Keep me alive

Community role-playing game

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ABSTRACT

This project consists in an interactive object with a web interface that presents a different way of communication and role sharing not dependent on typing and/or speaking skills. This game was specially designed for kids and the main objective is to increase community bonds among participants using physical interaction to explore non-traditional ways of communication. The main intent is to show readers how to turn existing objects in the physical world into potential interaction/communication tools.

Keywords

Making things interactive, tangible bits, web sharing, affective computing and interaction

INTRODUCTION

The main idea of this project is to strengthen community bonds using a physical and web based game. Influenced by emotional design readings it may be interesting to involve people in a common and shared game, with no limit for expanding and exploring affective relationships among participants.

People generally make effort when they feel shared responsibility and act together within the community when something depends on them. The concept behind this game is it to take care of an object (Figure 1,2) that depends on "its family" and vice versa.

The difference between this project and existing similar projects, like *Tamagotchi* or *Webikinz*, is that this one combines the physical and the virtual world to explore feelings and role sharing among people that use this object. The project intent is to develop affective, strategy and community competences across all ages, but specially children. The interactive object is a piece of technology that is able to sense the information coming from the environment, process it regarding pre-programmed procedures and return expected outputs.

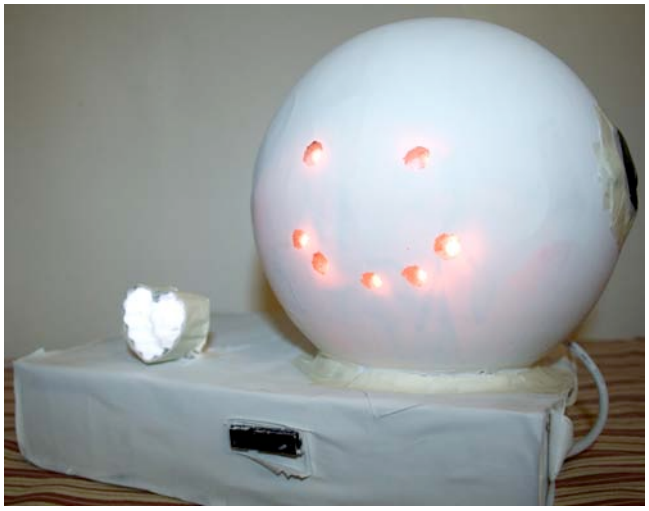

Figure 1 – Front view

Figure 2 – Dark view

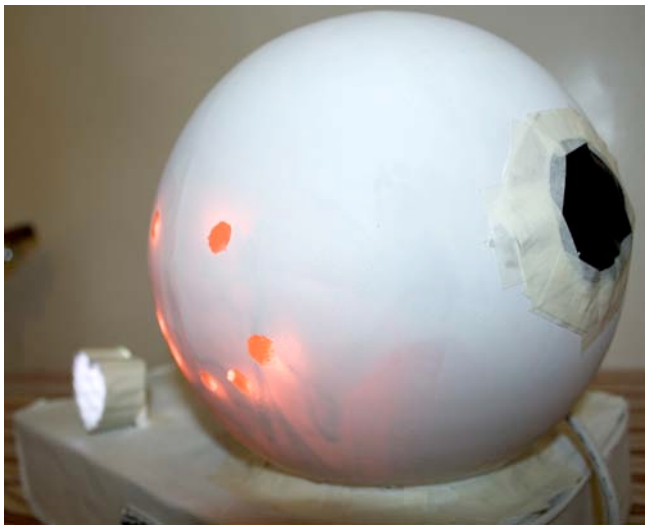

Figure 3 – Side view

RELATED WORK

The **Tamagotchi** is a handheld digital pet created in 1996 by Aki Maita and sold by Bandai. Over 10 million Tamagotchis have been sold as of 2005. More and more will be made in reference of this new technology. The Tamagotchi is housed in a small and simple egg-shaped computer. Three buttons (A, B, and C) allow the user to select and perform an activity, including:

Feeding the Tamagotchi a piece of food or a snack.

Playing games with the Tamagotchi.

Cleaning up a Tamagotchi's waste.

Checking its age, discipline, hunger, happiness and other statistics.

There are five versions and it is very likely that more varieties of Tamagotchis will be made. Tamagotchis can also get prizes and "Gotchi Gold," the currency of Tamagotchis.

Webkinz are stuffed animals that were originally released by the Ganz Company on April 29, 2005. The toys are similar to many other small plush toys. However, each Webkinz toy has an attached tag with a unique "Secret Code" printed on it that allows access to the "Webkinz World" website. On Webkinz World, the Secret Code allows the user to own a virtual version of the pet for virtual interaction.

There are also smaller, less expensive versions of the toys called Lil' Kinz. In June 2008, Webkinz opened its own eStore, where users can buy virtual items such as furniture and virtual pets.

PROJECT DESCRIPTION

The interactive object developed in this project is called *"Dudie"*. These are objects composed by a sphere, where users can recognize robot emotions and touch to generate events, and a small box on the bottom to display more outputs, detect presence and store all the mechanics (Figure 3).

Participants use their own *Dudie*, and all *Dudies* live and act as a family. Each *Dudie* is cable connected to a computer, which uses a web-based interface to connect to a web server, where all *Dudies* share their emotional state. Once they live as a family, *Dudies* depend on each other, which means that each player should play alone as part of a group trying to keep them all alive. If a *Dudie* dies, the entire family dies and the game is over.

Although this game is not dependent on location, once the number of *Dudies* can be unlimited and they can be spread all over the world, these objects have some common characteristics, such as: age; level of anger; level of happiness; self-intelligence; **life**.

This section will be answering to some questions, such as: how do people interact with these objects and get responses? How do users interact with other users? What are *Dudies* made of? How do I build one of those objects?

INTERACTION

These objects were developed to sense the world and promote interaction using touch, vision and audition.

In this sense, and once the target users are children, which may not have well developed typing and speaking skills, this project required

some evaluation about the level of interaction that should use.

In the application that supports this project as well as in the interactive object, the option was to use easy recognizable icons, light and sound to display outputs. Users are not required to read anything and the images explicitly state what is happening at any moment. Also the outputs are the real time consequence of users actions and the only thing that requires user reasoning is the emotional state of each *Dudie* and its relationship with the family, because it is the purpose of the game.

The following list shows the relationship between inputs and outputs in the physical object and in the web-based application, making the bridge between the user expectations and what *Dudies* are able to process.

Inputs in the physical object

Recording greeting message: This object is provided with a small micro, which allows users to record a short voice message. Recording voice directly into the object, permit users to personalize each sphere, turning it a little bit more unique and increasing users/machine familiarity.

Detecting presence: One of the most important features in these objects is the capability to recognize human presence. By simply displaying a greeting message and *Dudie' s*elf-mood each time anybody is close to the object, we can increase the motivation to interact.

Sensing touch: Because touch is probably the easiest way to interact with a physical object, *Dudies* have touch sensors in their ears allowing users to get immediate responses from the object.

Outputs in the physical object

Showing self-mood: Once each *Dudie* has itself personality, each object is provided with a matrix of LEDs displaying mood in form of different smiley's.

Displaying greeting message: As referred on the inputs section, users are able to record a greeting message. This message is displayed each time anybody is close to this object.

Showing family status: The family status is shown by the power of everything that composes *Dudies*. If the family is dying all the lights go dimmer and the object stops responding normally. The objective is to show users that they have to care more their own sphere and interact with it if they want to keep the family alive.

Playing warnings: "Playing warnings" is a funny way to increase collaboration between participants. Each *Dudie* contains a vibration motor inside that turns on each time a user send a warning to a specific object using the web application.

Sharing emotions: To share emotions each *Dudie* has a heart shape with a 3 color LED inside which displays a dynamic color that depends on the user interaction. Using *Dudies'* ears users can change its color at the same time, sharing this new information over the web.

Inputs and outputs in the web application

Recognizing family status: Users can easily recognize the status of each family component using the web interface. Using the application users are able to recognize the color of each sphere, if a specific user is currently interacting with the object, what is the happiness status of each *Dudie* and what is the general status of the family. The information is displayed using icons to be more intuitive, increasing the feed forward of each feature.

Understanding immediate actions: Using the web application users can see the color of the heart changing in real time on each *Dudie* and also identify in real time when a user is close or interacting with a specific sphere in a specific moment.

Interacting with others: To increase interaction between users, the system provides a feature that allows participants to send warnings whenever a sphere is in low level of happiness. To perform this action, users only have to select the participant they want to warn and click a button. On the other side, the specific selected sphere will vibrate, indicating that someone sent a warning. The feature intent is to allow users to inform each other when they find it convenient, in order to keep cooperation regarding the group objective.

IMPLEMENTATION

This section presents all the materials used to build this project and all the steps and knowledge involved to get it working in the physical and virtual environments (Figure 4).

Figure 4 – Web application

Construction

Materials: plastic sphere, paper box, transparent contact paper, spray paint, white paper tape, metal heart shape.

Electronics: Arduino Diecemila, conductive textile, micro & speaker combo (you can use a voice recordable gift card), 3 color LED, 7 red LEDs, infrared motion sensor, vibration motor, resistors and a relay.

Tools: X-acto, breadboard, soldering iron and conductive tape.

Software: This project requires a web server.

In the middle of the plastic sphere the red LEDs should be displayed in order to design a sad smile and a happy smile (2 for the eyes and 5 for the smile). Different smiles and eyes are connected to different ports on the board to easily control each part of the smiley. Also in the plastic sphere the conductive textile should be mounted in form of ears (left and right side). Those two ears are connected to the board using a voltage divider to detect different touches. Using a voltage divider allows it to differentiate powerful touches from light touches on the ears.

The bottom box is where the Arduino board and all the wire connections should be placed. The infrared red sensor has to show in the same side of the sphere face. Also it is convenient to place the speaker/micro combo in the front side of the object allowing users to easily record and listen to the sounds recorded. The vibration motor can be placed anywhere in the object, but once it is hard to assemble everything inside the sphere, it is convenient to place it on the bottom box.

The metal heart shape that contains the 3 color LED should be placed on the left side of the sphere, outside of the box. This way it will be coherent with the interface that supports this project.

Logic

To understand the logic behind this project, it is necessary to make the bridge between the physical object and the web application that supports the game. To better explain how the physical inputs are related to the physical and virtual outputs, the following list describes each step to build a similar project:

1- The system should use 5 text files placed on the web server to store different data,

such as: RGB levels updated by the touch sensors; happiness ratio; *Dudies* age; vibration request; presence detection;

2- Each time an ear is touched, the red, green and blue values are changed randomly, updating the correspondent text file. At the same time, the web application is reading continuously the values coming from that file and drawing an updated heart with an approximated match between the 3 LED color values and the most recent RGB code saved on the text file.

3- Whenever interaction is occurring in the physical object, the system changes the value in the presence text file. The web application is continuously reading this value, and if it is true for a specific sphere a icon is displayed indicating that the user is interacting with his *Dudie*.

4- The happiness ratio is calculated using the amount of time spent by a specific user interacting with his *Dudie* and the amount of time not interacting. If the level is low a sad smile is displayed and the value for the correspondent text file should be updated.

5- The vibration request for a specific *Dudie* is processed in the inverse way. The application controlling the physical object is continuously reading the correspondent file and whenever the value is set true, the vibration motor is turned on.

6- Family happiness is calculated using the average between all *Dudies*. If the value is low, the lights go dimmer and the other outputs should stop working normally.

Wiring

The matrix of LEDs is connected to the Arduino pins separately. By doing this it is possible to control the different parts of the smiley. The infrared sensor is connected to the Arduino board and acts like a switch. The vibration motor is connected in the same way (power/ground), but acts as an output. The conductive textile used in the ears is connected to the board through a voltage divisor, which permits to better control and read the values coming from those switches. The speaker/micro combo is connected to a relay that controls the amount of power send to the speaker. Controlling the power we are also controlling the record/speaking time, which allows the object to switch between the record mode and the speaker mode.

Programming

This project involves programming skills in Processing/Java to control the physical object, PHP, JavaScript, HTML and CSS to develop the web interface.

The entire source code is available in http://mti08fall.files.wordpress.com/2008/10/source_code.doc

CONCLUSION

This project demonstrates how powerful can be the usage of interactive objects to share affectivity across the web. It also shows that community bonds can be reinforced using the virtual world but not totally depending on the computer.

Regarding the public feedback in the MTI fall 2008 projects presentation and the gained experience developing this project it is possible to imagine a list of future iterations:

- Convert *Dudies* into single spherical objects.
- Include voice sharing across participants.
- Develop other forms of interaction, such as allowing kids to kick, throw and join all the existing spheres.

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