

Second Life: An Emerging Technology for 3D Websites

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Abstract Second Life is virtual reality based technology for designing 3D websites. This paper demonstrates the detailed process of creating a 3D website from scratch using Second Life. The steps required to make a 3D website are divided into sections to make things clear and understandable. The sections will be introducing the basic things that will need to be understood in order to make a website.

Keywords: *Second Life, avatar, Linden Scripting Language (LSL), animation, texture, script, Linden Dollar*

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1. Introduction

As time changes everything change. Similarly, the era of flat web is being replaced by three-dimensional websites. There are many questions which a person can ask these days, such as, are you bored of dealing with the flat web and its problems? How great it would be if you don't have to wait for the replies of the solutions of your problems? What if there lies a technology which along with making browsing interesting for you by helping you to enhance your experience in a very friendly way, also provides you with a real-time conversation facility which requires no waiting to get a suitable response of the questions? This paper demonstrates one such technology that is based on virtual reality which let the users explore their imaginations and bring them to a shape named Second Life, commonly known as SL.

There lies various other technologies besides Second Life which supports virtual reality named Active World [1] and Cyber Town [2], whereas Second Life is very popular among them. Second Life (SL) is the leading 3D virtual world, launched in 2003 [3] as a technology platform which enables millions of clients, represented in world as avatars, to imagine and build immersive environments that are easy and economical to create. SL, along with being one of the oldest virtual reality and virtual world platforms, it is also the largest platform with millions of active users residing in more than 160 countries globally [4].

SL has always been used by a wide variety of businesses, individuals, governments, educators and non-profit organizations as an environment for education, entertainment, research, social interaction, shopping, and more. Over the last few years, many famous multinational companies and government institutions have realized that Second Life is also a powerful collaboration tool for meetings, training sessions, and simulations and prototypes [5].

A client program named SLViewer(Second Life Viewer)enables SL residents to communicate through

avatars [4]. Residents are the users who use Avatars to represent themselves in the virtual world of Second Life. Avatars are customizable and can resemble to a user's Real Life (RL) appearance or be somebody else. It depends on a user's imagination that how they want themselves to be represented. SLViewer enables Residents to interact virtually with each other around the globe. There are other client side applications too beside SLViewer, for example, Phoenix viewer, dolphin, and Snowglobe viewer. These viewers also provide same functionality as SLViewer but they have different interfaces [4].

Second Life allows its users to make their own objects using prims. Prims are the building blocks of SL, they are stretchable, rotatable, and movable, they can be scaled according to the needs[6]. In short, prims can be used to make anything a user can imagine. Second Life has its own scripting language known as Linden Scripting Language (LSL) [7]. It allows users to make their animations and textures which can be applied on objects to make them look better and more real. Users can import textures and animations from other software for use. SL facilitates with business activities, so it has its own currency called Linden Dollars (L\$). Second Life users can sell objects, lands and homes.

1.1. Advantage of SL

There are several key advantages of using SL technology over the traditional static web technologies. For example, Second Life is now stretched over the globe and has users from the entire world [10]. In this way, SL promotes socialization. The SLViewer facilitates with avatars to communicate among each other. This is a major source of learning new things, generating new ideas, collaboration of users to work on projects together and remain intact with technologies and know multi-cultural values. Secondly, Avatars can earn money using Second Life. They can either have their own business or can do job somewhere. Stanford University and University of Texas have their campuses in Second Life [8,9] and they

conduct classes there. Dell has a 3D outlet in Second Life [10]. Snow Books has their outlet in Second Life, who allows avatars to read the books in 3D. Furthermore, Second Life's flexibility as a platform is supreme instead of having a virtual space dedicated to one use. In Second Life, you can place a team meeting space next to an event arena that is adjacent to a training simulation. It is easy to do because you have complete control over what is placed in your Second Life work environment. In other words, it saves a lot of server space as compared to other similar technologies.

1.2. Limitations of SL

Despite of advantages, there are also few disadvantages of this technology. The Second Life is still evolving so nothing is concrete. The versions of SLViewer keeps on updating in a very short span of time that causes inventory loss sometimes. The functions used in the Linden Scripting Language also keeps on changing. The scripts do not function properly specially the ones written long time back. Another important limitation of Second Life includes the high computation resources requirement for executing SLViewer fluently.

2. Building Blocks of SL

2.1. Prims: The Building Blocks

Prims are the building blocks in Second Life [6]. All the objects created in SL are built using different prims. For example, if a user has intended to make a table. They will have to rezz 5 prims (4 for legs and 1 for table Stop), together they will make an object which will be a table. An object has the capability to be shaped in any form. Residents can apply functions on objects and make them look however they have pictured it. Figure 1 depicts the prims in SL.



Figure 1. Prims

2.2. Inventory

All the objects you create are stored in inventory. Inventory in Second Life can be referred to as a storage

box. It stores everything owned by an Avatar. All the objects either created by avatars themselves or bought from market places are all stored in the inventory. All avatars have their own private inventory which is visible to them only. No one else can see it except the particular avatar.

2.3. Linden Scripting Language

Second Life has its own language called Linden Scripting Language, commonly known as LSL [7]. It is an event-driven language, which has its own events and functions. All the functions and events are present on the official wiki website of Second Life [5]. For example, few functions regarding Avatar are *llAttachToAvatar* to attach objects to the avatar. Similarly, there is another function called *llDetachFromAvatar* to detach objects from avatar. There are many numerous functions available to be used to interact with the environment. Scripts are written to bring objects to life. For example, to convert a simple glass into a money bank, we need to write a script using the appropriate events and functions. Scripts can directly be written inside SLViewer in an editor, this is convenient because it makes let the user see the effect of the script on the particular object then and there. It also makes it easy to catch the errors in the run time.



Figure 2. LSL Code Environment

2.4. Animation

Animation enables an avatar to perform some sequence of actions. For Example, An avatar has gone to a library and wants to sit on a table and read some book. As soon as Avatar will sit on the table, sitting Animation will get triggered and Avatar will get into the posture of reading a book. There is lots of software to create the animations like Qavimator, Mixamo.com, Poser, but we prefer to use *Qavimator* [11] because it gives the user friendly environment. Figure 3 depicts the environment of Qavimator. It is also called bvh animation editor, because the extension for animations accepted by Second Life is .bvh. Qavimator is widely used software because it is easily adaptable by letting the users to change each and every position of the body, from head to feet with respect to x, y, and z axis. Many types of animation can be created through this and can be imported to the SLViewer for applying to the objects.

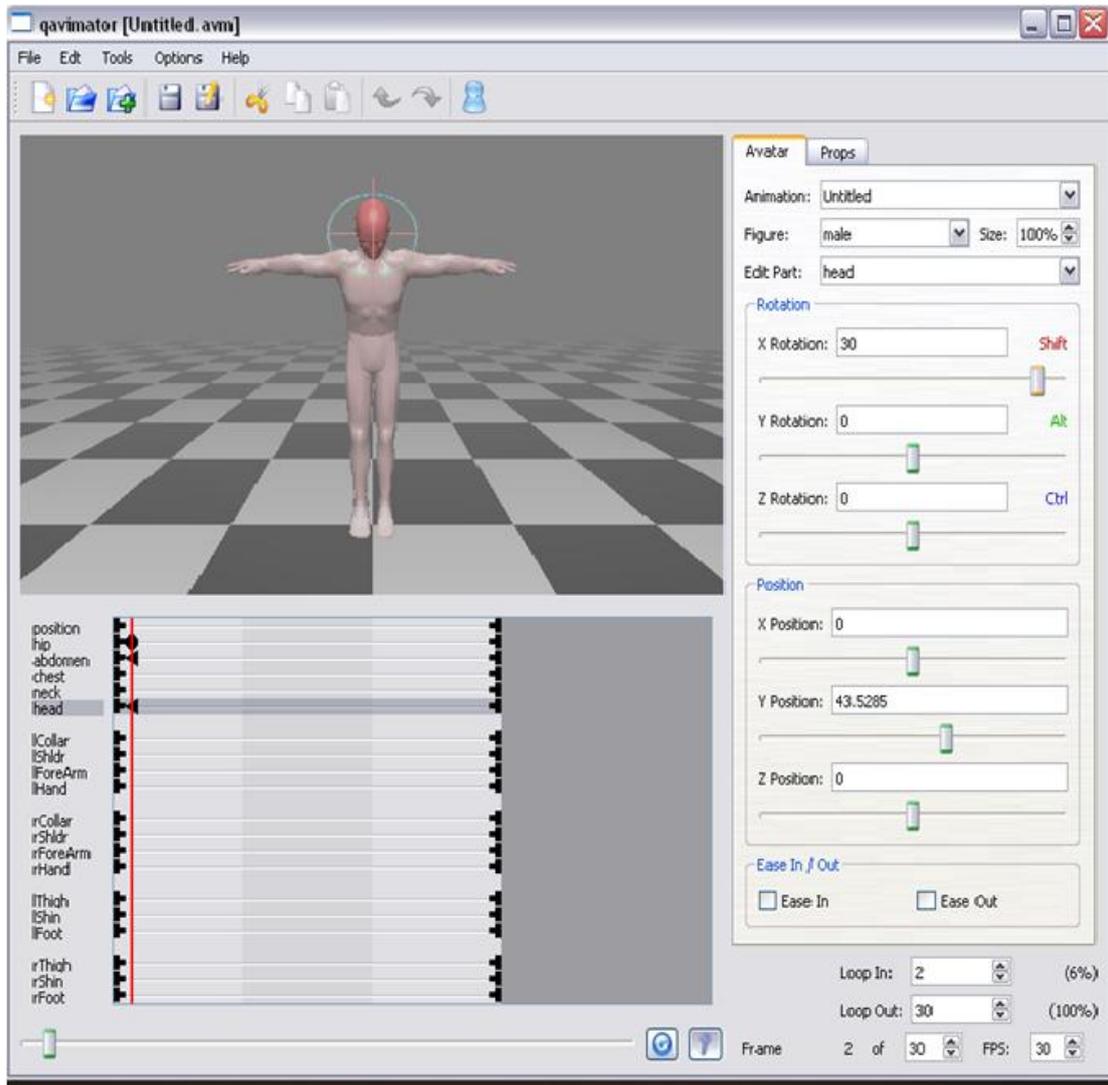


Figure 3. Snapshot of Qavimator

2.5. Textures

A texture is used to give a real face to the objects. They are like covers which are wrapped on the object to make them look real. For example, if an Avatar has created a beach chair, then they would like to give it a light colored stripped-fabric texture. The software used to make textures are GIMP - The GNU Image Manipulation Program [12], Photoshop, ArtRage2, Genetica, Texture Maker and more, but we have preferred GIMP.

2.6. Currency

Second Life has its own currency called Linden Dollars. Linden Dollars can be bought in exchange of US Dollars. Nowadays, $USD\ 1 = L\$ 250$ [13]. Residents of Second Life can create, buy and sell items in the virtual world. They can attend classes to learn about building in SL, attend concerts, party all the time and they can go to market place and do shopping. Marketplace has all type of stuff. They can be bought in exchange of Linden Dollars or for free. Business can also be conducted in Second Life, people can sell the objects created by them, and can give tuitions, sell land, rent land, teach in some school, and can do much more.

3. Implementation Using SL

We have mentioned in previous section that Second Life is an emerging technology so it keeps on changing very often. Because of its changing factor, all of its content is scattered over the internet which ends up making its users, especially the beginners confuse. Millions of residents, who are using SL since a very long time have invented their own way of explanations which they do by blogging it either on SL blogs or they have created their own forums. This makes it cumbersome and burdensome to find an exact thing. Here is an easy way to learn SL.

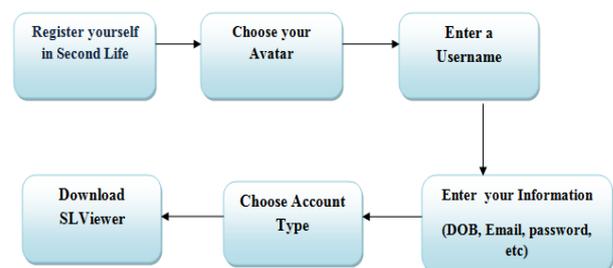


Figure 4. User's View

Figure 4 describes the introductory steps a user has to follow while stepping into the world of Second Life. The first thing a user should do is to register themselves to Second Life forum by logging in to their official website www.secondlife.com. The users are required to give their personal information including first and last name, email address and gender. Users will be asked to choose an avatar, which will represent them in the virtual world of SL. User can change the avatar later or they can create one themselves.

There are two types of accounts for a user to register as: Free and Premium. To be a Premium member a user has to pay registration fee in dollars. This type of account lets a user to buy a land where they can build their buildings and conduct the activities. Whereas free account is a limited account and the objects created by free users will not be permanent. Once user becomes a SL member, now they will require buying a land where they will be allowed to conduct any activity they like. The last step is to download the SLViewer. For users having free account is not required buy land but they can start directly. The major disadvantage of being a free member is that a user does not have their own land to work for. They have to be teleported to sandboxes, which are public places that allow residents to create objects. This is similar to the real world that no one would allow some other person to build a house or conduct any other activity within their premises. People have to buy their own properties even in Second Life.

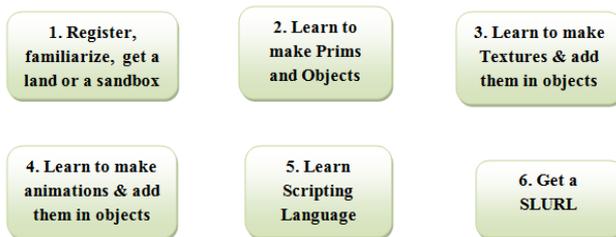


Figure 5. Developer's View

Figure 5 shows the steps which a developer has to go through in order to be able to make something in Second Life. The first step is to get registered and also get familiarize with the environment by meeting with the people and conducting different activities. Developers also can work on both types of accounts i.e. free and premium. If they are working on a free account they will have to build objects in a Sandbox and take those objects back to their inventory to save their work. Sandboxes do not keep the stuff for longer. The premium members have the advantage of keeping the objects in their own premises as longer as they want.

The root which has to be learned is making objects from prims as prims are the building blocks of Second Life they contain the property of being stretched, moved from one place to another, rotation. Textures can be applied to them to make an object look more real. Second Life provides built-in textures though residents can make textures of their own and even buy them from marketplace. To make textures of choice an external software is used called GNU Image Manipulation Program (GIMP). The texture made has to be saved with the extension of .png in order to import image in SL. It also requires having L\$10 to upload the image into the resident's inventory. Same

case is with the animation, L\$ 10 are required to upload the animations in to the inventory. Once the texture and animations are uploaded into the inventory they can be reused on unlimited objects.

The last step is to have SLURL of the location. SLURL is similar to URL, they lead to the location in the virtual world of Second Life. Users can publish their SLURL for marketing their SL virtual world.

4. Literature Review

Websites are the collection of related web pages which contains content like text, images, videos, and audio. The websites are to be hosted on a web server which should be accessible by an internet connection. Hosting a site means user want to get it access globally. The collection of all website makes World Wide Web (WWW). Webpage is a simple document written in plain text with some formatting of a special language called Hyper-Text Markup Language (HTML).

Websites can be of many types. There can be a gaming website, web-based email website, academic journal website, file-sharing website, websites providing real time stock market data, social networking websites and many other websites providing millions of services.

Generally there are static and dynamic websites. A website is said to be static when the web pages are stored on a server and are brought to the client as it is when a client request for them. In other words, static webpage are once-for-all; they do not have the capability to be modified after being brought on the client machine. Static websites display same type of information to all users. Mostly informative websites are static because they do not require a user to interact with them rather they only intend to discriminate the information. Whereas, the first part, also called Dynamic Code, is constructed using an active programming language. It particularly refers to the construction of web pages. A dynamic web page is further divide into small block of codes, routines or procedures. Database has to be active in this case, because dynamically generated web pages calls and recalls information bits from it and place them together as per the format of the page and deliver the matter to the viewer.

The second part of the dynamic websites is where the dynamic content displayed in simple plain view. A website having dynamic content points out to how the messages, text, images and other information contained in it are displayed on the web page, and majorly focuses on how the change in content happens at any given time. Second Life falls in dynamic website.

The world of entertainment started from black and white television; trend slowly shifted towards colored televisions but now, we have 3D televisions. China has recently launched a 3D channel. Similarly, web sites took their start with static websites, and then shifted to dynamic; they also started supporting transactions through websites like Amazon.com. Anticipating the advancement in technology, it can be assumed that the coming era of the websites would shift to 3D websites from flat websites.

Second Life is a technology that promotes 3D websites along with virtual reality with 3D effects. It allows a user to have their own SLURL (URL which directs to the land owned by the user) and use it as a hyperlink to the location.

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