Design and Implementation of a Site for the Presentation of a Petrochemical Plant

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Abstract

The paper presents the site of a petrochemical plant, created using various technologies. The site is structured in time phases of the plant's evolution and includes a number of interactive features that allow the visitor to get access to some information about the plant's units, along with the possibility of seeing in a 3D environment the plant's units.

Key words: *interactive site, VRML*

Introduction

The need for such a site arouse from a specific demand of an important firm, that asked a suggestive representation of one of the most important petrochemical plants in Romania. The discussions initially led to a 2D representation, but finally both parties agreed that a 3D interactive representation, hosted on a server would be the best idea since it also allowed the remote access to the information (the access being restricted and implying the use of an ID and a password).

Site's structure

The site's structure is centered on the following terms:

o Year,
o Phase,
o Action.

The first level, Year presents the stage of the plant to a particular moment in time (year). It also includes all the phases and actions related with that particular moment in time (year).

The site will grow with future evolutions of the plant, at the moment only three years (stages) being covered.

The second level, Phase describes visually different stages relative to a certain year. These stages would be: current situation (at the beginning of the year), demolition, reconstruction, cleaning.

The third level, Action implies actions like roads visualization or detailed information obtained interactively from the image area.

Figure 1 presents this structure.
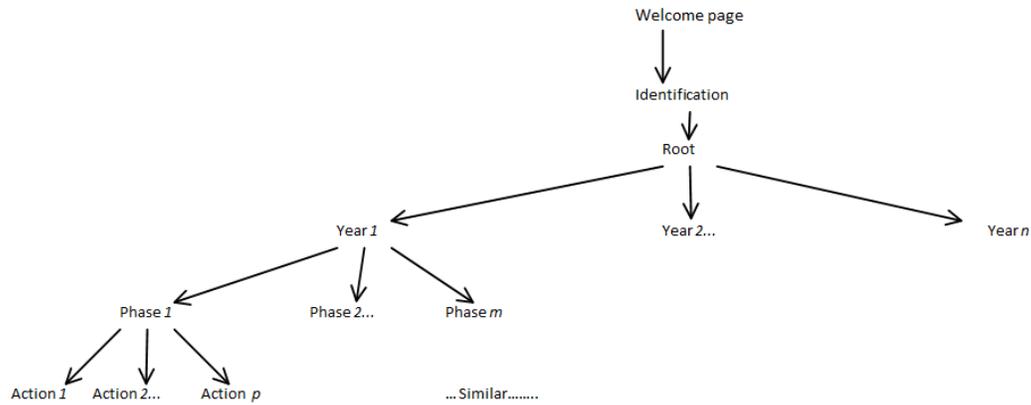
Fig. 1. Site's structure

Figure 2 presents the look of the site for the year 2006, while figure 3 presents an example of an action (getting details about a certain subdivision of the plant.
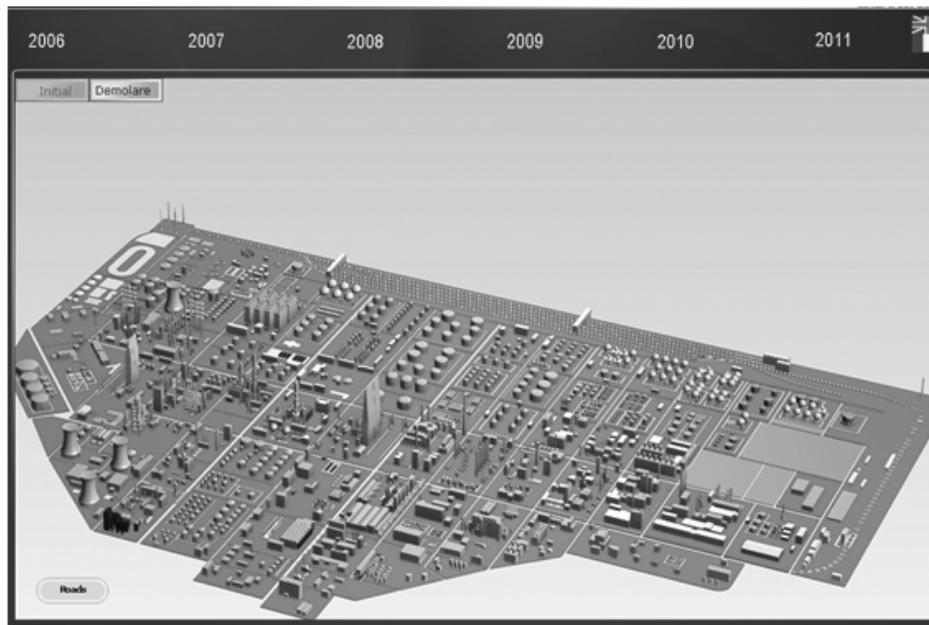

Fig. 2. The look of the site for the year 2006
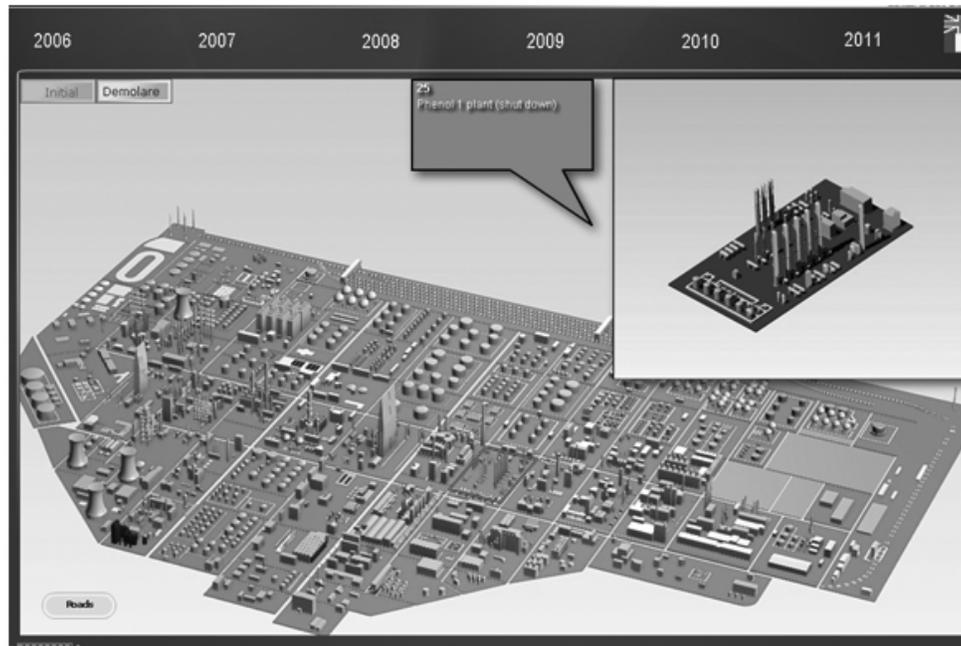
Fig. 3. Example of an action

Technologies Used

Technologies Used for the 3D Modeling of the Plant [1]

The whole plant is 3D modeled, using a parasolid format, compatible with the almost total 3D modelers available on the market. Every object is a solid. The more complex installations are assemblies, and they become subassemblies in the upper level assembly which is the plant subdivision. Figure 4 presents such a plant subdivision as a 3D model.
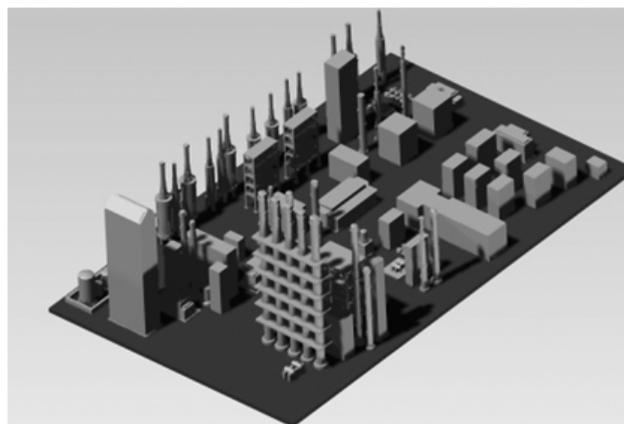

Fig. 4. Plant subdivision

All the detailed views are rendered images with a 1600 x 1050 resolution, and with a 24 bits color depth, with a 100 DPI relative resolution.

Technologies Used for the Design of the Site

This website combines technologies like HTML, CSS, JavaScript, PHP and Flash. It is characterized by: modularity, scalability and interoperability. These characteristics facilitate the addition of new applications and functions. [1], [2], [3]

Technologies Used for the Interactivity

The Virtual Reality Modeling Language (VRML) is the standard for delivering platform-independent virtual reality over the Internet. VRML is to 3D graphics what HTML is to document formatting. With a simple text file, you can describe how a virtual world looks and behaves and navigate around it without restrictions.

To represent the plant we used technologies based on 3D representations (in this case VRML). To view these 3D representations we recommend using the Cortona VRML Client.

Cortona® VRML Client is a fast and highly interactive Web3D viewer that is ideal for viewing 3D models on the Web. A set of optimized 3D renderers guaranties the best visual quality on both PCs with the latest video-cards and those with more basic video card capabilities. Cortona VRML Client works as a VRML plug-in for popular Internet browsers (Internet Explorer, Netscape Browser, Mozilla, Mozilla Firefox, etc.) and office applications (Microsoft PowerPoint, Microsoft Word, etc). But Cortona Client is more than just a plug-in! The powerful Automation Interface allows you to add exciting 3D capabilities to your Web site and standalone applications.

Figures 5 and 6 present, respectively, the action of getting visual and text information, and a 3D dynamic visualization of a subdivision of the plant.
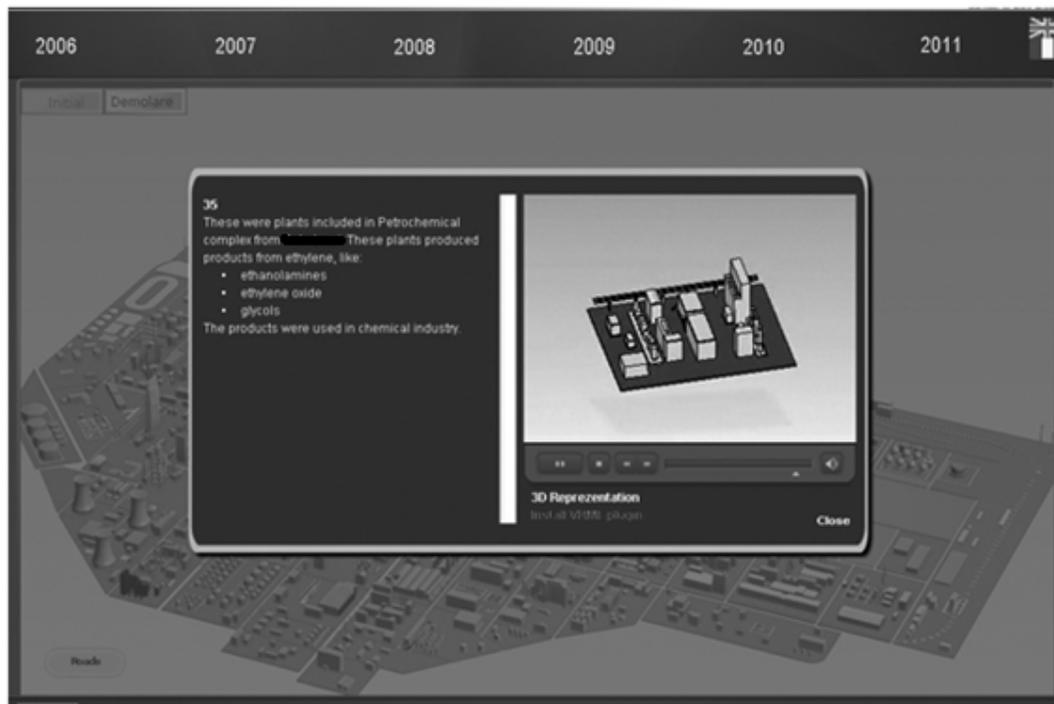
Fig. 5. Action of getting visual and text information about a plant subdivision
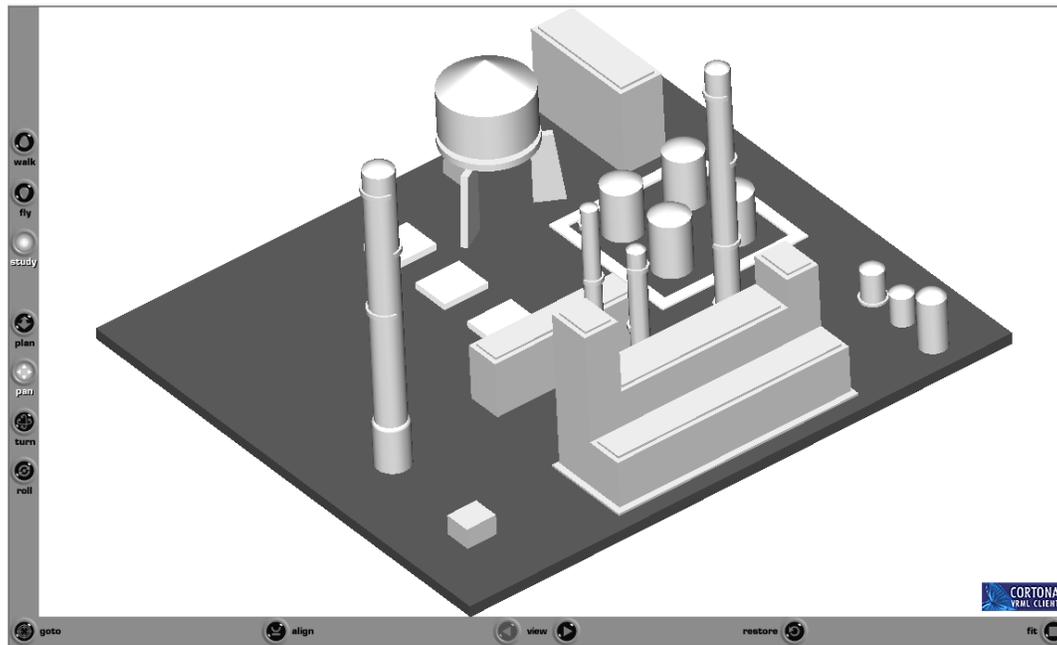
Fig. 6. Dynamic visualization using VRML and the Cortona client

The Data Base behind the Site

The structure of the data base that is behind the site is presented bellow in Tables 1 and 2. The Table user allows the restricted access to the data on the platform. The site works on an account access mode. The account is created on request by the platform administrator [4, 5].

Table 1. Table *user*

Table *user*	
id	int(11)
utilizator	char(60)
parola	char(60)
nume	char(30)
prenume	char(30)

Table 2. Table *data*

Table *data*	
nrcrt	tinyint(2)
instalatia	varchar(10)
carou	varchar(10)
reng	text
deng	text
rro	text
dro	text

Further Developments, Conclusions

The site will be permanently updated in order to keep track of the latest evolutions of the plant. A possibility would be to replace VRML with more modern alternatives. Another possible development will be the enlargement of the text information available on the site. In order to do this, it is possible to design and implement a larger data base. Finally, we reckon that the restricted access could be redesigned into a level access approach that is the users will have different access credentials to the information available on the site.

References

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4. * * * - http://www.parallelgraphics.com/products/cortona/
5. * * * - http://xml.coverpages.org/vrml-X3D.htm

Crearea unui site de prezentare a unui combinat petrochimic

Rezumat

Articolul prezintă un site al unui combinat petrochimic, creat prin utilizarea de diverse tehnologii IT. Site-ul este structurat pe etape de timp, faze ale evoluţiei combinatului şi include o serie de facilităţi de interactivitate care permit vizitatorului să obţină informaţii despre instalaţiile combinatului, ca şi vizualizarea dinamică 3D a acestora.