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Multimedia Information Resource «The Church of the Savior on Ilyina Street in Novgorod the Great»

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Abstract

Rapid development of information technologies, related equipment and software makes it possible to achieve significant results in cultural heritage preservation. In recent times not only abroad but also in Russia more and more efforts and funds are allocated for development of cultural preservation innovative projects, which are aimed at establishing of information sources, virtual museums and large-scale educational portals where Internet-users could find information on different museums of many regions of the Russian Federation. Multimedia resources combine several advanced technologies: the technology of augmented reality (AR), GPS-navigation and recognition of QR-codes. These technologies are supported by smart phones on the basis of iOS and Android platforms and can be available in Android Market and the App Store as the most common products. One of such resources developed in recent years is about a unique world-famous church located in Novgorod the Great. The Church of the Savior on Ilyina street is located in Novgorod the Great, built in 1374. It is the only church in the world, where we can see the frescoes of the hand of Theophanes the Greek. The church was decorated with frescoes in 1378. Painting of the church has not been completely preserved. Its greater part was destroyed due to numerous fires and repairs. But even small remaining pieces make it possible to appreciate general plan of the whole ensemble and unique style of Theophanes the Greek. Nowadays these pieces are the only in the world which can represent monumental work of Theophanes the Greek. Multimedia informational source is based on historical materials. It includes not only information on the Church of the Savior on Ilyina but also historical and cultural background of that period.

One of the most important results of this project is so-called «e-passport» of the object. It is a number of architectural drawings developed on the basis of exact architectural and geodesic measurements. Images from archival photos and preserved painting fragments including original textures are superimposed on these drawings. Three-dimensional model of the monument can be now implemented with the use of finalized drawings

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1. Introduction

Preservation of world and national heritage is a key issue in cultural studies and museology. Many factors – natural and human factors, climate changes, technology facilitation – affect ancient masterpieces and lead to significant changes, partial or complete destruction of works of art. Process of gradual deterioration of architectural monuments, ancient paintings, archival documents, books and other artifacts from the past is imperceptible and irreversible. Even tiny authentic fragment of ancient fresco or architectural detail keeps inestimable immaterial value. Our heritage is the basis for our present and future, a source of life and inspiration, which we pass to new generations.

Implementation of new technologies in cultural sector brings significant results, providing new approach in presentation of ancient masterpieces in its authentic view and in historical context. Common task is to develop general concept and layout of the object, which has been partially or completely modified or lost in the past. Information on certain ancient work of art can be spread across different archives and collections. Consolidation of all the available data into the one unified source is a challenging task, which demands complex systematic approach from its executors and participation of specialists from different fields of knowledge: art, architecture, restoration, museology, design, IT and others.

Virtual informational sources of cultural heritage objects are created all over the world. In many countries, including the Russian Federation, there are special state financing programs aimed to encourage and support such projects (Europeana project [14], CARARE[15], ATHENA [16], ICT Policy Support Programme [17], Russkiy Mir Foundation [18], Program “A Changing Museum in a Changing World” founded by the Vladimir Potanin Foundation [19] and others.

In Saint-Petersburg State University we develop various scientific and research programs with the use of innovative technologies. These projects help cultural institutions to meet the complex challenge of preserving cultural, historic, and scientific heritage. The main target is popularization of Russian art and culture, supporting of preservation of historical documents and archives, creation of e-catalogs and e-libraries, development of educational programs.

Among these projects there are ones for which augmented reality technology is applied. This method enables to create multi-component multimedia informational source. For the time being solutions, composition and interaction of the elements of such sources have very few analogues presented in other products.

To date the project team has developed several analogue products for individual monuments and architectural ensembles. The results were highly appreciated by museologists and IT-specialists as well as users. Among them there are Nabokov museum project [20-21], “Oranienbaum across the centuries” [22] project and others.

Augmented reality (AR) is a variation of Virtual Reality (Virtual Environments - VE). VE technology provides complete immersion into virtually created environment, whereas AR allows users to see the real world around and uses virtual elements mixed with real ones. Virtual objects can be superimposed on real picture or composited with the real world [7].

In AR camera controls the reality. Obtained image is processed and adapted and then projected on the display or special glasses. Computer can recognize objects and specific marks in the frame and embed virtual image into the real video. At the same time embedded virtual image is not static, it is attached to the real environment, which is constantly controlled by processed camera signal [8]. Multimedia products based on AR technology are supported by smartphones with Android or Apple’s mobile operating systems, and therefore are available on so popular Android Market and App Store.

There is a wide range of fields of knowledge, where AR technology can be applied: medicine, education, design and architecture, cartography and GIS, advertising, game industry, engineering [9].

Application of innovative technologies in museology and education brings culture orientated to a new level, engaging users with new experience and facilitating attendance of cultural objects. There are quite many

examples of such approach in international practice: project “CultureClic”, which is the most complete culture and tourism on mobile application for France [23], “The House of Olbrich” - an iPhone Augmented Reality app that visualizes the compelling history of Darmstadt’s unique Jugendstil (Art Nouveau) quarter [10], “Young Priestess” – a project where William-Adolphe Bouguereau's painting comes to life when seen through the lens of a capable smartphone camera [11]. Innovative approach brings new experience of visiting museums and galleries. For example, it becomes possible to see the monument or architectural ensemble in different time periods, or to investigate the painting from the inside, as if it was a live picture. A visitor can find modified or lost elements of an ancient artifact and get additional information, textual or audio comment, just looking at it with the use of smartphone or iPad.

One of such projects presents a scope of our research work completed in recent two years. It is dedicated to unique and world famous Church of the Transfiguration of the Savior on Ilyina street.

2. The Church of the Transfiguration of the Savior on Ilyina street

The Church of the Savior on Ilyina street was built in the suburbs of in Novgorod the Great in 1374. It is the only temple in the world, where we can see Theophanes the Greek frescoes. The church was decorated with fresco paintings in the year 1378. Inhabitants of Ilyina street took part in the construction works and therefore the temple obtained this name. A wooden church was previous to stone temple. It was known from the XII century for unique holy picture of the Mother of God “The Sign”. Nowadays this artifact is stored in the St. Sophia Cathedral. It is one of the most significant and adored sacred artifact of Novgorod [1].

The Church on Ilyina street is not the only attraction of the Novgorod suburbs. Together with other architectural objects and ensembles, such as the Church of the Savior on Nereditsa Hill (1198), the Church of the Domination on the Volotovo Field (1352) and others, it belongs to a unique ancient architectural complex. It was in 1992 when outstanding cultural and historical value of the monuments of Novgorod the Great was finally recognized and when 37 features of the city (including individual monuments and ensembles of Novgorod and its surroundings) were inscribed on the World Heritage List [3].

The Church of the Savior on Ilyina street is a representative sample of that time period, being notable for its magnificent monumentality and elegant splendor. Its structural and space-planning solutions are typical of Novgorod of the XIV century: it is square in plan with four columns which support the dome and one altar apse. The external decoration stands out for its exceptional richness.

Fresco paintings of the church are mentioned in the Novgorod Chronicles. A noble boyar from Novgorod who initiated the project invited one of the greatest masters of his time to paint the Church. By that time Theophanes the Greek was famous Constantinople painter [4].

Church paintings are not completely preserved. Majority of them was destroyed due to numerous fires and incorrect repairs [1]. However, extant fragments are the only remaining examples of Theophanes the Greek’s paintings. Even small fragments allow specialists and visitors appreciate composition in general and unique style of frescoes created by Theophanes. Only paintings inside the dome and on the drum were fully preserved. At the zenith of the dome we can see the Almighty Saviour in a roundel. Obviously this is one of the most famous ancient Russian frescos, preserved to our days. As for the main interior of the temple, here we can find only small extant fragments of painting (possibly we have not found yet every extant fragment under stucco). Frescos from the Troitsky side-altar and from the north-west choir are in much better condition.

Theophanes the Greek created his own, very unusual painting style. It belongs to expressive stream of Byzantine painting school of XIV century. It was fully represented in Novgorod temples: the Church of the Domination on the Volotovo Field and in the Church of Theodore Stratelates (on the stream, 1360). Theophanes created one of the strongest images in the Orthodox art (Fig. 1).



Fig. 1. The Church of the Savior on Ilyina Street.

3. Multimedia Information Resource “The Church of the Savior on Ilyina Street”

Multimedia informational source “The Church of the Savior on Ilyina Street” is based on historical materials and includes not only information on the Church of the Savior on Ilyina but also historical and cultural background of that period.

Virtual excursions are fully illustrated with archival photographs, authentic documents and drawings. Visitors can get acquainted with art research articles, literature about the monument and interesting historical facts. User can get detailed description of every exhibit and get access to several large scientific and research projects which subjects are the church itself and its surroundings.

This product is multi-component and multi-functional, it gives an opportunity to travel in time and provides new approach in presenting various information about the object. It also facilitates cooperation of specialists from different fields of knowledge and provides popularization of cultural heritage.

Complex informational source based on sequential historical reconstruction, gives an experience of deep investigation into time and introduces conditions of construction process at all its stages. It helps to study historical context and to feel stream of time, to reproduce losses and regain lost data on every object. Having enough information accumulated in such a source it is possible to reproduce appearance and condition of a monument at different stages of its existence, to demonstrate possible options of its reconstruction or restoration.

Interactive 3d historical reconstruction on the base of AG technology provides an opportunity not just to study single monument, but to obtain information about its existence from the very beginning up to the moment, to find and any facts related to it. It is an innovative approach in presentation and popularization of cultural heritage objects.

4. E-passport

One of the most important results of the project implementation is so called e-passport of a cultural object. It is a system of architectural drawings, made in accordance with exact architectural and geodesic measurements. Photos of fragments with original texture are superimposed on these drawings. This is the base for further 3d modeling of the monument.

3d model can be also created by means of 3d scanning, but materials obtained in such way would require additional processing. Obviously 3d scanning does really facilitates data capturing stage (my option: It is obvious that 3d scanning speeds up data collecting). But in case of ancient frescos we face with large and complicated destroyed surface, with plaster basis and fragments of painting on it, with considerable damages and cracks. In the scanned image a random crack would have same activeness as an author's stroke. Such a digital copy would be useful only for restorers for absolute scientific wall fixation. As for visual impression of the copy – an author's stroke, which forms complicated texture of the painting, is much more important than random scratch or crack. Thus the result of 3d scanning will definitely need an accurate manual improvement. The main characteristic of any work of art is quality of composition, where secondary elements support the main theme, therefore reliable copy of the image can be also obtained only through the method of creative composition selection.

E-passport is a kind of interior map, which fixes actual condition of the painting and demonstrates gradual modifying of the object – restoration, natural destruction, process of disclosure of new fragments.

E-passport or digital copy of the monument can be considered as an optimized form of storage of museum exhibits. Also it can be used at the stage of restoration as the main method of documenting information on the object. Information stored in this document can be improved, at any stage of research (Fig. 2).



Fig. 2. (a) - The Eastern wall of the Church, preserved fragments of frescoes, (b) - The South wall of the Church, preserved fragments of frescoes

5. Analog Reconstruction

Like many other ancient Russian monuments the Church on Ilyina Street has been suffered from numerous destruction factors. Most of Novgorod churches were partially or completely destroyed during the Second World War. But unique fresco painting of the Church on Ilyina Street had been partially lost even earlier in consequence of numerous fires and repairs.

Few archival photographs, containing some data on frescos, are the only source of proved information about lost fragments. A fairly accurate reconstruction of the painting of the Church of our Savior on Ilyina can be done only upon thorough study of textual descriptions, restoration materials and archeological research.

In this particular case fresco reconstruction is the problem, which can be solved only through art and historical analyses, deep study of historical monuments of the same time period and architectural style. The goal of such reconstruction is reproducing of general visual impression close to original and creation of authentic atmosphere. The choice of conceptual approach and reconstruction method depends not only on conservation condition of the object or technological options possible in particular case, but also on specific visual perception of work of art. That is the art and esthetic quintessence of the reconstruction.

Practically analog reconstruction is a result of cooperation of specialists from different fields of knowledge. Historians, art historians, architects and restorers participate in initial scientific research. Final stage of the works is to be performed by artists, architectures, IT-specialists and designers. Completed 3d reconstruction is a basis for interactive multimedia product – an application created by means of innovative AG technology (Fig.3).



Fig. 3. (a) - The altar, (b) - The altar, reconstruction

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