which contains the game board and all of the objects such as balls, holes, and walls. The controller handles all of the user input, so it queries the accelerometer for data and also registers touch inputs.

4.3 Network Architecture

Table Tilt uses Bonjour as its service discovery protocol, because Bonjour is natively supported on both the iPhone and iPod Touch platforms and it has support for WiFi networking. Since the iPod Touch does not have Bluetooth, it was important to find a solution that utilized WiFi so that we would not alienate half of our platform.

The devices in the system communicate via Bonjour and use a server – client relationship. One of the devices is designated as the server, and the others connect to it as clients. The server sends out information to all of the clients, and the clients then determine if that information is relevant to them. If a client needs to send data to another client, it must send it to the server, and the server in turn broadcasts it to all clients. Because Bonjour is a very slow protocol, it could easily bottleneck the system. To avoid this, the system only sends information across the network when absolutely necessary, and relies on the individual devices to do their own calculations.

Level information is generated by the server and sent out in a packet at the beginning of each level. The packet contains an array of ball objects and hole objects. Each of these objects contains a position, vector, and enumerated types for object type and color. By passing enumerated type and color, the art asset does not need to be passed, and the individual devices can perform the mapping when they receive the packet. An example level packet would be a blue ball, red ball, blue hole, blank hole, and two craters that must be avoided. Each client determines which parts of that level fall within their local screen coordinates. Gameplay continues at a local device level until a ball needs to move to a different device. At that point, the server sends out the updated ball information to all clients, and each client determines if the ball has moved to their screen. In this way, the network traffic is kept to a minimum, and there is no bottlenecking of the system.

4.4 Hypothesis and Study

We plan to conduct a pilot study on Table Tilt at the STARS Alliance conference in August. Of the 300 attendees, we hope to see 75% of them participate in the nightly game sessions. Each night before dinner, several game sessions will be held at the front of the dining hall. We will provide enough devices for one game session, and other sessions can run concurrently if there are enough other conference attendees who are willing to share their devices. On the first night, the teams will consist of members from the same table who already know one another. On the second night, half of the team will be from one table, and the other half will be from another. This will enable cross-school interaction while also allowing the students to work with some familiar teammates. On the third night, the teams will be composed of players from entirely different tables in order to maximize cross-school communication and interaction. Each night, the team with the most points will have those points added to their individual scores for the other social networking games.

Our hypothesis is that Table Tilt will increase the players' motivation to participate in conference activities and communicate with other attendees. We will measure this by recording the number of

people who play each night, and how many times each of them play. We will also conduct surveys at the beginning and end of the conference to gauge attendee interest in the game and their perception of its effectiveness.

The pre-survey consists of baseline questions that will allow us to put the post-survey results into a meaningful context. The post-survey evaluates the effectiveness of the game as a networking tool, and also provides opportunities for students to make suggestions for improving the game.

Pre-Survey
About how many people do you know at this conference who are not from your school?
What age bracket are you in?
What is your gender?
How would you rate yourself on a scale of 1 to 5, where 1 is very reserved and 5 is very outgoing?
On a scale of 1 to 5 (1 is low and 5 is high), how often do you play video games?
On a scale of 1 to 5 (1 is low and 5 is high), how often do you play casual games (ex. cell phone games)?
Do you find it easy to meet new people?

Post-Survey
How much did you interact with other players during the game? Rate your interaction from 1 – 5, where 1 is no interaction and 5 is a lot of interaction.
After playing the game, did you interact again with the new people that you met during the game?
If you answered yes to the previous question, then did you feel that the game gave you some common ground to interact with those people?
Is there anything that you would change about the game to make it easier to network with the other players?

Is there anything that you would change about the way in which people were selected to play the game?
Is there anything that you would change about the times that the game was played during the conference? Would you have the game be played more or less?
Did playing this game help you progress in your Snag'em missions?
Do you feel that playing the game was a waste of time?
Was the game confusing?
Did you have fun while playing the game?
Did you like the look and feel of the game?
The game crashed: Never, once or twice, several times, a lot
Did the game feel sluggish?
Would you want to play the game again?
What did you like most about the game?
What did you dislike most about the game?
Do you have any other comments about the game?

5. DISCUSSION
Since we have not conducted our pilot study yet, we do not have statistically significant data. However, the user studies that we conducted in the lab indicate high enthusiasm for the game, and several users requested more levels and harder levels. Since the members of the study knew each other, it was not possible to gauge the networking aspects of the game yet, but their other inputs are being taken into account, and the modifications to the system should be in place in time for the pilot study.

6. CONCLUSIONS
In this paper we have described the design, implementation, and proposed study for the game Table Tilt. Table Tilt is a multiplayer game written for the iPhone and iPod Touch platforms that facilitates networking in a conference setting. The goal of the system is

to increase the players' motivation to participate in conference activities and communicate with other attendees. Since we have not conducted our pilot study yet, it is difficult to measure how effective this game will be, but the correlation between playing the game and increased interaction and participation is worthy of further study.

7. FUTURE WORK

Since this system was built in such a short amount of time, we did not have the opportunity to research sound for the iPhone platform. Sound would add a degree of immersion and feedback for the user that would be very beneficial in future iterations of the game.

We would also like to add the potential for players to "drop" the ball between screens. This would require the players to be in constant communication while passing the ball between screens in order to avoid losing it. There is currently a bug in the system that occasionally allows the ball to disappear while passing between screens, but it is caused when the ball's vector is reversed while in transit. This means that no device will receive it, and no more updates will occur to the ball's vector, and therefore it is lost. This issue needs to be resolved, but we are interested in developing a way to lose the ball through careless passing.

Another area of future research would be to expand the system to allow for direct competition between groups or individuals. It would be interesting to see if this improved player interaction, or actually caused it to decrease.

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