AUTOMATING AVATARS IN SECOND LIFE, EDUCATIONAL INSIGHTS AND APPLICATIONS

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Abstract: Second Life has established itself as the benchmark in virtual world education, offering a set of useful synchronous communication tools out of the box as well as design construction and a community of developers and educators working together to create revolutionary projects.
However, the virtual platform lacks interesting activities when tasks are designed for single users. You can still generate exercises for the student but the sensation of immersion that provides both the motivation and sense of reality to the student is reduced.
In light of this, our aim in this article is to apply automation technology to a virtual world avatar to remedy these shortcomings, studying the potential of this idea through the specific implementation of a guided visit bot.

1 SETTING THE CONTENT

With the arrival of the so-called **web 2.0** newer opportunities have appeared for internet users to participate, share, communicate and collaborate with one another in order to spread knowledge and learning experiences. Unlike their predecessors, the latest developments allow users to interact, modify or create more dynamic and enriched information by means of the integration of social networks and the appearance of collaborative web projects, learning management systems and the so-called virtual words, learning environments which, based on Social Constructivist Learning Theory, enhance the development of educational perspectives on motivation, problem-solving and collaboration

In this sense, this first chapter describes the context of virtual world learning, focusing on the capacity to exploit and explore Second Life.

1.1 Virtual Environments Potential for Educational Purposes

Virtual Worlds are a combination of virtual reality with a chat environment, also known as Multi User Virtual Environments (MUVEs). From a technical standpoint this is the product of the union of a 3D graphics environment with a social interaction systems developed for multiple users.

The original uses of these worlds (and still the most common) are leisure and entertainment, building communities of players who participate daily. In the last few years virtual worlds have become the most used videogames for young and not so young audiences, creating an industry that is not just limited to gambling in the virtual world, but administering tournaments, working in advertising and merchandising and finally becoming a host of money.

However, Virtual worlds are currently used outside of the gaming sector, adjusting educative projects to the virtual environment. This new application of technology is called MMOL (Massively Multiuser Online Learning) and has its

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greatest exponent in the Second Life tool (Bainbridge 2007).

1.2 Community-driven Experience and Learning in Second Life

Although the concept of Second Life is not entirely new, but a modernized version of multi-user text-based virtual environments developed decades ago (e.g., MUDs, MOOs), the new 3D worlds can re-create traditional classrooms where users (instructors and students in our case), can simulate educational applications rich in learning opportunities.

Users in Second Life are represented by avatars (characters designed at will) which can interact with each other and the world itself, constituting what is called "a metaverse".

It offers a totally customizable virtual space in both design and programming, which has led to its use by the education community. The multimedia capabilities of this tool make it perfect for engaging in eminently practical activities from a remote location as well as being an interesting alternative to face to face oral meetings or even implementing practical protocols in almost real environments (Zhao & Wu 2009).

In addition, Second Life is a tool that encourages communication between users and groups, facilitating the development of collective and collaborative activities. In this sense this virtual world is already accepted as a more than useful tool to prepare our students to work together to achieve objectives.

1.3 Bots in Second Life: I Spy with My Virtual Eyes

We can define a bot as a software application that performs a specific set of tasks automatically. Traditional examples of bots are standalone content moderators in chat room service or web analyzers (crawlers or spiders).

Second Life has an inworld banning policy on bots that don't contribute to the user community. The so-called traffic or camping bots have been massively used to enhance the visitor statistics for a particular area and thereby increase their popularity improperly.

Some useful and accepted applications for a bot are gathering information about visitors to your parcel or even a world traveler that stores and processes the information it gathers, including the communication and behavior of other users (Pelachaud et al. 2007).

Finally, we can create bots that, apart from retrieving data, could offer useful information to the user. These are the most appropriate bots to provide functionality to an educational project by interacting with the user.

In this article we refer to a bot as a Second Life avatar who, instead of being handled by a real person, acts independently as a result of a previously implemented computer code. Thus, like any other type of avatars, bots can move about the virtual world, interactions and role-play can vary according to situations and contexts and can help to facilitate learner engagement during computer-mediated communication.

2 PROGRAMMING BOTS IN SECOND LIFE

We are going to differentiate between two kinds of bots. On the one hand there are bots created by appending LSL (Linden Scripting Language) code to a Second Life prim (a simple object) or set of prims composing a human form, and on the other hand, it is possible to implement a piece of software that actually handles a real avatar, connecting it to the SL grid with your username and password and managing it at will. The code used with the second option gives us more programming liberty than LSL (strongly focused on events and states) while building our automation. The disadvantages are that we can produce some latency derived from the communication of entities, although very little with a regular high speed Internet connection.

We will choose the second option for our developments because of the ease of integrating external services to our implemented code in a .NET platform. In addition, we will have no limit on the size of the code to compile and its complexity will not affect virtual world stability in a negative way because the program will run on our own server. The communication with Second Life will be limited to the avatar automatic handle according to the specific situations we have implemented.

2.1 Technical Resources

To create a Linden Scripting Language bot we just need to design the 3D appearance of the wearer and create the associated code to be added, but, if we intend to use the second kind of bot, the so-called "Automated avatar", we will need some additional resources.

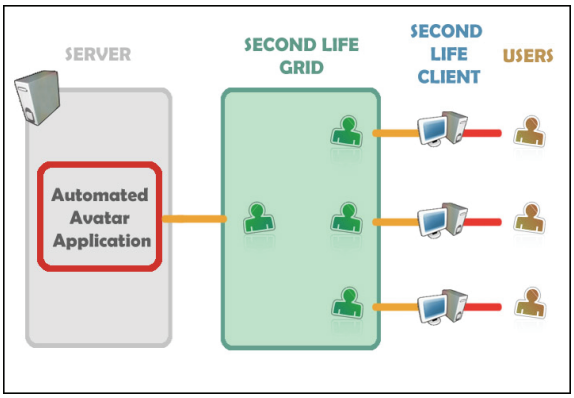

Figure 1: Entities interaction diagram involving the server, the metaverse, the client software and the users.

There is a library called libomv (libopenmetaverse) with functions that allows us to perform basic operations on a character in Second

Life or other virtual worlds. From their own website they point out how to integrate them into a .NET project, providing an example. Although this library is heavily used by the developer community of Second Life it is important to mention that is still in beta stage of development. There is an active mailing list where you can ask for information when something goes wrong.

There are also independent tools offering easy implementation of Second Life bots using a graphical interface or even a text document and XML standard markup for virtual worlds like MPML3D (Ullrich et al. 2008), but they all rely on the libomv libraries to work.

2.2 Implementing an Example, the Guided Visit Bot

After describing the common settings where interactive bots should be applied, let us at this time proceed to implement a specific example to find out the restrictions of the development process. We rather create the bot using the libomv library from scratch. By so doing, we can learn about those libraries from which different existing tools to generate multimedia bots are based and we can directly observe what they can accomplish and what they can´t.

We own virtual land on the educational island called Avalon where we currently develop on-line tandem language courses (English-Spanish-English). Here, we aim to integrate a bot to work as an information staff or guide. There, he would offer a virtual walk along which he would explain the current developments made and offer details about the lots he moves around. Finally, the bot would provide the avatars with a safety card including useful and reference information.

From the Visual Studio platform we have created a C# program that performs a sequence of movements of the avatar, and presents in the general chat (as well as orally) a preconfigured speech, with the possibility of changing the language even in the middle of the speech.

Using the built in events and functions it is relatively easy to implement an interactive avatar that acts according to other users chat, movement or even physical appearance.

3 APPLICATION SCENARIOS

The scenarios where the automated avatar can help with the learning process are wide-ranging. From applications based on open-ended questions, where the bot would assume the role of a speaker, going through learning scenarios based on courses, up to becoming an essential tool for a competitive game-based learning proposal, environment in which the bot would act as a virtual counterpart of a human opponent. Likewise, bots can also grow to be a collaborator with whom to achieve the goals sought in the activity (Derntl & Hummel s.d.).

Now, we quote some of the current developing applications, those already implemented or still within the research process, which are popular among the virtual platform community and can be helpful for CALL learning contexts (Computer assisted language learning).

3.1 Educational Bots in Language Learning: Can I Help You?

At the end of the day bots are imitations of human behavior, so they can be programmed to replace an instructor at least in part. Educational Bots are usually designed to provide details about the exercises you must do, to develop situations from which questions and conclusions can be drawn, or to act as partner in a particular activity or protocol. In any case the possibilities of oral communication and movement/animation make it a very interesting resource for language learning environments to develop exercises based on roleplays (Edwards et al. 2008).

Figure 2: Avatars during a guided visit in Avalon Island.

Figure 3: Invoking an automatically handled avatar.

In this sense, integrated voice chat software has a direct application. Through this tool, virtual office hours, listening comprehension exercises or oral exams would neglect the need of in-person traditional teaching/learning. Another appealing development is the inclusion of artificial intelligence speaking bots such as A.L.I.C.E. This bot can be trained to function within a particular context or with specific exercises that employ other external devices such as the Google maps API, designed to learn languages being orientation aware

4 CONCLUSIONS

The practical applications arising from the implementation of a permanent bot in Second Life allow the development of synchronous activities without the need for a partner or teacher. They also offer an interactive way to provide information to users who require it in the virtual world.

Nowadays there are a great deal of teaching proposals in SL and other virtual worlds already in use, being however, not so frequent at all the introduction of these robot-like programs for educational purposes. Though many can be the causes leading to such shortage (i.e. lack of theoretical information or technical expertise for an effective implementation of an automatization process as the one presented), we claim for the need to get insight on this topic and work on the development of authoring tools which could help to make teacher´s work easier and straightforward.

We have implemented a concrete example using external libraries with success, which shows that the development of an educational automated avatar is viable. By implementing the software in C# we have complete freedom to use the external resources we need and rely on a database or communicate with a remote server if we need to. Thus, current developments should aim to use existing services like artificial intelligence systems or text-to-speech software and integrate them into educational bots.

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