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On The Way to The Web3D: The Applications of 2-Layer Interface Paradigm

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ABSTRACT

The use of the Internet for entertainment continues to grow. The success of rich media web portals, such as: YouTube, Flickr, or Google Maps proves that people look for more and more interactive experience on the Web.

In this paper, we briefly report our previous work related to the human-computer interaction discipline: we describe 2-Layer Interface Paradigm (2LIP) - a new way for designing interactive 3D web applications, and its prototype implementation – Copernicus, the 3D Encyclopedia.

We present new possible applications of 2LIP, among others: personal 3D backgrounds, 3D applications in the touristic information and in the museums, interactive internet shopping, and commercials embedded into web portals.

All propositions aforementioned give the idea of a new generation of the Web3D interfaces. Those interfaces can enrich interactive experience of people on the Web; at the same time, they remain simple and intuitive in use.

INTRODUCTION

The success of Web 2.0 Rich-Internet application techniques, such as: AJAX, Adobe Flash, Flex, Java, and Silverlight, proves that a part of the information society starves for more entertainment on the Web. Popularity of online computer games cannot remain unnoticed either. World of Warcraft, which is currently the world's largest massively multiplayer online role-playing game (MMORPG) has over 10 million subscribers. Second Life and its competitors also attract attention of millions of users.

The Web3D, first introduced to the Internet by VRML, and now popularized by Web3D Consortium, can be the next step towards new, more interactive Internet. Thanks to the fast increase in the performance of affordable graphics hardware and communication, this approach is finally ready to emerge.

The aim of this article is to briefly report our previous work and present the new possible applications of 2LIP – our novel approach for designing Web3D interfaces (see

Section 2.1). Our goal is to point out the parts of the Web, where our technique can be applied.

Outline

This article is structured as follows. In the next section we present our previous work, the new approach for designing interactive web interfaces (2LIP) and its implementation - Copernicus - The Virtual 3D Encyclopedia. Section 3 discusses the new possible applications of 2LIP. We conclude in section 4.

PREVIOUS WORK

Pushed by the fast increase in the performance of affordable graphics hardware, 3D computer games are more popular than ever before. Computer generated, virtual worlds are competitive with our real world. Some web designers also dream about building interfaces that approach the richness of reality. Nevertheless, user studies proved that complex and disorienting navigation, and annoying occlusions could slow user performance in 3D interfaces [2, 6, 7].

To solve the problem we worked out a new solution for designing interactive 3D web applications - 2-Layer Interface Paradigm (2LIP - *pren. tulip*) [5].

2LIP – The New 3D Interface

2-Layer Interface Paradigm defines the graphical user interfaces as a result of the integration of two layers (see Figure 1):

- The first layer is a 3D scene, which a user cannot directly interact with.
- The second layer, above the 3D view, is an HTML content. Only taking actions at this content (e.g. pressing a hyperlink, scrolling a page) can affect the 3D scene.

Our approach builds upon well-established hypertext model; it does not rapidly change the style of interaction, from the one user were used to in the classic HTML pages. 2LIP, similarly to Navigation by Query in Virtual Worlds [8], avoids the classic problem of users getting 'lost-in-cyberspace'; it is also easier for an average user to discover all that a specific 3D webpage has to offer.



Figure 1. 2LIP Page.

Our research derives from the concept of the Augmented Reality [3]. However, instead of creating a layer over the real world, we placed the information HTML-layer on the top of the computer generated 3D scene.

Copernicus

In order to illustrate our idea we have implemented the prototype system called Copernicus (see <http://copernicus.deri.ie>) [4]. It resembles Wikipedia; however, in comparison to a classic wiki page, the background in Copernicus is a 3D visualization of the place or object described in the article.



Figure 2. Article in Copernicus.

While reading an article the user can be presented with some details from the 3D scene; clicking on the hyperlinks, e.g., related to an interesting place, or scrolling the text of the article, can trigger a predefined camera movement. For example: a user reading an article about Irish Heritage Park in Williamsburg (see Figure 2) might be interested in taking a closer look at a sword used during the rebellion. Clicking the “sword” link triggers the animation. The camera will smoothly move over the 3D scene following the predefined

motion path; it will stop inside the workshop showing this historical artifact.

The evaluation [5] shown that, thanks to a small difference between current web browsing techniques and the one proposed by us, users had no problems with using Copernicus.

NEW APPLICATIONS OF 2LIP

In previous section, we presented Copernicus – the 2LIP implementation of online encyclopedia. During its evaluation [5], we received many comments concerning various use cases of our paradigm. We decided to put them together to present the idea of 2LIP from other perspectives.

In the following subsections, we show possible applications of 2-Layer Interface Paradigm.



Figure 3. 2LIP-type DERI homepage.

2LIP for the Masses

Creating web applications with 2LIP-type interfaces is not easy task – it requires:

- 3D modeling skills – for creating three-dimensional backgrounds;
- Understanding of trigonometry – for generating geometric transformations;
- Programming experience – for connecting 3D scene with the rest of the interface;

These attributes are not as common as knowledge about HTML, JavaScript, or Flash; however, we can imagine new web development environments for building 2LIP-type websites. We envision people using predefined 3D backgrounds. Instead of writing the line: `<body background=" /images/image_name.jpg ">`, they would be able to simply choose 3D scene from the list and add it to their web pages as a second layer.

One of the examples of such a predefined scene can be an idyllic view on the nature. The DERI homepage could be augmented with the 3D background (see Figure 3), where grass is waving, sun is traveling through the sky, clouds are making shadows on the ground, and birds are flying all around.

Online Advertising

Online advertising is currently one of the biggest markets worldwide. The Yankee Group¹ predicts that only in the U.S. it will generate annual revenue of \$50.3 billion by 2011. However, many of the solutions used in online advertising, such as: pop-ups, floating ads, trick banners are not welcome by the majority of Internet users.

2LIP can improve this situation. Thanks to our paradigm, advertisements can be added to websites in the traditional way, but they can also be placed in the background of 3D pages. Users will be able to perform actions and see commercials at the same time. Figure 4 presents a fabricated welcome page of Flickr² with the Coca-Cola ad played in the background.

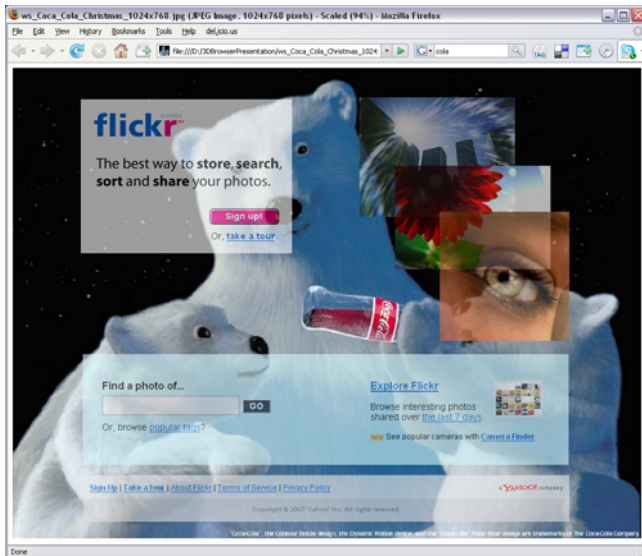


Figure 4. 2LIP-type Flickr.

There is also another way of advertising in 2LIP-type websites, less visible for end-users. Advertisements can be placed on objects of the 3D scenes. For example: a logo of a company that produces swords can be placed on the wall of the blacksmith/workshop that is included in the 3D scene in the article about Irish Heritage Park in Williamsburg (see the Figure 2).

Both proposed solutions of advertising using 2-LIP are less aggressive than pop-ups or trick banners, hence they are

less inconvenient for the users. Nonetheless, these advertisements remain noticeable and draw users' attention. Moreover, the implementation of such kind of advertising is not difficult – in the simplest scenario logos and banners can be incorporated to the textures used in the scene.

Tourist's Guides

2LIP interface can be also used successfully in the tourism business. People visiting cities usually want to know what is worth seeing or how much time they will need to discover all that a specific place has to offer. To make it easier for them, virtual guides can be deployed at tourist offices. Such applications:

- Would provide people with information about the most interesting places in the city;
- Would be built according to the 2LIP paradigm. As a result, they could give a description of the tourist route on the first plan and the map with the 3D sights in the background. User could view interesting places by clicking on the hyperlinks.

This kind of the tourist help can be adopted in museums or galleries as well. For example: at the entrance of the Louvre Museum user would be able to plan his or her visit in the museum by describing how much time he or she has, or what he or she wants to see. The 2LIP-type application would present descriptions of several propositions of routes in the museum with exhibits presented in the background. Thanks to such a solution the user would be prepared much better to face an enormous collection of Louvre.

Online Shops

Another domain of life where 2LIP paradigm can be useful is online shopping. Sometimes people like to see products in more detail before they buy them. Therefore, a shop webpage with the description of items and their 3D models in the background can be very helpful.

For example: somebody wants to buy clothes in an online shop. The shop web application provides a 3D avatar in the background layout. User can select different parts of clothing and then see closer how they look like on the avatar. This solution can be supportive in making decisions for the potential clients of the online shops but also it can be treated as a preliminary phase of the real-life shopping.

Personal 3D Backgrounds

According to Alexa [1], Google³, Yahoo!⁴, and Windows Live⁵ are in the top five of the most popular sites on the Web. For many people Google and Internet is even the same thing. Search engines are used very often as our start

¹ <http://www.yankeegroup.com>

² <http://www.flickr.com>

³ <http://www.google.com>

⁴ <http://www.yahoo.com>

⁵ <http://www.live.com>

pages (websites that automatically load when a web browser starts or when the browser's "home" button is pressed); they became our windows to the Web.

Currently you can personalize and customize some of them (see: iGoogle, My Yahoo!). The question arises: what is next?

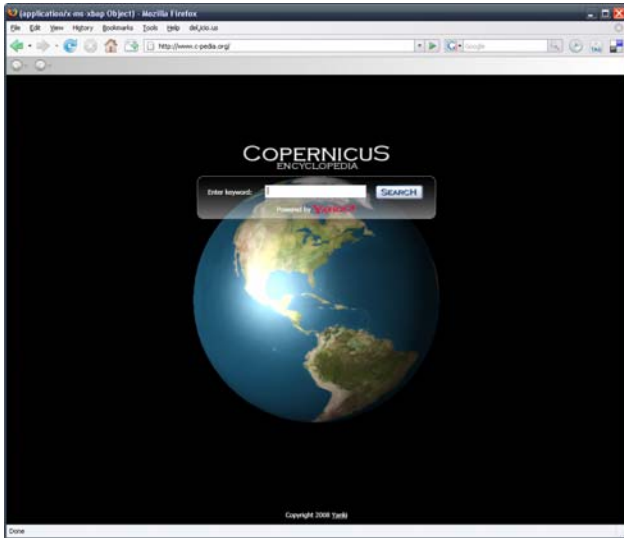


Figure 5. <http://www.c-pedia.org>.

Thanks to the fast increase in the performance of graphics hardware, it is finally possible to build search engines, which can incorporate 3D techniques to increase interactivity and fun. Figure 5 presents c-pedia, our vision of search engine developed according to 2LIP (see: <http://www.c-pedia.org>). Figure 6 shows, what could be done in the future – we present Google with a living character from the Final Fantasy game in the animated 3D background.

CONCLUSION

In this article, we have briefly presented 2LIP – a new way for designing interactive 3D web applications, and its implementation, Copernicus – a prototype application that can be placed between Web 2.0 and Web3D.

We have presented new possible applications of 2LIP, among others: personal 3D backgrounds, 3D applications in the tourist information and in the museums, interactive internet shopping, and commercials embedded into web portals.

All propositions above give the idea of a new generation of the Web3D interfaces. They can enrich interactive experience of people on the Web; at the same time, they remain simple and intuitive in use. We use 2-LIP to exemplify that Web3D should be one of the future directions of the human-computer interaction development.

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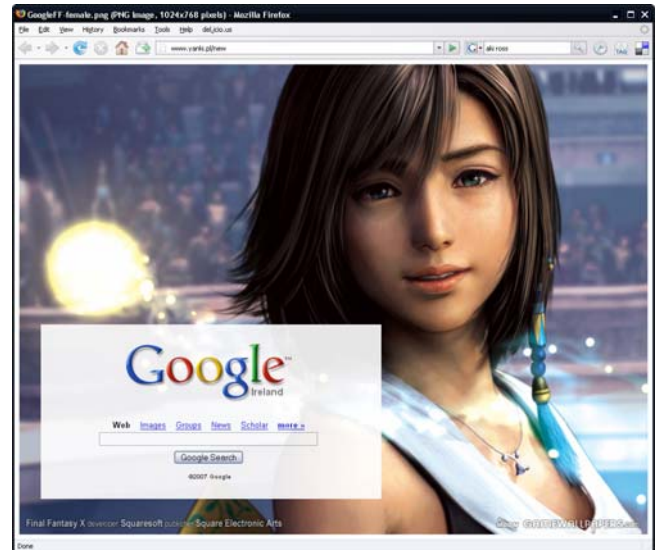


Figure 6. Personalized Google.

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