

DELIVERABLE 3.1.2

Common methodology for the collection of information
on intangible cultural heritage

Work Package	3
Activity	3.1.2
Phase Leader	PP1-NASPA
Deliverable	Common methodology for the collection of information on intangible cultural heritage

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Aim of the paper

This technical paper fixes a common methodology for collection of information on city port cultural heritages.

Contents and methodology should be a consequence of the REMEMBER's project and "Adriatic Port Cultural Network" goals, and what they want to transmit to the audiences, in the framework of a common storytelling relating on the identity of the Adriatic ports.

In this regard, the proposed methodology should explain how to undertake their researches, which methodologies and taxonomies to use.

In addition, the document provides concepts about the Cloud backoffice (part of the platform by PP9_UNIVPM) that will enable the information management.

Setting the scene: the context

One goal of the REMEMBER Virtual Museum (hereafter VM) should be to set up new touristic routes that will connect physically or virtually city ports. For this purpose we should transform the visitor into an Ambassador, keeping his relationship with the territories alive and encouraging him to visit the others port- cities involved in the project and to share his/her experience troughs social media and other channels.

To achieve this ambitious result, a particular attention must be paid to the experience design of the VM because each one must be memorable and sharable.

Each REMEMBER VM will be unique, as unique are the contents of the territories, cities and ports involved. The quality of the VM is based on the **quality of the information collected, selected and presented. Information must be relevant, validated, engaging, comparable.**

Therefore, it is essential that each partner focuses its attention not only on the technological components of the VM but mostly on the content level, the real pillar of the project.

As summarized in a couple of paragraphs of The Cluetrain Manifesto¹ “A powerful global conversation has begun. Through the Internet, people are discovering and inventing new ways to share relevant knowledge with blinding speed. As a direct result, markets are getting smarter—and getting smarter faster than most companies”. [...] “These markets are conversations. Their members communicate in language that is natural, open, honest, direct, funny and often shocking. Whether explaining or complaining, joking or serious, the human voice is unmistakably genuine. It can't be faked”.

So thank to the web, new opportunities of conversations have arisen, people become more informed, smarter and demanding. The touristic and cultural market are changed too and also them are now run by conversations.

These networked conversations are enabling powerful new forms of social organization and of knowledge exchange. People in networked markets have figured out that they get far better information and support from one another than from vendors.

In order to be efficient, today these conversations must be designed and managed: strong messages are interesting, and the coherent ones are convincing.

Data collection methodology

The methodology is shaped on the requirements of the web-based tool which defines scope of data collection, thematic areas, timeframe, nature, typology and sources of data to be collected.

As specified in the deliverable 3.1.1, the REMEMBER Virtual Museum should have:

¹ The Cluetrain Manifesto, written by Rick Levine, Christopher Locke, Doc Searls and David Weinberger in 1999, analyzes the influence that the Internet has on the markets and on all the subjects that revolve around them.

- **an introductory and common section.** A common platform in which there will be a common thread.
- **a local section,** conceived as a net of clouds developed by each partner
The 8 Virtual Museums – Local sections should contribute to improve the accessibility to the 8 cultural heritage ports sites (Ancona, Ravenna, Trieste, Venice, Rijeka, Dubrovnik, Zadar, Split). Moreover, each of the 8 VM should be linked to the other VMs realized in the project, so to enhance accessibility to digitalized contents of other involved ports. Each partner should upload its own contents.

Aim of data collection and thematic area

"**WHY**" a territory is to be appreciated leads to investigate on "**WHAT**" it offers. This statement will lead the creation of core stories that could arise interest around what is offered by the city ports

If the REMEMBER VM wants to **diversify the flows** and to **widen the range of the tourist's visit**, it is necessary to motivate the reasons with "whys". REMEMBER's project partners have to **overcome the natural self-reference**. As general guideline we can state that: **a VM is not "for" visitors, but it gets meaning "with" visitors/users.**

That also means that is useful includes them in the VM core stories, to mirror their lives, their memories, makes them think, laugh and play.

Furthermore, it should be pointed out that the goal is **audience development** with the creation of a new public and its **engagement** with the development of **cultural tourism** that appreciates the framework of city ports.

Therefore the narration must **intercept the biographical history of the audience** to whom it is addressed, **asking questions** to the people, about the values that guide their choices, their attitude towards other territories and which relations link them to a destination.

We must be aware that technologies do not arise to enhance art and cultural assets but to play, measure, orient, transmit, reproduce, memorize, seduce, astonish. We have to focus them on our specific cultural goals taking advantage by the fact that they are intrinsically bidirectional.

The REMEMBER VM should bring visitors and citizens to be also users, co-designers of services, Ambassadors thank to social media and other channels, evaluators with their feedbacks and monitored behaviours, providers of contents.

The REMEMBER VM common platform of the Adriatic Sea regards the process of virtualization of dynamic relations concerning this shared heritage. The common platform cannot be considered just as a static representation of the Adriatic Sea, but as a live, dynamic and relational common base within an evolving process.

Port activities in the framework of the Adriatic Macro Region must be seen as a richness. **In the past as in the present, the relationship with the sea is the key to the development of communities.**

In this framework, the **aim of data collection is the preservation of tangible and intangible cultural heritage** (Deliverable 3.1.1) of the involved ports supported by the implementation of a cloud-based tool implemented by the 8 ports sites.

Virtual and Augmented Reality applications break down the difference between tangible and intangible, building relation for those immersed in the recreated world. In this context, Culture is what transforms the viewer because it answers his questions. The particular **heritage** - related to the Adriatic Sea – to be preserved by the partners in the VM must be articulated in 3 categories, that are the thematic areas that should be developed:

1. Heritage as a specific **element of the Identity** of each one of the local communities – (the intangible)
2. Heritage as a **potential resource to be protected and valorised** in order to generate new social and economic opportunities (such as new jobs, cultural values, etc.) – (the intangible)
3. **Tangible heritage to be preserved from** potential deterioration caused by the time, pollution, mass tourism, etc. – (tangible).

The introductory and common section should help to describe the influence that the relationship with the sea and with the maritime system has had on the cultural, social and economic development of the eight ports involved in the project and their relative territories.

This narrative should be developed through processes taking place today as in the past: the involved ports share a common background and a sense of belonging resulting from the intense commercial and social relations, conflicts and cooperations, between the two Adriatic shores. Today, this maritime cultural heritage is facing several challenges that are endangering its integrity and its very existence.

The common part aims at enhancing and rediscovering the cultural values and the social and economic relations that linked the Adriatic Italian and Croatian ports and their surrounding territories, starting from the role of „cultural hubs“ traditionally played by the ports.

Increasing knowledge and awareness on the relations that forged the cultural identity of the involved territories, through activities aimed at safeguarding, systemizing and valorising the common cultural heritage, must strengthen the mutual understanding between ports, cities and surrounding territories contributing to the generation of added value to the social, cultural and economic aspects.

The cloud-based platform will allow the accessibility to the cultural contents also from remote locations and by virtual tourists, contributing to enhance the visibility of the cultural destinations.

The common historical introduction will use a visual narrative, considered the best way to communicate the common identity to the ordinary visitors. Each VM should be linked to the common platform and with other’s virtual museums realized in the project, so to enhance accessibility to digitalized contents of other involved ports.

The Adriatic “strong” identity **must be assumed by the partners.**

Contents must design the role of the **ports as gateways for social and economic development** in centuries, but also their current importance, their dynamism and **their ongoing evolution to the changing environment.**

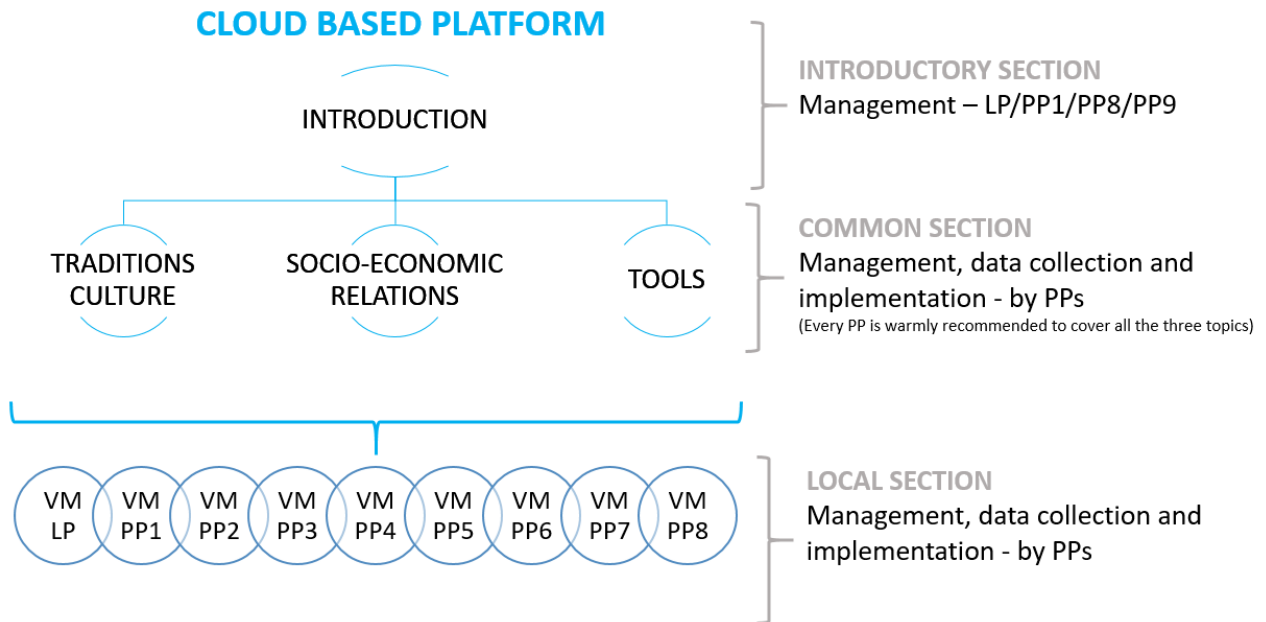
With the aim of valorizing and strengthening **the link between the cities and their communities**, paying specific attention to the **experiences and feelings**, the **“FILE ROUGE”** should be based on what qualify city ports in term of:

- TRADITIONS CULTURE,
- SOCIO-ECONOMIC RELATIONS ,
- TOOLS AND PHYSICAL HERITAGE.

In order to define common logical ‘content routes’ among the partner, each partner is warmly recommended contribute with some content in all the three topics. The processes, intended as routes, exchanges, professions, traditions, paths, artefacts are the categories that are grafted into the narrative and that allow each partner to vertically decline their contents.

REMEMBER project partners need to bear in mind that the nature and the value of the objects that they represent must be understandable as evidence of the Adriatic Maritime culture related to the single city-port. The identity must not be denied by virtual items, it must be assumed by it.

The port-maritime intangible cultural heritage needs to be continuously **recreated** by the community as to recover and valorise the relation between ports and cities, **by linking the present with the past. This parallel valorisation aims at demonstrating that the past is the origin of today’s port-cities identity and richness in terms of culture, works, productions, investments and that the port system is still operating as an engine for the local community.**



The scope of data used for the research should be much important/relevant than the scope of data that will be implemented into the Virtual Museums (VM). The scope of data needed for the research should be as wide as possible, but still within the framework of the above said “FILE ROUGE”. In this way we will learn more about the specific topic that is going to be implemented in VM, and it will be much easier to select a specific theme (artifact or story) that will be shown in VM.

HOW TO COLLECT INFORMATION?

Once we have set the information framework, we should define the main sources:

- a. Historical, Technical and other Scientific sources:

- b. Oral history:
- c. Crowdsourced content, User Generated Content:
- d. Physical Items:
- e. General information:

Most of the PPs have important archives, data bases, communication and information material, and other multimedia information repositories that could be used to select existing materials. These material could be used as they are, if they fit the REMEMBER goals, or edited in the desired format

Each VM will be implemented with the supervision of a local content Curator

The balance among the previous sources will be discussed among the teams and will be made always to allow a continuous referral/link between city ports and Italian/Croatian worlds.

HOW MUCH INFORMATION?

From information selected on a specific topic each Project partner should extract only the fundamental facts about it that is going to be show in VM.

Quantity is crucial as quality, because a large amount of texts or photos could discourage our visitors from enjoying VM and the overuse of the technology could be tiring for visitors.

For example, if we decide to present a hologram of an old boat that was used for trade between Adriatic ports, we should first select information. The data about an old boat could probably be in the form of scientific articles and drawings of the boat. We should research data about the boat so that we could learn almost everything about the process of building the boat, the dimensions of the boat, the way it was sailed, how many people were required to sail the boat, which goods it could carry, and so on. After researches we filter what is relevant to our purposes: what we have to talk about: shipbuilding? Sailing? Commerce? Migration? Now we can create a clear 3D model

of the perspective we need and decide how/if the visitor interact with it. From a first layer we should go in deep into some interesting other stories about the boat that we think will encourage our visitors to pass to the further items.

Data Sets

Moreover the VM components, both the platform and the 8VM, should be developed as digital devices: language and contents must be conceived for an internet use, on the web or on the mobile.

The project should use **common languages**, where languages are a sort of experience.

The sets of data that REMEMBER project Partners should research and implement into Virtual Museums will mostly:

- Texts (books, articles, scientific papers...)
- Pictures (photographs, historical paintings, maps...)
- Sounds (various sound recordings)
- Videos (short videos made mainly by you during the creation of Virtual museum, or videos that had been already filmed before)

References

When researching data it is very important to keep track of the references, so every text, picture, sound or video that we are going to research or implement into our VM must take evidence of its source.

By referencing data we will acknowledge the contribution of other researchers in our work, and give a credit to the writers from whom we have borrowed words and ideas. By quoting the work of a particular researcher we acknowledge and respect the intellectual property rights of that researcher.

The best way to make sure the reference is accurate is to keep a record of all the sources that we used when reading and researching.

As mentioned above, the data that we will show in VM will be short because most of our visitors will be interested only in that kind of story. There will always be some visitors who will want to know more about the subject. References should allow those visitors to trace the sources of information that we have used, so that they can research the given theme by themselves. References will also help us, because we will probably need to check some of the data later on, and it will be impossible to trace back the source of that particular data without any reference.

The way that reference will be recorded within the platform itself, it will be discussed later on. For now it is only important to keep track of the data that we are researching and to take notes of the references. Those notes should include the name of the author of the text, picture, sound or video; the year it was published or created; the name of the book or movie/video from which we took the data; and the city or country that it was made in.

CLOUD - BACKOFFICE

As specified in Del 3.1.1, REMEMBER project will be developed upon a **specific framework** that allows application developers to make their apps available to end-users and end-users to browse, install and use available applications. These applications can be either hybrid or web thanks to the use of **HTML5**. The REMEMBER framework provides a framework to develop, deploy and deliver applications through various components: a mean to deploy apps that can be used either as native, a responsive HTML5 UI framework, a client-side REMEMBER library and a backend service acting as the REMEMBER Applications Repository.

Specifically, the **backend service** will act as the REMEMBER Applications Repository: this service is the central place where developed applications are deployed. Indeed, it allows developers to deploy and

publish their contents within the apps. Then, this service makes applications available either to REMEMBER Smart Mobile clients or web browsers. Finally, it provides a set of APIs.

The backend follows a classic n-tiers architecture, as described hereafter:

- The **first layer, called REST**, provides the resources used to execute the frontend. Also, is the entry point to communicate the frontend with the backend at runtime, but most importantly it provides all the methods exploited by the SAR module. This module is highly coupled with the security mechanism. So, for each received request, before analyzing its content, this layer inspects authentication to grant access or not.
- The **business layer** ensures the consistency of the information. This layer is basically composed of:
 - **Administration manager**, which allows performing all the operations of the structuring entities (users, clients and products).
 - **Session manager**, to handle all the operations related to co-design session, such as access to and modification of virtual prototypes and access to history of modifications.
 - **Resource manager**, to manage documents, notes, comments and everything related to external information that helps the preparation of a co-design session.
 - **Authorization manager**, to ensure the logical access of the information. The requirements defined in the Deliverable 3.1.1 impose a fine-grained authorization mechanism for each co-design session.
- The **data access layer** is highly coupled with the database containing all the information.

Through the **administration backoffice** it is possible to manage and insert structured contents in a simple way. The administration platform is designed to have a generalized data structure; this way, the partners and collaborators will be able to arrange the entities of the data structures even in future steps, based on the needs of the project. The data structure makes use of an object –based logic, where an object can be a point of interest, an event, a product page, etc.

Each object is composed of different parameters such as, for example:

- First name
- GPS coordinates
- Subtitle
- Description
- Address, Country, City, etc.
- Media (Images, video, audio)
- Other parameters ...

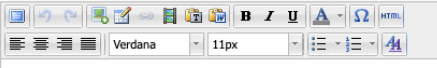

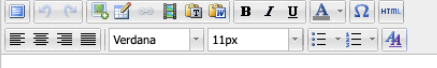
The above-mentioned structure is meant to generalize the cloud-based content management platform, useful for dealing with any type of need. In addition, the administration platform is designed to manage accesses by structuring a user hierarchy; the reason is to have an administrator user and multiple users with different permissions and roles. The administrator user will be able to manage the entire platform in complete autonomy, through a simple and intuitive interface. One can create users, points of interest, content, etc.

The cloud platform displays API calls that will be used to populate the **various frontends** (website, app, totems, etc.). The contents uploading will be easy even for not expert users, as showed in the following step by step guide through.

Within the platform it will be possible to create the new **“Point Of Interest (POI)” object**; a new window will be opened containing all the configuration parameters. The POI is composed of:

- ID: a unique code to identify each POI;
- Category: to identify the typology of POI
it may match with the three REMEMBER topics (Common Traditions Culture, Socio-economic relation, Tools) or foresee sub-categories
- GPS coordinates: for the geolocalization and the positioning upon maps;
- Title: to identify the name of each POI;
- Image and Image preview: allows to visualise the preview of the image representing each POI;

- Video: link a video to the specific POI;
- Addresses: Parameters to identify and reach a POI;
- url AR: this parameter indicates the multimedia content visualised in AR mode with the editor;
- url VR: this parameter indicates the multimedia content visualised in VR mode with the editor;
- Tags: further fields that can be useful as metadata to facilitate searching for a POI.

Versione base (it) Inglese Tedesco	
ID	1399
co_x	43.161211
co_y	13.716956
nome *	Cattedrale
preview	<div style="border: 1px solid #ccc; padding: 5px;">  <div style="border: 1px solid #ccc; height: 100px; width: 100%;"></div> </div>
Percorso: p Parole:0	
img_preview	
testo	<div style="border: 1px solid #ccc; padding: 5px;">  <p>In pochi minuti da Piazza del Popolo si raggiunge la sommità del colle Girifalco, conosciuto anticamente come Colle Sabulo dal quale lo sguardo spazia dai Monti Sibillini al mare, accarezzando le curve dolci delle colline ricoperte da vigneti, uliveti e frutteti.</p> <p>In fondo al parco è possibile ammirare l'imponente mole della <i>Cattedrale dedicata all'Assunta</i>. L'antico Duomo di Fermo, fondato su un tempio pagano di cui rimangono tracce nell'ipogeo, venne distrutto nel 1176 per ordine di Federico I, detto il Barbarossa.</p> <p>Della ricostruzione del 1227, voluta da Federico II, rimane solo l'imponente facciata romanico-gotica e l'atrio ricco di affreschi del Trecento.</p> <p>L'interno, malgrado sia stato modificato in stile neoclassico nel Settecento, conserva ancora preziose opere che testimoniano il rilievo assunto dalla Diocesi della città di Fermo nel corso dei secoli.</p> <p>Sono infatti visibili opere di grande pregio: un sarcofago paleocristiano del III-IV secolo, collocato nella cripta duecentesca; diversi monumenti funebri di importanti personaggi tra cui quello dedicato a Giovanni Visconti d'Oleggio situato nell'atrio della cattedrale; un'icona bizantina, dono di San Giacomo della Marca, situata nel coro d'inverno; un mosaico paleocristiano con pavoni, visibile dall'altare principale.</p> <p>Orario di apertura Giugno luglio e agosto tutti i giorni 10.00-12.30 / 16.00-20.00 Per visite in altri periodi tel. 0734.229005 Interno 32, oppure 0734.229350 -</p> <p>Biglietto d'ingresso Entrata libera. Visita guidata € 2,00 - Solo Ipogeo € 1,00</p> </div>

img

galleria

video

via

ncivico

citta *

cap

provincia

nazione *

telefono

fax

email

sitoweb

urlAR

urlVR

tags

Categoria

ID	categoria	nome	citta	tags	co_x	co_y	Attivo
1162	Monumenti	Chiesa Santa Maria delle Grazie -	Montegioorgio	#collina #montegioorgio #cultura	-	-	SI
1161	Monumenti	Chiesa di San Michele e Santa Dor	Montegioorgio	#montegioorgio #cultura #collina	-	-	SI
1160	Monumenti	Chiesa Santa Maria delle Grazie	Montegioorgio - Frazione Monteven	#collina #montegioorgio #cultura	-	-	SI
1159	Monumenti	Villa Fontebella	Montegioorgio	#montegioorgio #collina #cultura	-	-	SI
1158	Monumenti	Chiesa di Sant'Angelo in Montilan	Montegioorgio	#collina #montegioorgio #cultura	-	-	SI
1157	Monumenti	Mulino Fortificato	Montegioorgio	#montegioorgio #collina #cultura	-	-	SI
1156	Monumenti						SI
1155	Monumenti						SI
1154	Monumenti						SI
1153	Monumenti						SI
1152	Monumenti						SI
1151	Monumenti						SI
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1143	Monumenti						SI
1142	Monumenti						SI
1141	Monumenti						SI
1140	Monumenti						SI
1139	Ufficio Turistico						SI
1138	Monumenti						SI
1137	Ufficio Turistico						SI
1136	Ufficio Turistico						SI
1135	Ufficio Turistico						SI
1134	Ufficio Turistico						SI
1133	Ufficio Turistico						SI
1132	Ufficio Turistico						SI
1131	Ufficio Turistico						SI
1130	Ufficio Turistico						SI
1129	Ufficio Turistico						SI
1128	Ufficio Turistico						SI
1127	Ufficio Turistico						SI
1126	Ufficio Turistico						SI
1125	Stabilimenti Balneari						SI
1124	Stabilimenti Balneari						SI
1123	Stabilimenti Balneari						SI
1122	Stabilimenti Balneari						SI
1121	Stabilimenti Balneari						SI
1120	Stabilimenti Balneari						SI
1119	Stabilimenti Balneari						SI
1118	Stabilimenti Balneari						SI
1117	Stabilimenti Balneari	UKTYOE	Porto Sant'Espidio	#portosanteepidio #mare	-	-	SI
1116	Stabilimenti Balneari	SETTEMAR	Porto Sant'Espidio	#portosanteepidio #mare	-	-	SI
1115	Stabilimenti Balneari	MOBY DOCK	Porto Sant'Espidio	#portosanteepidio #mare	-	-	SI
1114	Stabilimenti Balneari	BAGNI SS	Porto Sant'Espidio	#portosanteepidio #mare	-	-	SI
1113	Stabilimenti Balneari	PAPILLON	Porto Sant'Espidio	#portosanteepidio #mare	-	-	SI
1112	Stabilimenti Balneari	GUNESON	Porto Sant'Espidio	#portosanteepidio #mare	-	-	SI

Hence, once the POI has been created, they can be always modified and/or updated by selecting them from the list. by selecting each element, will be showed the content preview and thanks to the “modify button”, a tool list will be visualised to insert/modify/delete information about a POI.



The procedure of content uploading through the backoffice platform is subject to eventual changes, according to specific needs or requirements that may arise during the project duration.

INNOVATIVE FUNCTIONALITY - BACKOFFICE

Referring to Del 3.1.1, this document is meant to provide technical specifications about the implementation of two main functions that are included in the platform.

AR/VR Editor

This tool is designed to enable users to be autonomous in the creation of AR/VR contents. In other words:

- It provides a platform for creating AR/VR contents.
- It makes use of innovative technologies to facilitate the creation of virtual experiences.
- It represents a driver for digitalisation among different actors and entities.
- It facilitates selling partners' digital content.

With augmented reality, users can create their projects for visualizing enhanced content. By recognizing a Marker, it will be possible to view images, audio, text and video on Smartphone. With virtual reality, users can create immersive paths with the possibility of inserting contents such as audio, images, texts or videos. After the creation of an authenticated backend there are two possibilities.

Creation of a VR project:

- Inserting a 360 ° panoramic photo
- Assignment of the "Project Name"
- View the overview in the «VR/AR Editor» app

Creation of an AR project:

- Selecting a predefined marker from a list
- "Project Name" Association
- Loading a .png file to Associate with the marker

- Visualization of the project in the «VR/AR/ Editor» app

Here below some screen shots of the already implemented tool, that will be scaled up in the REMEMBER framework:

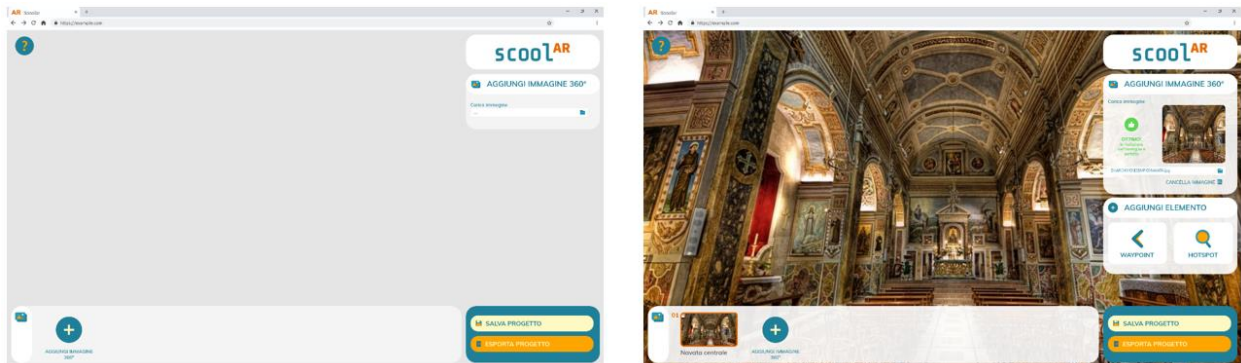


Figure 1 VR PROJECT. When opening a new project, the user will be asked to upload a 360 ° image, in order to start working. Feedback on the resolution of the uploaded image will be provided immediately. Once the image has been approved, it will be possible to add elements, Waypoints and Hotspots. Waypoints allow you to navigate from one image to another. Hotspots to insert windows with informational contents.

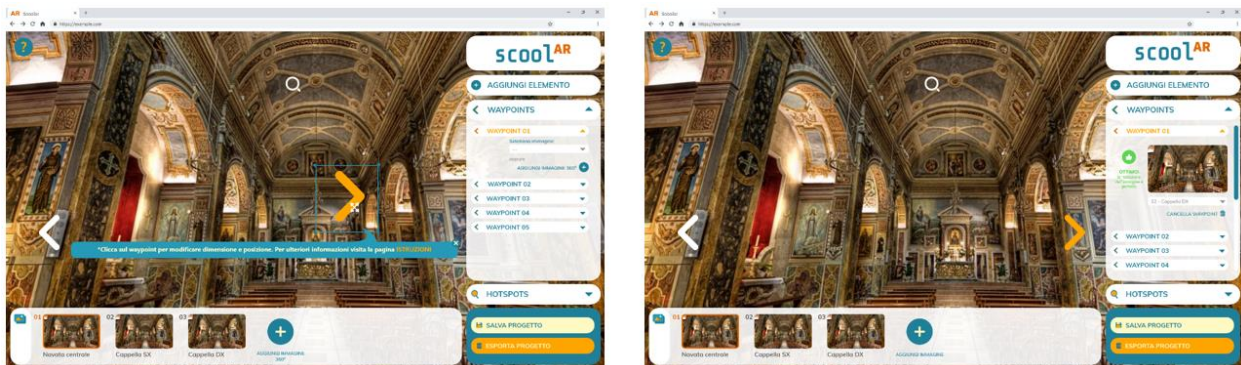


Figure 2 VR PROJECT. By adding a Waypoint, the associated icon will appear on the work area that will allow the passage from one 360 ° image to another. On the right panel will be present all the Waypoints created. In the active Waypoint section, it will be possible to select the image to be associated, via drop-down menu if previously loaded, or load another. All the 360 ° images loaded will be visible at the bottom on the «360 ° image bar».

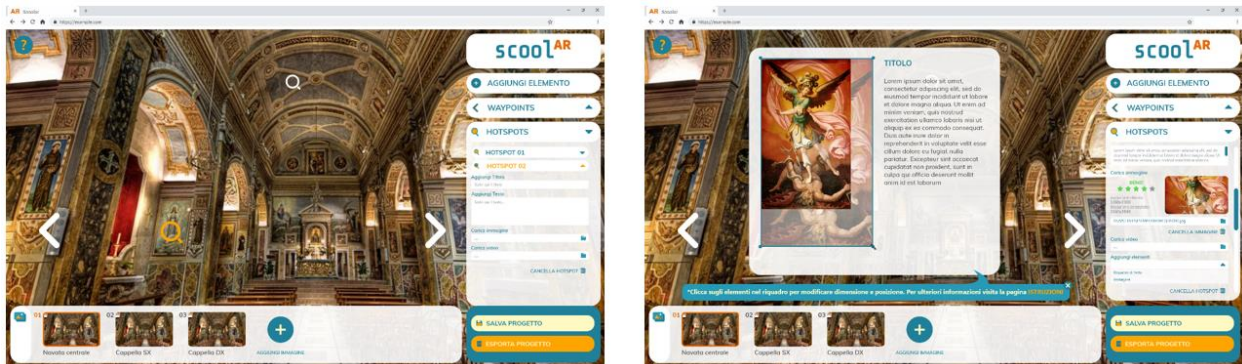


Figure 3 VR PROJECT. Adding a Hotspot, the associated icon will appear on the work area that will allow consultation of the contents inserted. Once added, as for AR projects, a series of elements will appear to be added to the contents window of the hotspot. By filling in any section, a containing window can be created which can be modified using Drag-and-Drop.

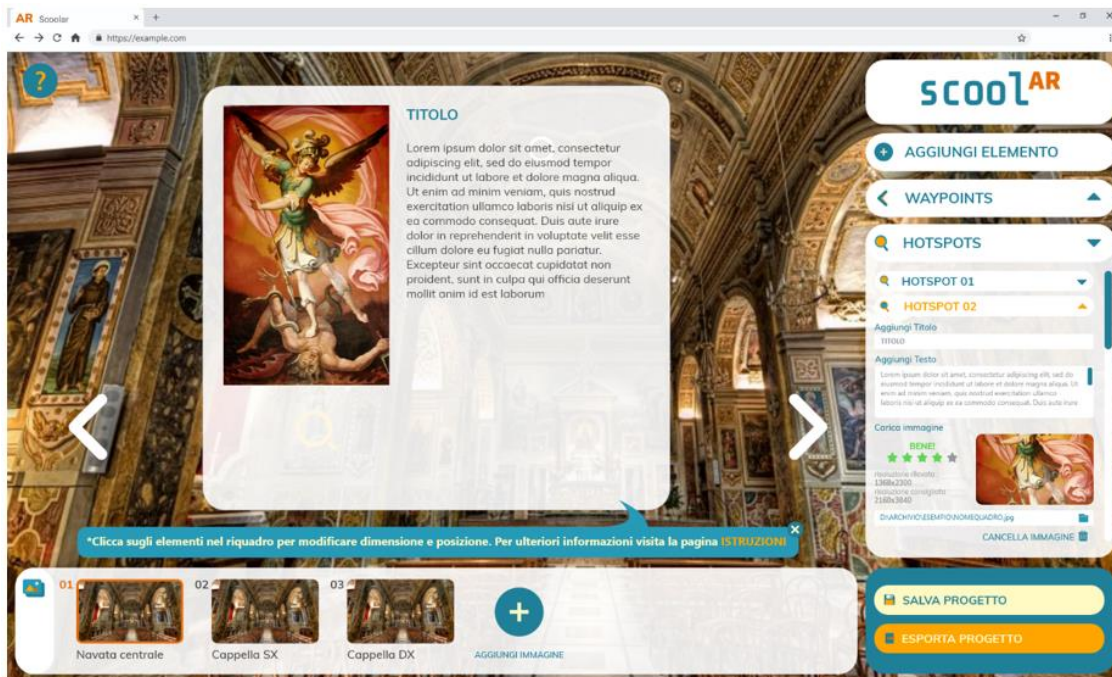


Figure 4 VR PROJECT. Once the work is finished, the project can be saved on the user dashboard and / or exported.

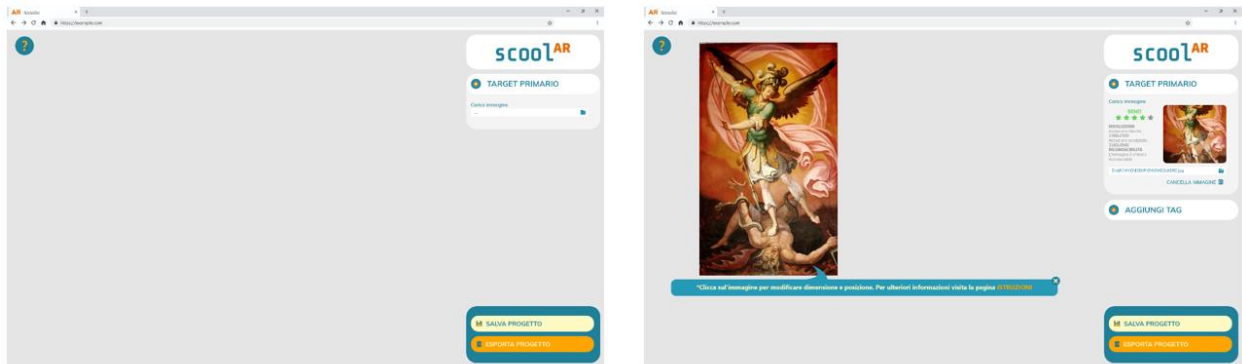


Figure 5 AR PROJECT. When opening a new project, the user will be asked to upload a target image, i.e. the image object of the project that the application will have to recognize. Feedback will be immediately provided on the resolution of the uploaded image but above all on its recognizability. Once the image is approved, it will be possible to add tags. All elements on the work area will be editable via Drag-and-drop.

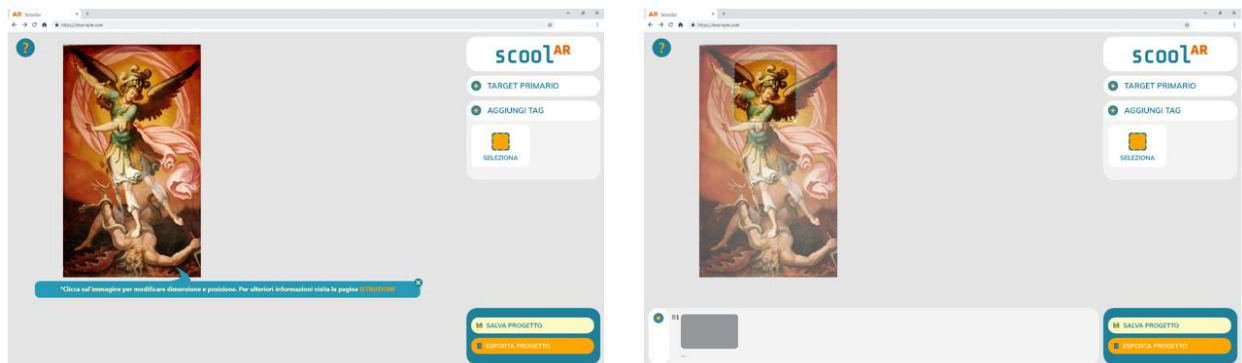


Figure 6 AR PROJECT. Selecting «Add Tag» in the right section will open a panel with the tool for selecting the Tag area. Once the instrument has been selected, the image will appear in semi-transparency, thus helping the selection. Once the area is selected, the "tag navigation bar" will appear at the bottom, which will contain all the selected areas, giving the user the possibility to navigate between them with ease.

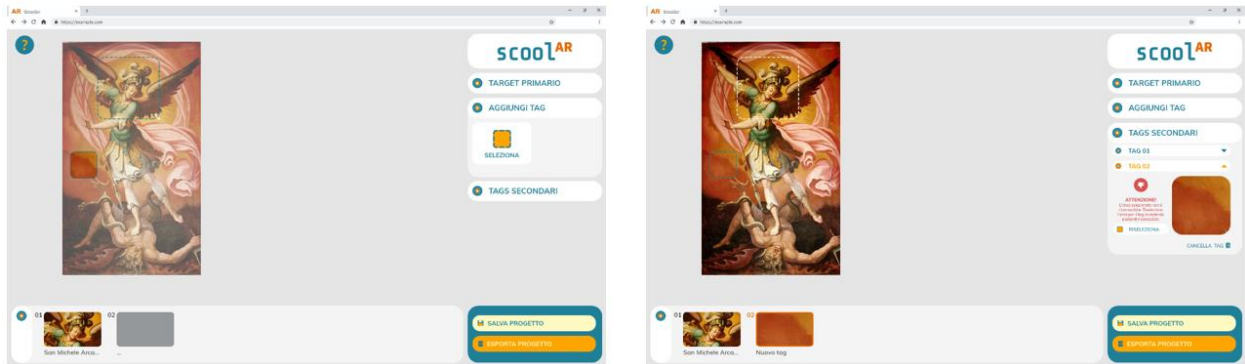


Figure 7 AR PROJECT. In case of selection not sufficiently recognizable by the application, a negative feedback will be provided which will force the user to reselect the tag area.

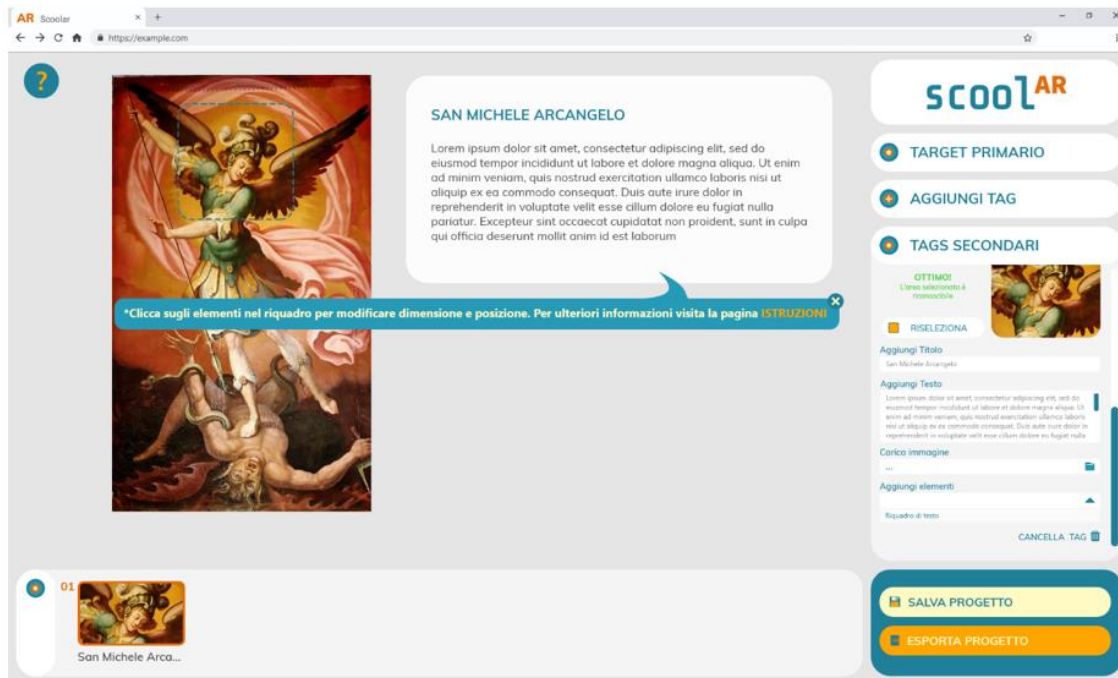


Figure 8 AR PROJECT. Adding information content to the right panel, a containment window will appear automatically. All contents, including the window, will be editable via Drag-And-Drop. A dialog box will help the user addressing it to an «Instructions» page.

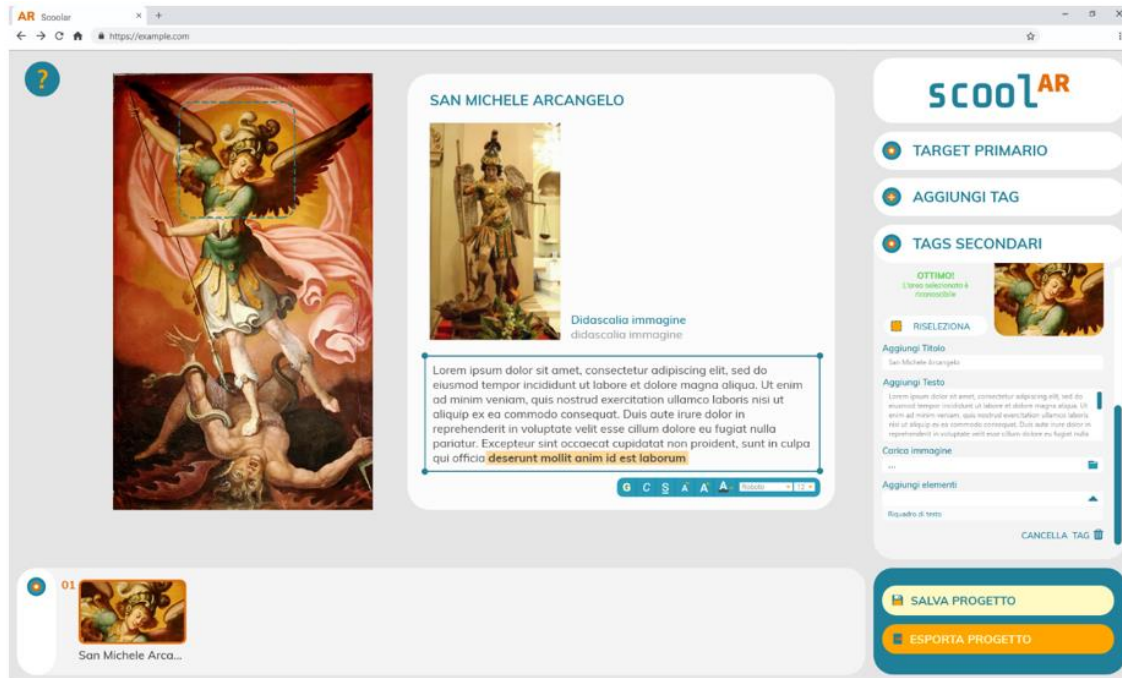


Figure 9 AR PROJECT. Once the project is completed, the user can save it on his dashboard and / or export it for the application.

Analytics

The main goals and benefits of this feature of the framework can be seen in the development of a novel set of AR/VR tests and metrics in the pre-release phase (in order to help the commercial launch and developers), and in the release phase by introducing the measures for long-life app **optimization, usage tests and hint on final users**, providing a method for **automatic testing of quality and popularity improvements**. The proposed approach is affordable and reliable for long-life testing and optimization.

The proposed framework allows one to explore the usage of the application in a large-scale user study.

For the pre-release phase tests, web-dashboard is implemented. A full list of all the digital metrics we collect is the following:

- Active Users: The number of users that have started a session in the last 5 minutes.
- Daily Active Users: The number of unique app installations on every device identified as active on a specific day.
- Daily New Users: The number of new app installations on each device within a given day.
- Monthly Active Users: The number of unique app installations on every device that was active over the trailing period of 30 days. Note: Device is active if there is foreground activity.
- Crash-Free Users: The percentage of daily active users that had a crash-free experience on a given day.
- Sessions: The total number of sessions across all app installations on a given day.
- Top Builds: All builds that have been used by at least 10% of Daily Active Users (DAU) on any single day in the last 30 days, or at least 4% of DAU on the current day.
- Daily Users for Top Builds: The percentage of DAU using a specific top build.
- Daily Active Users by Device: The number of DAU using a specific device type.
- Daily Active Users by OS: The number of DAU using a specific OS version.
- New Users Over Active Users: The percentage of DAU that installed the app on a specific day.
- Retention: The percentage of unique users that were daily active users on a specific day, 1, 7, or 30, post installation.
- Crash-Free Sessions: The percentage of sessions that did not experience a crash on a given day.

From the AR and VR side, a novel set of metrics for are available for the post-release phase:

- average usage time;

- number of AR interactions per session (defined as the the number of touches per users in AR interactions; i.e., moving an AR character on the Puzzle, activating snow, etc.);
- AR tag discovery time (defined as the time between the camera switch on and the appearance of the AR contents on the screen, meaning that the user was able to activate the AR in a certain time);
- AR bounce rate (defined as the percentage of users entering the AR section and going back without any interaction or AR activation);
- distances between the AR target (the marker) and the device (measured as the average of distance during the AR interaction in millimeters);
- amount of movements around the marker that the user performs to interact with AR contents from different points of view (measured as the total distance of device travel around the AR target/market in millimeters);

AR target losing percentage (measured as the number of users that lose focus on the AR marker and then come back to it in less than 10s).

HOW TO ENGAGE VISITORS AND STAKEHOLDERS?

The promotion of the project REMEMBER and the Virtual Museums will be done mostly within the Project activities 5.2. Through those activities we will promote our project during various cultural and tourism exhibitions. There will also be some promotional materials like videos and brochures. In this way we will promote our work to the wide public.

The engagement of our visitors will be a much harder task because port sites are usually seen only as places for traveling. Although our VM will definitely be very interesting, we need to engage visitors to visit them.

For that task we will:

- Put some engaging labels in our port public spaces (i.e: qr codes, funny questions, activating challenges) that can push general public to navigate our applications and/or visit our premises
- Include local tourist and cultural institutions,. Every Port Authority should contact their local tourist offices and tourist information centers,
- museums and cultural institutions must be included, also in the content design processes
- Universities and schools are natural partners, both for having visitors and to develop partnerships

. All those institutions should be interested in the promotion of Virtual Museums in a win win relationship. They could help us in the process of content collecting and implementation.

We should also encourage our local shipping companies to create a sort of a room or a hot spot, where promote VM to passengers. The same thing could be done in local museums or tourist information centers. The way of implementing our VM on that kind of location will be discussed later on.

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