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ADVANCED LEARNING WITH UFFIZI TOUCH® CLOUD EDU

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Abstract

Uffizi Touch® Cloud Edu is the cloud service that supports the advanced study of the collection of the Uffizi Gallery through 1150 artworks at a resolution up to 10 GigaPixel, and was presented as an innovative support for education at DigitalHeritage 2015 in Granada. Teaching and learning art will be easier with Uffizi Touch® Cloud Edu on your interactive whiteboard, thanks to features such as zooming, direct selection of an area of interest, informative sheets, virtual measurement, but also innovative features such as comparison, thematic navigation and suggestions based on ontologies, lesson samples designed for elementary, middle and high schools.

Keywords

Uffizi Gallery, Digital imaging, Ontologies, Cloud, Whiteboard, School, Education

1. *Uffizi Touch® Cloud Edu*

Uffizi Touch® Cloud Edu is a cloud service that gives access to 1.150 artworks preserved in the Uffizi Gallery, through an interactive whiteboard. Schools and educational institutions will be able to view and study the masterpieces of one of the most important museums in the world at a quality that allows to see details invisible to the naked eye and with features supporting an advanced learning.

The collection can be explored through different learning paths:

- by artist name (Fig. 1)
- by title (Fig. 2)
- by position in the museum (Fig. 3)
- by timeline (Fig. 4)
- by themes/objects (Fig. 5)

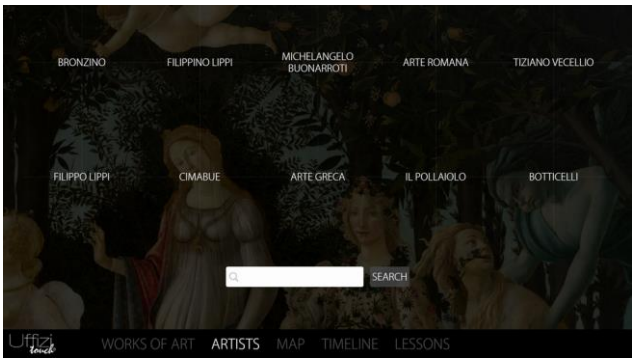

Fig. 1: Artists

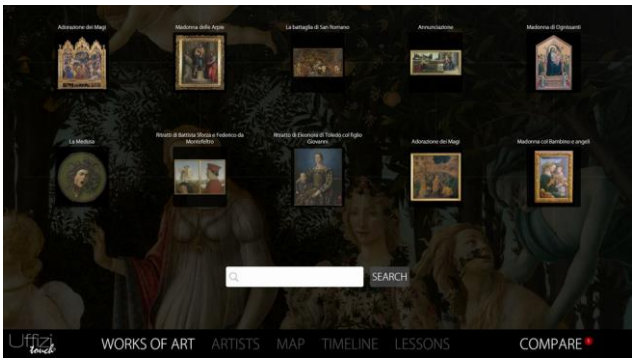

Fig. 2: Artwork

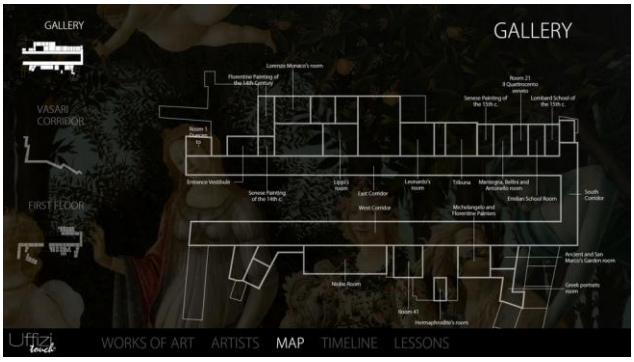

Fig. 3: Maps

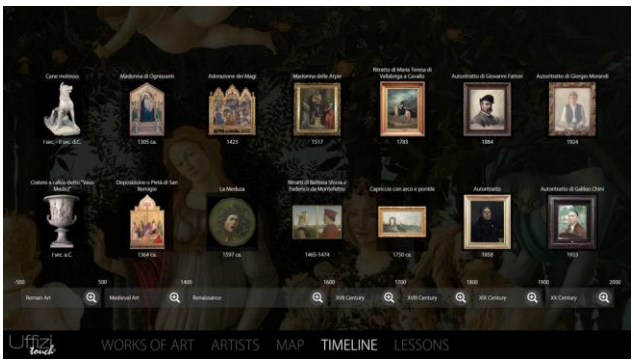

Fig. 4: Timeline

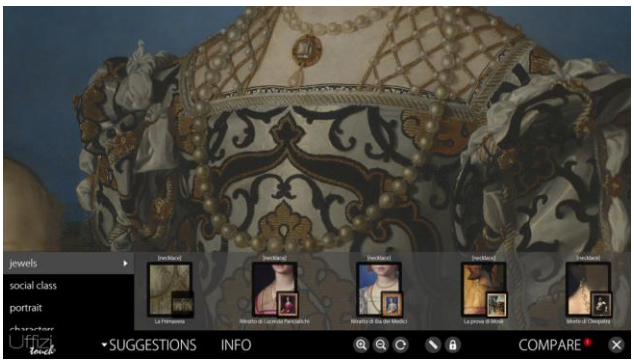

Fig. 5: Theme/Object

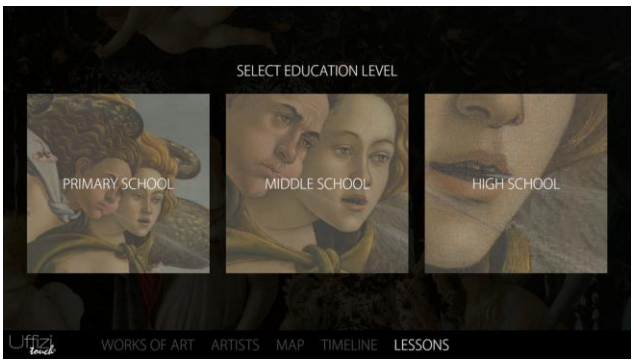

Fig. 6: Lessons

Moreover, a "Lessons" menu shows several art lessons specifically designed for to teach elementary, middle and high school some aspects of Italian art history, art techniques and Renaissance costumes (Fig. 6).

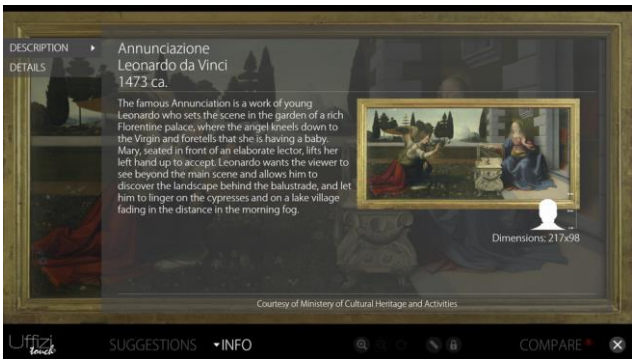

Fig. 7: Annunciazione, Leonardo da Vinci (informative sheet)

More than 1.100 artworks of the Uffizi Gallery and the Vasari Corridor, and 100 artworks preserved in the storerooms are available. Once a work of art is selected it is possible to:

- learn about the work of art through an informative sheet with historical and technical descriptions (Fig. 7)
- view the artwork in every detail, even details invisible to the naked eye. Images are between 40 and 150 Megapixel and 28 masterpieces have a super high resolution with corresponding images up to 10 GigaPixel.
- virtually measure any detail or object in the work of art to understand its dimensions in the reality (Fig. 8)
- compare two works of art arbitrarily chosen in the entire collection (for instance, it's possible to make a comparison between "Annunciazione" by Leonardo da Vinci and "Annunciazione" by Botticelli (Fig. 9)
- activate the "Suggestions" feature to discover a similar painting and/or a similar detail in respect to what is currently visualized (Fig. 10)

Fig. 8: Madonna del Magnificat, Botticelli (measure)

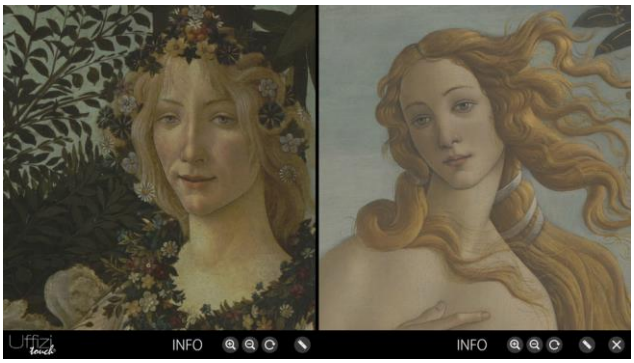

Fig.9: Primavera, Botticelli and Birth of Venus, Botticelli (compare)

Fig. 10: Madonna del Cardellino (Raffaello) - Suggestions feature activated

2. State of the art

At the moment there are no similar products specifically designed for the view and study of the collection of the Uffizi Gallery and we can't find anything comparable to Uffizi Touch® Cloud Edu. This said, we can take in consideration an important contribution linked to the Uffizi Gallery and the distance visit of a museum collection: Google Art Project.

Google Art Project is a very large free collection of artworks and museum institutions. This tool is very easy to use: through a website, it's possible to make a virtual tour of the museum and view paintings in high resolution with an integrated viewer.

Being a larger project, this virtual gallery includes countless museums and street art instalments. However, the project is designed to support the virtual visit of the museum with 360° views and not the study of the collection. Some artworks are visible in detail, but the system is overall dispersive.

Moreover:

- the image quality is lower
- there are no informative sheets for every artwork
- there is no interactive measuring tool
- there are no suggestions
- the project doesn't support the entire collection of the museum
- there is no lesson tool.

3. Browsing by themes

In Uffizi Touch® Cloud, artworks are also presented through specific themes. During the interaction with the single work of art, the system automatically suggests other works according to what the user is analysing and shows them in their entirety or through a relevant detail.

These suggestions are based on ontologies, that are enabled in the system by XLknowledge®, an innovative software technology developed by Centrica for this specific purpose. In the case of Uffizi Touch® Cloud, XLknowledge® allows to see all the Uffizi masterpieces containing a particular theme, like jewels, furniture, landscapes, animals, portrait etc. The image represents the interaction through the "suggestions" with in evidence the theme of jewels (Fig. 11).

The feature "suggestions" presents the artworks and their details according to what the user wants to analyze and lets the user navigate through different works of art with a thematic approach.

Uffizi Touch® Cloud is a product designed and developed by Centrica, which signed an

exclusive agreement with the Polo Museale Fiorentino (now Gallerie degli Uffizi). Italian Ministry of Cultural Heritage selected Uffizi Touch® to be part of the Ministry of Culture exhibitions as an example of innovative digital technologies applied to Culture and part of best Italian innovations in Shanghai EXPO 2010 and XLknowledge® is one of Italia innovations of 2011-2012.

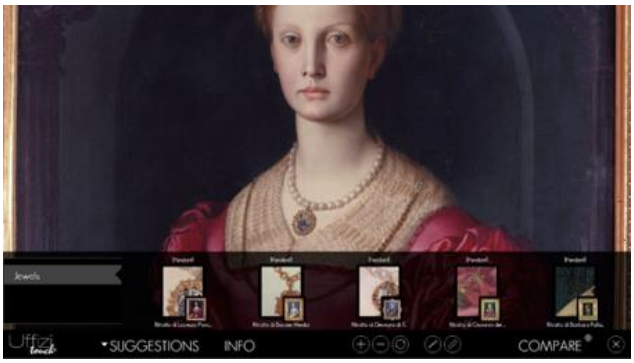

Fig. 11: Suggestions with jewels - Uffizi Touch® Cloud Edu application interface

Uffizi Touch® Cloud Edu Pro adds to the tool the possibility for teachers to create their customized lessons, by storing a set of works of art and details of works of art in a sequence that can be "reloaded" by them during live lessons. Each teacher has a profile (accessible with a personal username/password) to load/save lessons.

For example, if the teacher wants to prepare a lesson regarding traditional clothing inside the Uffizi Gallery collection, he can search for the desired works of art, highlight a detail of a work of art (an hot spot HS) and store it, add a caption (optional), then search for another detail or entire view of a work of art (EV), add a caption (optional), and so on. The preparation of the lesson can be achieved with a PC or a tablet. Once he has finished this activity, he can store the lesson under the name "Clothing" so that the lesson can be retrieved when in class. Later, on the interactive board, the teacher can access to his profile using his username/password and load the lesson he created. Moreover, he can start a presentation (HS and EV one after the other) or manually load HS and EV.

Uffizi Touch® Cloud Edu and Uffizi Touch® Cloud Edu Pro are accessible through a web service by username/password authentication and is associated to a specific IP address of the computer connected to the interactive whiteboard.

Fig. 12: Suggestions with jewels - Uffizi Touch® Cloud Edu representation of ontology concepts

Fig. 13: Uffizi Touch® Cloud Edu at EVA Florence 2015 https://youtu.be/kscZB7m8--c

4. Technical requirements

Requirements are: Internet connection (a normal ADSL connection at least), PC connected to the whiteboard with a minimum configuration equal or equivalent to Intel Core i5, 4GB RAM, Ethernet, graphics card ATI RADEON HD 3450 with 256 MB, HD with 100 GB space.

5. User analysis

Feedback from users was overall positive. Being able to access almost the entire collection of the Uffizi Gallery at a very high resolution leaves most of art lovers fascinated. Teachers see in this tool an interesting support for their lessons and students find a more practical and pleasant way to see art. In general, touching the artworks and seeing them in detail is the functionality that captures their attention first.

Besides positive comments, we registered some complaints and critical aspects. The most relevant complaint underlined the difficulty to find a personal but exhaustive learning path. Not having a comprehensive knowledge of the collection of the Uffizi Gallery, in fact, it's hard to reach every artwork in Uffizi Touch® Cloud Edu and the tool may appear dispersive. For this reason, we decided to include the "lesson" feature and we are planning to develop the system expanding this area and adding some help tool. Moreover, we are designing a guide feature as a way to make the virtual visit and the study easier and bring users in an involving experience.

6. Case studies

Uffizi Touch® Cloud Edu is currently used by professors at Landesinstitut für Lehrerbildung und Schulentwicklung in Hamburg, an advanced learning centre for art teachers, where it's available through five interactive whiteboards (Fig. 14).

Uffizi Touch® Cloud Edu has been recently used also inside "Uffizi Virtual Experience. From Giotto to Caravaggio", the immersive and interactive digital exhibition based on super-high resolution digital images and enabling technologies that was held from January 22nd to March 13th 2016 at Fabbrica del Vapore in Milan (Fig. 15). Part of the interactive area of the exhibition were seven touchscreens featuring Uffizi Touch® Cloud Edu, where visitors from all ages could freely explore the Uffizi Gallery collection. These 53 days of exhibition have been very interesting for user testing.

Fig. 14: Uffizi Touch® Cloud Edu at Landesinstitut für Lehrerbildung und Schulentwicklung in Hamburg https://youtu.be/4uk0gBkUdHo

Art history talks were organized to guide visitors and show them the possibilities of this interactive tool, supported by a large touchscreen and a projector, interactive lessons and activities specifically designed for elementary, middle and high school visits with a guide who gave students an in depth view of the Renaissance and how technology can help us understand it.

In this context, the tool was tested by the general public, both as autonomous interaction and group interaction during guided lessons.

More info can be found at http://www.uffizitouch.it and http://www.uffizivirtualexperience.com.

Fig. 15: Uffizi Touch® Cloud Edu at Fabbrica del Vapore during Uffizi Virtual Experience https://vimeo.com/159668367

Fig. 16: Some girls using Uffizi Touch® Cloud Edu at Fabbrica del Vapore during Uffizi Virtual Experience https://vimeo.com/159668367

7. Economic model

The tool is marketed as a cloud licensed service with an annual fee and can be used from a computer or interactive whiteboard connected to internet. Multi-user licenses are also available. Royalties are provided to Gallerie degli Uffizi.

Marketing analysis

- Competitive advantages

Uffizi Touch® Cloud Edu offers the highest resolution imaging technology for the Uffizi Gallery available on the market. Other museum apps offer HD technology but are not comparable. The software displays 1150 artworks, including pieces from the Vasari Corridor and 100 artworks from the Storeroom, which are not visible in other ways. Every artwork can be zoomed and analyzed in details and comes with a brief history and background information. The Gallery can be explored in different ways: by artist name, by title, by museum hall, by historic period and other groupings like "jewels" and "landscape". Innovative interactive features are a measuring tool, a suggestion capability thanks to a system of applied ontology, and side by side comparison.

- Primary value proposition

Customers will purchase the Uffizi Touch® Cloud service because it offers the highest quality definition of these specific works of art available today. This will enable users to study the works of art in ways that were never possible before. Uffizi Touch will revolutionize the way you see and experience art through its high quality and definition.

- Target Market

Schools, colleges and Universities with a specific focus on Art and Art History programs: Uffizi Touch® Cloud Edu would allow art professors and teachers to view and analyze paintings from the Uffizi Gallery at a higher quality than ever before. These institutions will likely use Uffizi Touch as an educational tool, in conjunction with regular lecture and textbook materials. Students could use Uffizi Touch® Cloud Edu in class for personal study on the designated school computers. The cloud could be installed at one computer or multiple computers in a single lab.

- Market size

Education and Technology area:

- 43,27 B$ global market
- 93,76 B$ in 2020 (Research&Markets, 2016)

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