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Synagogue Neudeggasse: A Virtual Reconstruction in Vienna

Abstract

Issues associated with virtual reconstruction are first dealt within this paper. Visualizing of no longer existent (architectural) objects and their surroundings practically amounts to a "virtual comeback". Furthermore, special attention is given to the description of the working procedure for a case study of reconstruction sounding out the potentials of Quicktime VR. The paper ends up with a set of conclusions taking a close look at the "pros" and "cons" of this type of re-construction.

Resumen

Este artículo trata temas relacionados con reconstrucción virtual. La visualización de objetos (arquitectónicos) y sus alrededores que ya no existen significa un "regreso virtual". Además se enfoca la descripción del proceso laboral de un caso ejemplar de reconstrucción para sondear las potenciales del Quicktime VR. El artículo termina con una serie de conclusiones con respecto a las ventajas y desventajas de este tipo de re-construcción.

1. Introduction

Irreversible destruction having removed identity-establishing buildings from the urban surface for all times are the principal cause for the attempt of renewed imagining. When dealing with such reconstruction first the problem of reliability concerning the existing basic material has to be tackled. Due to their two-dimensional recording photographs only supply us with a restricted information content of the object under consideration. Thus the missing part has to be supplemented or substituted by additional sources. Within the process of assembling and overlaying of differing data sets the way of dealing with such fragmentations becomes of major importance. Priority is given to the choice of information. One of the most elementary items of information regarding perception of three-dimensional objects surely is the effect that color and material furnishes. It seems to suggest itself that black-and-white shots hardly will prove valid in this respect. The three-dimensional object doubtlessly provides us with a by far greater variety of possibilities in the following working process than the "cardboard model with pasted-on facade photography". Only the completely designed model structure makes for visualizing the plastic representation form of architecture in a sustainable manner. Furthermore, a virtual model can be dismantled into part models without amounting to a destruction process thereof. Apart therefrom the virtual model permits the generation of differing reconstruction variants regarding color and material. Moreover, architecture models of a physical nature are inherently connected to locality as such.

2. Fundamental principles

Simulation or the faking of reality aims at approaching the impact of a constructional state no longer existing or to be constructed. What precision this results to depends both on the specific possibilities of implementation of the simulation technique used and on the input time (degree of detail) invested. In this context the phenomenon of virtual reality has great expectations having become very fashionable recently, however. As far as accuracy of terminology is concerned please note that the virtual reality refers to the reality we know despite all technological advancements. Reality is that where mankind finds himself and what results for him due to planning and developing of an environment to be built in future. The other way round it also includes the look back with regard to reconstruction of no longer existing building substance.

2.1. QTVR-Technique

QuicktimeVR® is a spatial simulation technique first developed by Apple™ Computers and meanwhile having been adopted as animation standard by several hardware platforms. The basic approach of this technique is to develop virtual worlds by means of pure software-expansion based on the conventional or commonly available PC-technology. The generation of virtual space relies on the principle of ramified picture sequences, i.e. various picture segments corresponding to spatial navigation paths are united at predetermined junctions, the so-called "hot spots". Thus the user can select the sequence of predetermined scene by means of the junctions available. This approach uses photographic and/or computer-generated images for the production of spatial sceneries. The utilization possibilities of Quicktime VR (QTVR) within architecture are manifold as an efficient



structure for (re-) construction of spatial sceneries is available. Additionally the degree of detailing to be reproduced by means of QTVR-technique can hardly be achieved by other 3D-formats such as Quick-Draw3D (QD3D) or Virtual Reality Modeling Language (VRML) also necessitating disproportionately great requirements concerning the hardware of the playing system. The viewing possibilities of Quicktime VR-scenes make for actively driven experiencing of spatial situations according to the user's liking. The attractiveness of QTVR is considerably enhanced due to its close connection with Internet, as www-pages may contain QTVR-scenes as components or may be integrated in Quicktime VR-scenes likewise.

2.2. Navigation

Navigating through reality with all the pertaining tools usually is reserved to the human eye. Navigation in virtual space calls for a translation, an abstraction into forwards, backwards, sideways, quick and slow. The angle of view at our disposal compares to the restricted field of vision through the windscreen of a vehicle. The relation between space and space viewer remains a distant one. The reception matches that of a recording of a TV-picture. Manoeuvring in this context is to be regarded as a shifting of picture frames an impression increased by the QTVR-technique. Moving via "mouse" makes for continuous simple handling of drive by means of the picture cylinder compiled in advance. The VRML-viewing environment compares to a virtual cockpit. The steering and manoeuvring equipment features well-known devices, proves pretty awkward in use, as operating the VRML-joystick reminds you of turning a steering wheel by means of a pair of pliers.

2.3. Modeling/Visualizing

Two processes can be differentiated during (re-) construction of a spatial object structure: modeling and subsequent visualizing. The available software packages try to satisfy both intentions, however, having specific shortcomings and strongholds. In the course of modeling considerations regarding available geometrical tools and the software to be implemented are to be made, a procedure reminding us somewhat of building with (digital) Lego-bricks. Some programs attempt to reproduce the working behavior of creators of architecture using terms for digital building elements such as "ceiling", "wall", "roof", etc. Building parts already generated can be repeated over and over again and stored in a building part-library. Parametrics is the major goal, questions as to accuracy while input - in other words as to detail variety - still have to be solved. Moreover, the issue of scale is a matter of definition. Furthermore, sections of a project can be assembled at a later stage.

Visualizing, i.e. a viewable representation is based on geometrical information modeling. The wire mesh model featuring all edges outlining the structure is produced in a matter of no time. Some users prefer this kind of representation and take it for granted that the viewer will be able to make head or tail of this jungle of lines. The so-called "Hidden-Lines-Representation" reduces the number of depicted lines, this leading to frequent errors. Shading procedures represent the next step in representation means, also making for color and material differentiations. Scanned or textures produced by a paint program are projected on a surface by means of "texture mapping" and various light sources can be positioned additionally within the space. The parameters to be determined usually are direction of light, radiation angle and intensity.

With the (complete) 3D-model any desired sections through this model can be generated and subsequently processed as 2D-drawing document. The point of viewing can be varied as required this making for a quick and simple perspective check of the input-objects.

2.4. Chronological overlapping

The computer-assisted representation evidently has an orientation "to the future" substantially having the future development in mind. Using catchwords such as efficiency and productivity the virtual "heaven on earth" is promised. These techniques dedicated to advancement simultaneously also furnish us with the "learning look" at the past. Construction serving reconstruction or reconstruction in terms of construction may lend itself as motto.

Regarding computer-assisted reconstruction the question arises to which extent such visualizing of already destroyed building substance rather provides us with a construction method based on abstract, i.e. fragmented data. These data sets are bound to contain some fuzziness, the required supplementations and their resulting "falsification" of the historical picture are to be studied carefully. Reconstruction of a substance also amounts to delaying the chronology of decay or of changes in some way or the other. What was lost is somehow regained. A specific historical moment is detached from its chronological context, to be considered as an "absolute value" in various respects obtaining the status of autonomy and resistance as far as chronological sequences are concerned. "Moves" are achieved by means of the QTVR-technique which e.g. integrates the object structures reconstructed

into the e.g. photographically recorded reality. The virtual and the real meet and overlap in the picture-window, the joint between physical and virtual reality: a dynamic approach regarding dialogue between viewer and reconstruction.

3. Context

Vienna, one of the historically most interesting capitals of the world, is constantly accompanied by its ever-present past with every step forwards. Wherever one goes traces of the past are witnessed, amidst the urban scenery as well as in the maze of underground development. Cultivation of this past has already become a specific program. The past and its "animation" serves as a major attraction for many tourists to Vienna. Several oppositional spots, however, have remained unnoticed, as "blind spots" hidden in the urban scenario full of places of historical interest.

3.1. Surroundings

The Neudeggasse 12 inhabits one of those barren, weather-beaten municipal housing projects, the dating of which is pretty evident. Put up haphazardly in the fifties, the so-called post-war period, it is located where an impressive, historical interesting building had been up to November 1938. The Synagogue in Neudeggasse erected according to Max Fleischer's plans was a sublime Neo-Gothic exposed brick building dominating the surrounding street space adding to the "characteristics" of the vicinity. With a height practically double as high as the surrounding buildings its towers rose into the sky and gave the tranquil street a dominant vertical line. Other works of the architect Max Fleischer include the synagogues in Schmalzhofgasse and Müllnergasse in Vienna and other buildings in Budweis, Pilgram and Lundenburg.

3.2. Collection of source material

Research work on the Synagogue in Neudeggasse in the Jewish Museum Vienna, the Historical Museum of the City of Vienna and the Picture Archives of the Austrian National Library only produced meagre findings, such as individual pictures of varying quality mainly of the main facade and the interior. The complete plans submitted (horizontal projections, axial and cross sections) in the 1:100 scale with all modifications from the period of 1897 to 1903 as well as a "demolishing plan" stemming from 1938 were discovered (fig. 1).

4. Reconstruction work

4.1. In-situ pictures

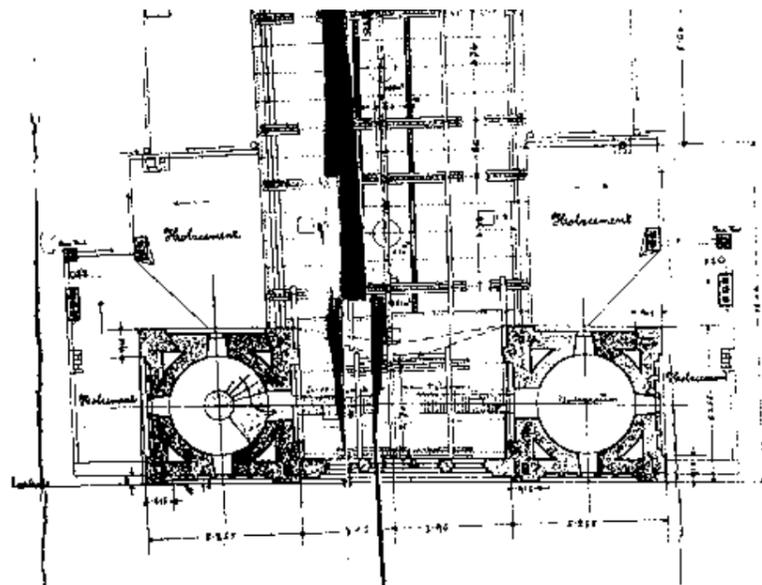


Figure 1- Original ground floor plan

Panorama views from various view points in the Neudeggasse were made. Seven shots per viewing point were produced using a miniature reflex camera and 15mm-wide angle objective, the two adjacent pictures partly overlapping. In addition, the complete facade of the residential house Neudeggasse 12 was photographed from the other side of the street.

4.2. Panorama view points

First the pictures taken are digitalized. The photographs are transmitted to a PhotoCD directly after developing in differing resolutions. The now digital material is imported picture for picture in the QTVR Authoring Studio Software™ (processing surface "Panorama Stitcher"). After entering the specific values of focus (15 mm) and the desired compression (Cinepak 75) and the picture size (512x384 Pixel /3:4) three files are available:

- a) a plane cylinder view development of the panorama ("pict");
- b) a "tile-file", an automatic re-entering Quicktime file containing all information of the compression of the QTVR panorama view point ("mov");
- c) a QTVR-panorama file ("pano")

This procedure is repeated for the other views, thus producing a "vicinity model" with a great degree of details.

4.3. Three-dimensional modeling

The synagogue is modeled by means of the available set of plans using the program ArchiCAD.

The complete project is broken down into easily comprehensible sections, such as the facades, towers, furnishings, etc. In the course of modeling processing procedures such as multiplication, reflection and changes in dimension are modified using varying parameters. Upon completion of the individual sections they are put together to make up a total.

4.4. Texturing

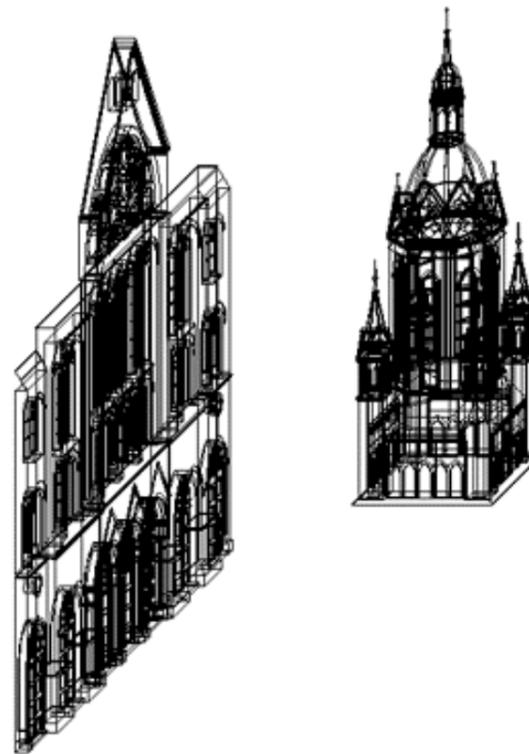


Figure 2 - Main facade and tower section.

The next step towards the virtual model is the texturing of the individual building parts according to their original appearance, i.e. the visual appearance of the surface is simulated. Adequate surface patterns are scanned in or produced in picture-processing programs. These patterns are matched to the the respective building parts by means of ArchiCAD and materials, i.e. the building parts obtaining the same texture, are grouped together. No reliable findings as to colors and materials of interior decoration of the synagogue in Neudeggergasse were available, thus texturing of the interior were subjected to an abstraction leaving all building parts in grey, only for the Holy Shrine in the very center (“Aron Hakodesch”) being gold-plated.

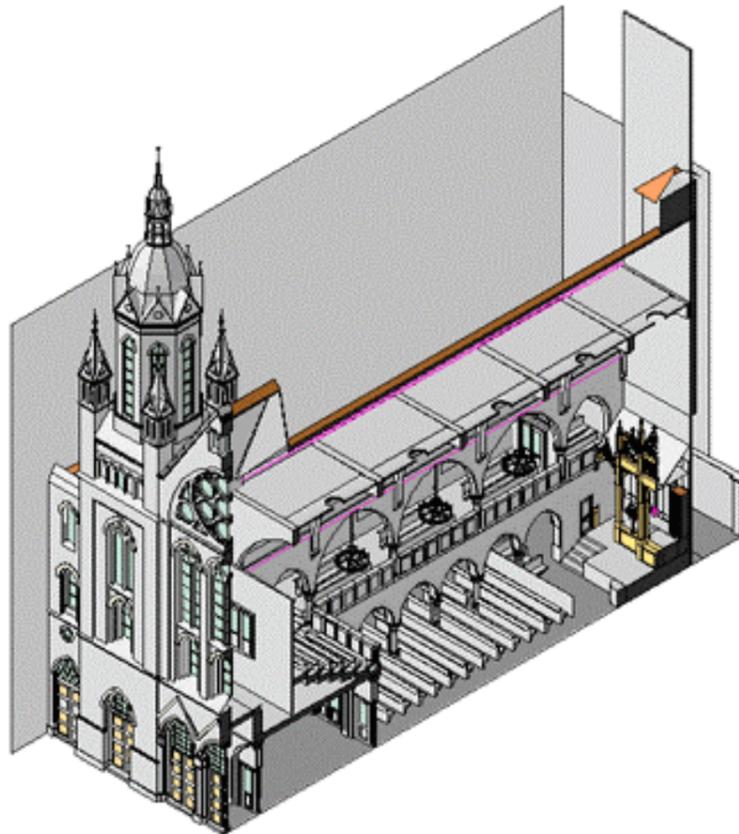


Figure 3 -View into the dismantled model

4.5. Model and surroundings

ArchiCAD also makes for a VR-Panorama for integration of the generated 3D-model of the synagogue into the also available QTVR panorama of the surroundings of Neudeggergasse. Therefore those locations are to be chosen corresponding to the real-picture camera position in situ. Focus and angle of view are to be adjusted accordingly. By means of picture-processing the superpositioning is accomplished. The result can finally be put together in the QTVR Authoring Studio under the processing surface “Panorama Maker” to make up a QTVR panorama file.



Figure 4 - Existing versus reconstructed situation



Figure 5 - Panorama Neudeggasse

4.6.QTVR Scenery

Linkage of the produced QTVR elements by re-importing the already available panorama files in the QTVR Authoring Studio (processing surface "Scene Maker") result in a "walk-through" scenery. The individual viewing points are entered by so-called "Hotspots."

5. Conclusions

The present project is sounding out the potential of Quicktime VR throughout the framework of a computer-generated reconstruction of the synagogue "Neudeggasse 12" in Vienna. Adapted from the complex perceptive procedures within the daily vicinity also the virtual reconstruction attempts to consider the coherent viewing of a scenery. The inevitably necessary falling back upon the everyday world we are accustomed to requires transmittal of such experience into the experiences throughout the virtual world. Thus the entirely free moving in space is impaired, is forced into the rigid structure of perception we know. The world we then are moving in naturally only exists in fragments and collections thereof, major parts of which are added automatically anyway in our thoughts. On the screen we once again find ourselves in a collection of virtual objects, a patchwork of different sections of the picture reminding us over and over again that we are dealing with a completely artificial motional space. A world in which we can only move in leaps from room to room. The "hotspots" to be regarded as the keyholes partially evoke the impression of representations merging in parts into each other. What is to be pointed out anyhow, is that the entry into each following scenery amounts to an actual peeking into the neighboring room. But when does this ever happen in our everyday world? The areas of transition, i.e. the normally leading-up thresholds, are missing. Critically seen, there is somewhat of a flavor of artificialness, a characteristic rather clinging to the computer-generated with regard to its visual form of appearance. On the other hand possibilities are developed hardly to be physically experienced in the real world. The practically simultaneous leap into the past and back makes for the basis gaining ground for establishing new interrelations. Past and future are merely a mouse-click apart. The experience gained throughout the reconstruction of a synagogue in the Neudeggasse (Vienna) demonstrated that the effective reconstruction has been accomplished and thus a sustainable confrontation with history initiated. The implementation of computer-generated building structures in an assembled real-picture surroundings furnished us with a reality level approaching the complex procedures within human perception.

References

Following www-adresses provide a web-version:

<http://info.tuwien.ac.at/raumsim/IRIS-ISIS>
and

<http://www.mediatecture.at/synagogue.html>

Following www-adresses provide more information on QuicktimeVR and VRML:

<http://www.apple.com/quicktime/qtvr/>

<http://www.vrtools.com/>

<http://www.iqtvra.org/index.html>

<http://www.vrml.org/>

<http://www.web3d.org/vrml/>