Report with results of first pilot trial and alignments needed

Deliverable D5.2

Work Package 5: Pilot System

DOCUMENT HISTORY

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EXECUTIVE SUMMARY

This document describes the results of the pilot trial and the required alignments of the 3rd-LIFE system.

Following the user requirements analysis conducted with two groups of users, special consideration was put into developing applications that would be useful and interesting to the intended users. Different factors were taken into account, especially simplicity of use and making the applications appear as realistic as possible.

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1. INTRODUCTION

The main objective of the 3rD-LIFE project is to implement and test an ICT tool which would help elderly individuals to socialise and take part in various activities. The tool in question is a three-dimensional virtual world that a user accesses via a PC-like terminal. In the virtual world each user is represented by a virtual character (avatar), which resides within a virtual environment, i.e. moves around, manipulates virtual objects, has conversations with other users etc. The virtual environment can resemble a real world-like place with floors, walls, furniture and other inventory.

From a technical perspective, virtual worlds along with their features and residents are most commonly run on a server back-end. A key part of the server software solution is a 3-D platform, which produces the virtual environment along with its basic functions such as scene rendering, object creation and manipulation, and avatars. A platform with its basic feature set can be enhanced and customised by adding further virtual spaces, objects and applications that avatars interact with.

2. DESIGN AND IMPLEMENTATION OF THE SOLUTION

Most objects in Second Life [1] are created from basic three-dimensional geometric objects called primitives or "prims". A prim is one of several 3D shapes: a box, a cylinder, a prism, a sphere, a torus, a tube, or a ring. They can assume any desired shape and can be made to perform different actions with the use of scripts written in a dedicated scripting language.

Linden Scripting Language (LSL) is the scripting language that gives behavior to Second Life primitives, objects and avatars [1]. Its syntax is similar to the common C or Java programming languages, and it is event-driven. If a language is event-driven, it means that the flow of the program is determined by events. LSL has an explicit state model and it models scripts as finite state machines, meaning that different classes of behaviors can be captured in separate states, and there are explicit transitions between those states [2].

Second life also offers its users the possibility to sell and buy a variety of virtual items using a web-based marketplace. Some items are free, while others are priced in Linden dollars, which is the official currency of Second Life.

The island landscape was selected due to its greater control and flexibility for configuring access. The owner of a Private Region can control access and permissions for the entire region, as well as for individual parcels within it.

Figure 1: Map of the island

As can be seen in Figure 1 the island was divided in three main areas, the *Café* (C), the *Exhibition* area (B) and the *Residences* (A). Each section has its own set of applications and functionalities pertaining to that specific area. The *Café* area will offer a range of activities, from watching movies, socializing and playing multi-player games, to language courses. It is the main area for social interaction between the users. The *Exhibition* area allows users to exhibit their own photographs and also allows other users to vote and comments on the exhibited pictures. Each *Residence* is private and can be accessed only by the designated avatar or avatars. This is done with the help of a locking door mechanism, which only allows access to a specifically defined user or users.

The three aforementioned areas are interconnected with roads and there are also a few scenic areas the users can go to. There is a lighthouse with a pier and boats on the water as well as a scenic view point on the mountain, with views of the whole island. The different places can be visited using the teleport function or simply by walking.

2.1. SPECIFICALLY DEVELOPED APPLICATION COMPONENTS

Following the preliminary trials conducted with a group of users, special consideration was put into developing applications that would be useful and interesting to the intended users. Different factors were taken into account, especially simplicity of use and making the applications appear as realistic as possible.

2.1.1. TELEPORT

Teleport is a method of moving users directly to a predefined location as quickly as possible. It is used as a means of transportation throughout the island. Teleporting is done with the help of a simple script containing the destination coordinates. Teleport is visually implemented with the use of bus stops, located at the main sites on the island, as can be seen in Figure 2. With a click of a button, the user is transferred to their desired location.

Figure 2: Teleport implemented as a bus stop

2.1.2. EMBEDDED WEB BROWSER WINDOW

The embedded web browsers are used throughout the island and serve different purposes. They are used as announcement boards and photograph displays.

The announcement board is a 3D object with a media texture acting as a browser window that displays a web page hosted on the 3rD-LIFE Server. An avatar can view it but cannot change its content. The announcement board appears as one display, but it is actually displaying both the announcements and the registration list of the users who have signed up for the activity.

The photograph display offers users the possibility to display their own photographs and receive comments on the posted photographs from other users.

2.1.3. LIKING OBJECT

The liking object is located in the exhibition area and placed next to every exhibited photograph.

The object itself is comprised of two separate objects, a green tube and a clear tube that envelops it. These two objects communicate with the help of communication channels. When the clear tube is touched, it sends a message to the green tube, which then augments in size and increases the like count by one. The object only registers one click per avatar, making duplicate voting impossible.

2.1.4. POSTING COMMENTS

The object for posting comments is located in the exhibition area and placed next to every exhibited photograph.
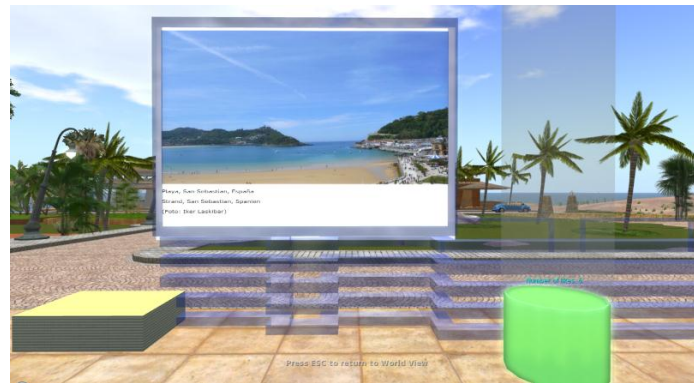

Figure 3: Photograph display with repositionable notes and a like counter

Posting comments is made possible with the use of repositionable notes, which can be attached to a photograph in the exhibition area. The stack of papers and the individual notes communicate with the help of chosen communication channels defined in the attached script. When a user clicks on the stack of papers, it sends a message to a specific note, which then lifts up and is ready to receive text. After a user submits the comment, the paper moves to a predetermined area surrounding the picture and displays the comment.

2.1.5. LOCKABLE DOOR

The lockable door is made of a flat cube with an attached script, which provides a smooth opening and closing door animation. An additional option allows the door to respond only to the owner and any additional added user, by typing the appropriate command. The purpose of the lockable door is to provide the users with a private personal space, where they can retreat to.

Figure 4: Residences with lockable doors

3. APPLICATION ARCHITECTURE AND DATA MODEL

Due to some limitations of Second Life, there was a need for a more complex architecture model that would provide increased security and adaptability by handling data outside Second Life. In addition, all the actions that pertain to a specific user can also be recorded at the server, allowing for a level of personalization. This split architecture also offers the possibility of simplified content editing and keeping a log of the actions (sending emails, registration, posting comments, rating photographs and announcements) performed in the Second Life environment.

The external 3rD-LIFE server communicates with Second Life by receiving HTTP requests sent by Linden Scripts attached to specific objects. For example, when a user touches the liking object, the script inside the objects executes a HTTP Request/Response to the external server with the pertaining information.
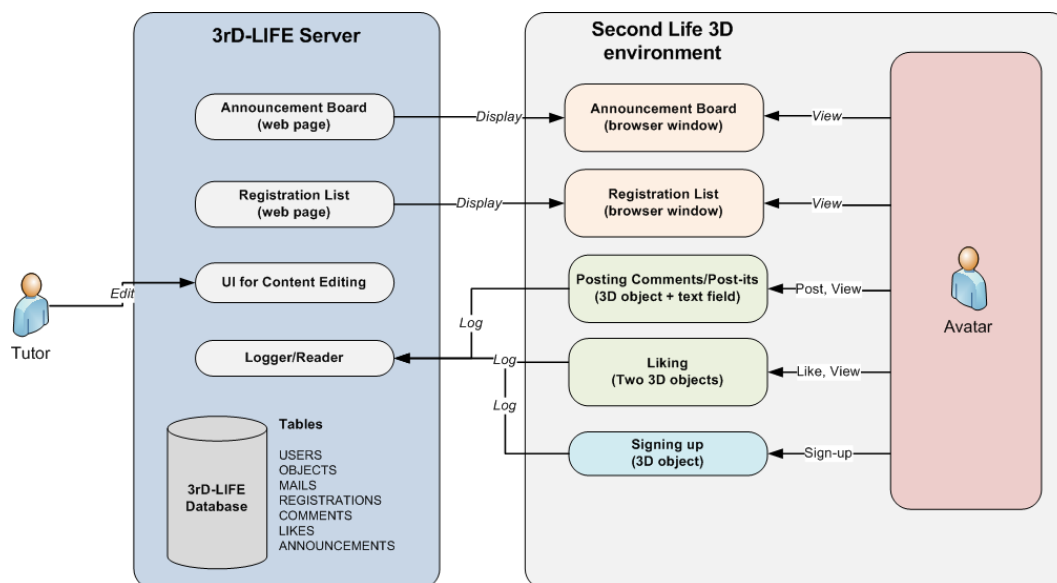

Figure 5: Split architecture

Figure **¡Error! No se encuentra el origen de la referencia.** shows the two principal blocks, the Second Life environment and the 3rD-LIFE Server. The 3D environment presents the various applications and the avatar's interaction with them. The announcement board

and the e-mail client are both browser windows with content hosted on the 3rD-LIFE Server. The user can interact with the e-mail client, but can only view the Announcement board content. Posting comments, registering for different events and rating photographs require user interaction which is also saved in the Logger on the 3rD-LIFE Server.

In order to be able to use the implemented 3D virtual environment, users need to have a username and password which they use at login. There is no personal information needed for the account and the username and password are saved on the secure external server. After logging in, the user is free to travel anywhere on the island.

4. TECHNICAL EVALUATION OF THE SYSTEM

The pilot testing was performed to evaluate the developed 3rd-LIFE system and all the applications. In deliverable 3.1, we described the process of comparing and choosing the most appropriate platform that would best suit the needs of the project. The decision was made to use Second Life that provides better scalability and access to grid infrastructure compared to other considered platforms (Open Simulator and Open Wonderland).

4.1. 3D MULTIUSER PLATFORM EVALUATION

During the pilot testing, the stability and performance of the Second Life platform were verified. There were certain limitations that became apparent after a number of media textures very introduced onto the island. When there are many media textures, the loading time for each one is very slow. In our case this means that the Exhibition area which has nine web browsers, takes a long time to load all of the photographs. To eliminate the confusion of blank screens, we used a specially designed texture with an animation of the text loading.

4.2. 3D END-USER CLIENT EVALUATION

Only the Windows version of the Second Life client was tested and it proved to be very stable. In the beginning of the project, the system requirements were determined to make sure all the equipment used in the trails was at a satisfactory level. The requirements were sufficient and the equipment functioned as planned. There was only one irregularity detected with simultaneous video capturing affecting the client operation. We therefore abandoned simultaneous video capturing that was preliminary meant for additional of-line session evaluation at one particular client.

4.3. BACKEND SERVER EVALUATION

The backend server was functional, but not tested during the pilot testing of the system. The focus was mainly on the developed applications and verifying the irreproachableness of the system.

5. SYSTEM ALIGNMENTS

The objective of the first trials was to evaluate the usability of the features that were developed thus far and the technical implementation of the system, as a step of the iterative circle, to involve the users in the design of the 3D virtual world. The questions were taken from the Computer System Usability Questionnaire [4] and were adapted to fit our project. They are expected to provide the outcome in form of the data we are interested in collecting. The objective was to measure the users' opinion regarding the prototype's usability, attractiveness, usefulness, accessibility and reliability.

The first part of the evaluation is the training phase, where users are instructed to navigate and interact with various objects. The navigation and communication evaluation is transversal during the whole trial as the user continues moving around and communicating while performing the assigned tasks. The user has a 5-10 minutes test period once entering the island to learn how to move the avatar from one place to another using the teleports, walking and flying functions. One researcher is assisting the user in order to use the correct keys on the keyboard to make the avatar walk, jump, turn around, grasp objects, fly, land etc. The concept of using the teleports is explained and tried out with the user. Another researcher is present as an avatar inside the 3rD-LIFE island to communicate with the user, using the chat and voice functions.

The evaluation highlighted some aspects of the system that could be improved in order to enhance the user experience. The first step was to identify the usability problems and positive aspects of the product that users experienced. Based on these results, there will be some changes made to the island topology itself as well as some changes to the developed applications. The main topology enhancements are comprised of two new areas on the island, one for learning and the other for gaming activities. One of the most important aspects of the 3D virtual environments is the social interaction. For this reason, we have decided to add two more areas, one for playing multiplayer games and the other for various learning activities, such as language courses.

While the gaming area is meant mainly for entertainment and socializing, it will also include games for improving the cognitive skills of the user. The learning area will serve as a

Collaborative Virtual Environment (CVE). CVEs can be used for educational applications, such as collaborative e-learning. Collaborative e-learning is defined as any kind of learning process performed by more than one person that takes place mainly in a virtual environment. In contrast to conventional 2D web e-learning applications, the shared sense of space and presence is a big asset of 3D virtual environments due to the real time communication features.

There will also be some usability enhancements, for example removing walls and making the furniture in the residences smaller, as the users have had problems navigating the interior of the residences. Other changes include simplifying the use of the liking and commenting mechanisms in the *Exhibition* area, as well as rearranging the *Café* layout. All of these changes will bring added value to the developed system and make the 3D virtual environment easier to use.

6. CONCLUSION

The evaluation of the developed 3D Multiuser Virtual Environment and its applications provided a valuable insight into possible usability related issues and helped us define enhancements for the final version of the system. For the most part, the user opinions and the evaluation of the prototype were positive. There will be minor changes made to the island topology and applications that will contribute to a better user experience. The first user trials emphasized the importance of having more areas specifically focused on social interaction. The significance of the multiuser aspect was made apparent during the first trials, while the users were only testing the applications, and possibly not enough focus was placed on interaction between the users. For this reason, we are developing the additional areas, which will greatly enhance the user experience.

7. REFERENCES

[1]   Second Life, available at: http://secondlife.com/

[2]   Dana Moore, Michael Thorne, Dr. Karen Zita Haigh, Scripting Your World: The Official Guide to Second Life Scripting, Wiley Publishing Inc., 2008

[3]   Questionnaire (Based on: Lewis, J. R. (1995) IBM Computer Usability Satisfaction Questionnaires: Psychometric Evaluation and Instructions for Use. International Journal of Human-Computer Interaction, 7:1, 57-78)

[4]   Second Life Wiki, http://wiki.secondlife.com/wiki/LSL_Portal