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ENIGMA

Endorsing safeguarding, protection, and
provenance management of cultural heritage

Provenance GUI

User Guide of LEA Officers and Experts

ENIGMA Project

Project title	Endorsing safeguarding, protection, and provenance management of cultural heritage
Project acronym	ENIGMA
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Manual name	Provenance GUI User Guide_v0.1
Tool name	Provenance GUI
Beneficiary	Members of the Consortium

Abbreviations

Term	Explanation
CGs	Cultural Goods
CH	Cultural Heritage
DO	Demonstration, Dissemination & Exploitation Objectives
EC	European Commission
PC	Project Coordinator
TG	Target Group
WP	Work Package

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1.1 INTRODUCTION

The provenance research tool developed within the framework of ENIGMA takes into account the user requirements. This application is comprised of different tools / components and utilizes the output of other services developed within ENIGMA in order to determine the provenance of an object. The provenance research tool exploits the UAI layers developed and defined in to determine the unique "fingerprint" of a registered CG, uses the AI/ML stratification tools and the contextual analysis developed to provide the best prediction of an unknown CG "fingerprint". The tool also exploits the scenario building engine to overcome semantic reasoning heterogeneity of support data and documents, uses the output ENIGMA decission support system to incorporate metadata cross-checking and automatic matching with various CH database, and exploits the input from public engagement (crowd sourcing app) to scale up the search range. Furthermore, alerts generated by the Earth Observation toolkit, are used to refine the performed queries and provide clearer results regarding the provenance of CGs.
This user guide focuses on introducing the provenance web interface and its functionalities to the end users, in order to support the main goal of the provenance tool.
The end users are devided in two groups:

- The LEA officers
- The Experts (Archaeologist and other)

1.2 GETTING STARTED

The provenance tool is a web based accessible interface that doesn't have any system-based requirements for using the tool.

The only requirement is to register at the ENIGMA platform and get assigned with the appropriate role (LEA or Expert) by the system administrator.

- **Getting access to the system**

The users have to register through the main enigma platform web interface. The landing page is the following (*figure 1*):

https://enigma.cellock.com

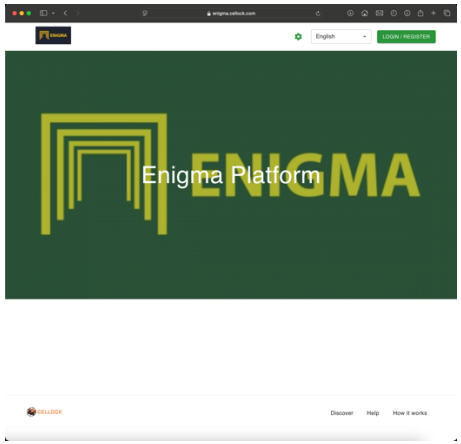

Figure 1: Main ENIGMA platform landing page

The users have to select the "Login/register" option on the top menu to access the section regarding the signing up process or login (*Figure 2*).

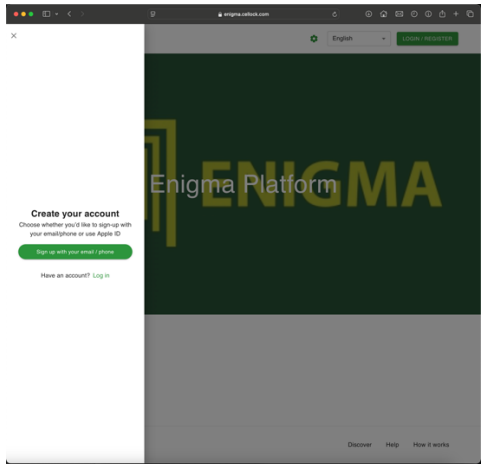

Figure 2: Signup and login option tab

If the users get access to the interface for the first time, they need to sign up and the administrator will assign the appropriate user role (LEA officer or Expert).

- **Sign up process**

The users need to provide the following information to request access:

1. First Name
2. Last name
3. E-mail
4. Password

The prerequisites for the password are the following:

- Password has at least 8 characters.
- Password has special characters.
- Password has a number.
- Password has a capital letter.
- Passwords match.

The user interface for the signup process is presented in the following image (*Figure 3*).

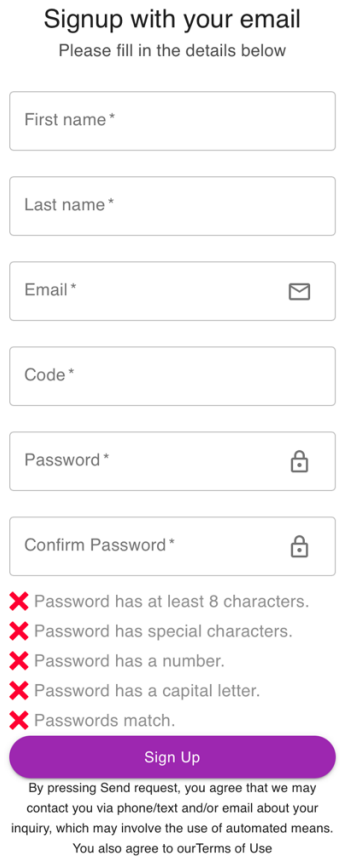

Figure 3: Signup form

2.1 USER INTERFACE OVERVIEW

The experts after their authentication are getting access to the ENIGMA platform tools under a unified environment. In the left panel the users have access to the tools that their role is entitled to access. In this case the experts have access to the provenance research tool, to the earth observation analysis results tool, and the crowdsourcing analysis tool (*Figure 4*).

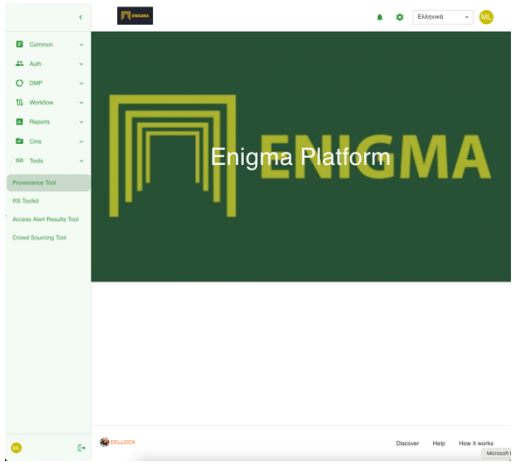

Figure 4: Navigation panel for Experts access

- **Description of the main components of the interface**

In the provenance research tool the Archaeologists/experts have the ability to review all the CG cases assigned to them and provide further information to the system using the fast documentation module and get access to the images, 3D content in parallel with additional tools that incorporated insights based on the UAI similarity checking process, AI/ML module and the joint data workspace that provides access to various sources. Furthermore, access to the earth observation toolkit and crowdsourcing analysis tool provide more information in the field for the potential origin areas.

- **Explanation of icons, buttons, and menus**

The tool has 3 main sections the navigation area, the main editing and analysis screens section, and the searching areas. The user can select the section of the tool to work on by selecting it from the navigation area (*Figure 5*).

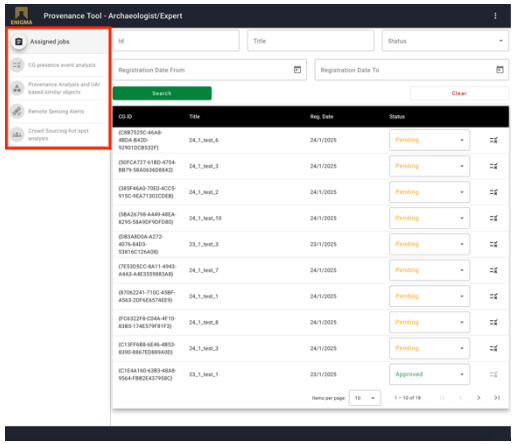

Figure 5: Navigation section of the provenance tool

In each section that the end user will need to perform a query to a list of multiple objects has on top of the screen a search panel to filter out the necessary objects based on specific characteristics/parameters (*Figure 6*).

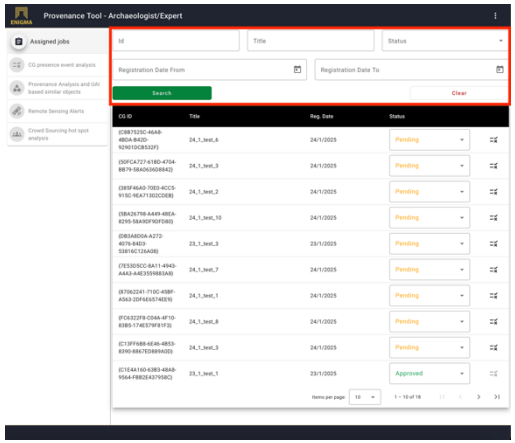

Figure 6: Navigation section of the provenance tool

The screens where the end users can edit and analyse information provide them with "Buttons" to move forward to the workflow process "Next" or to go back "Back" (*Figure 7*).

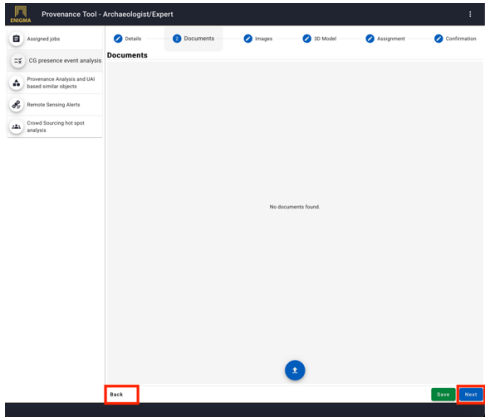

Figure 7: Action Buttons supporting the process and the expert's work

Furthermore, the end users have the "Save" option to save the corresponding edited information of the current screen (*Figure 8*).

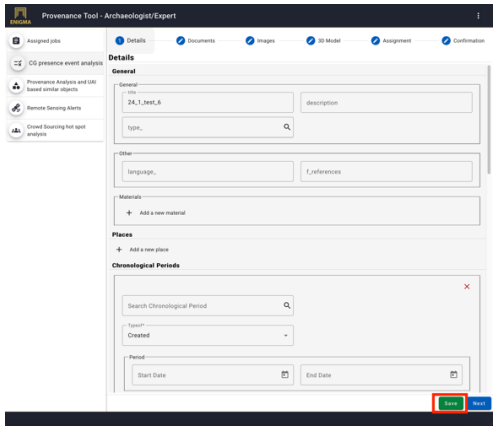

Figure 8: "Save" Button for the edited information

The end users can go back and forth to the screens and also navigate to the addtional tools "Similarity checking", "Remote Sensing Alerts" and "Crowdsourcing Analysis Tool" (*cf. Figure 5*).

2.2 BASIC OPERATIONS

The experts are involved in the process when the LEA officers assign to them a CG for further investigation. In this context the experts have access to several tools to work and provide feedback to the LEA officers. The basic tools that the experts have access are the following:

- **Assignment management form**
- **CG documentation forms**
- **Provenance analysis and UAI based similar objects**
- **Remote sensing alerts**
- **Crowdsourcing analysis**

2.3 BASIC OPERATIONS – EXPERTS

The experts start their analysis process from the page where the list of assigned objects are provided by the LEA Officer. The experts have access only to the objects that are assigned to them.

- **Assignment management form**

The experts can search and select from the interface the CG object they are going to work on. The form provides some searching parameters to filter the list of the assigned objects (*Figure 9*).

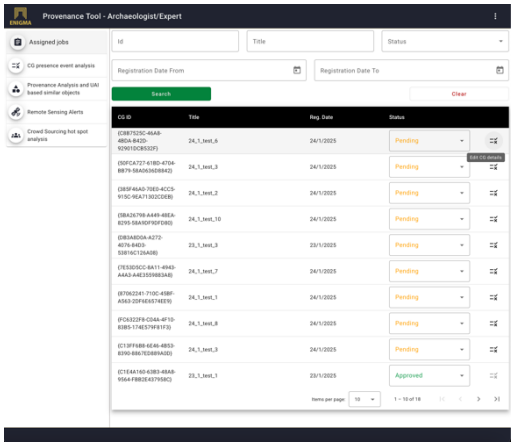

Figure 9: Assignment management form

The experts select the CG that they are going to work with and choose the option to access and edit the already provided information (from the LEA Officer) (*Figure 10*).

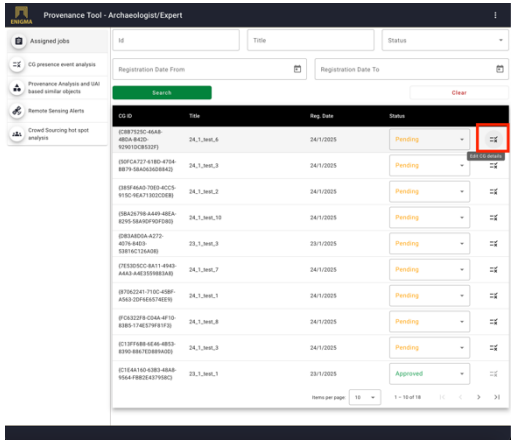

Figure 10: Button to select and edit CG information

Following the selection of the CG that requires further investigation, the experts are guided through the interface to the screens where they can provide additional and more detailed information regarding the CG documentation.

- **CG documentation forms**

The provenance research tool is structured in a way that enables the experts to provide additional information to better document the CG. In the details form the experts can add information regarding the CG. The main categories of information are the **General** information regarding the description of the object, the type, the material etc., the **Places** where different type of places (provenance, excavated from, current location, coverage etc.) associated to the object can be recorded, the **Chronological Periods** to cover the timespan of the period that the object comes from, issued or related to etc., the **Dimensions** of the object, and the **Agents** (organizations or persons) that stand for different type of relationship with the object (*Figure 11)*.

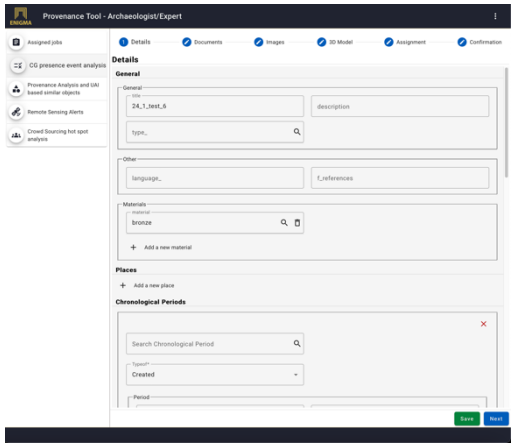

Figure 11: Screen to manage CG object detail features

Important remark: When the features to be edited has a standardized list of values the UI provides a search button like the one on *Figure 12*. This button lists proposed standardized vocabulary values from Getty and other sources.

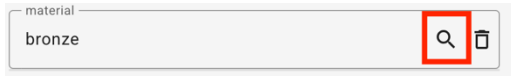

Figure 12: Search button to get proposed standardized vocabulary values from Getty and other resources

In the section of the CG fast documentation process the provenance research tool provides the end users with the ability to access, download and view any documents that the LEA Officer has provided. They can also upload additional documents (*Figure 13)*.

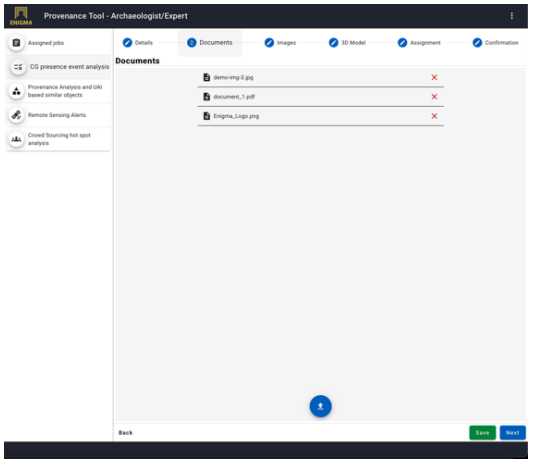

Figure 13: Documents navigation, view or upload functionality

The next screen in the CG documentation form contains the section regarding images of the CG under investigation. The experts can access the images that the LEA Officer provided in ordert to get additional information (*Figures 14 and 15*).

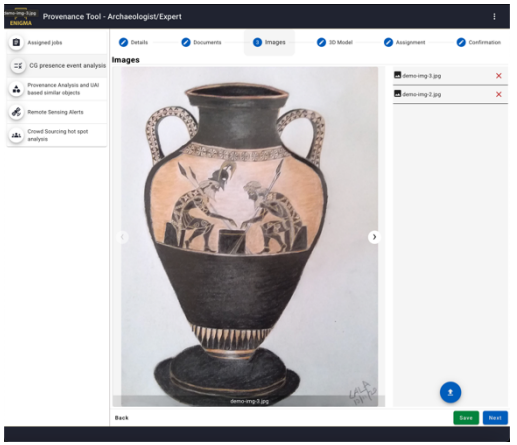

Figure 14: Images navigation, view or upload functionality

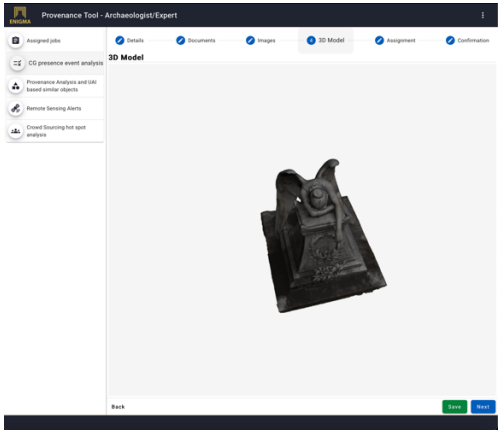

Figure 15: 3D navigation, view or upload functionality

The detailed documentation of the object and the overall required information provision is an iterative process that needs research and further investigation from the experts. The additional insights regarding the object are provided to the experts by the following tools: the UAI similarity checking tool, the earth obsevation alerts results and the crowdsourcing analysis tool.

- **Provenance analysis and UAI based similar objects**

While the archaeologists/experts research and investigate the object they can access and view similar objects that the system provides from the joint workspace. The joint workspace migrates information of CG objects of multiple databases and crawled data.

In the process to understand and recognize the object's provenance the end users can iteratively add and enrich the features of the CG and access the similarity checking tool to view suggestions of similar objects. Using this approach the users access multiple similar objects with the corresponding similarity score. They can view the objects' images, access the related information in the source and get "help" to decide and recognize the objects' provenance.

The system provides the most similar CGs to the one that is under investigation and the users can search, filter and change the features' importance to get better similarity results (*Figure 16*).

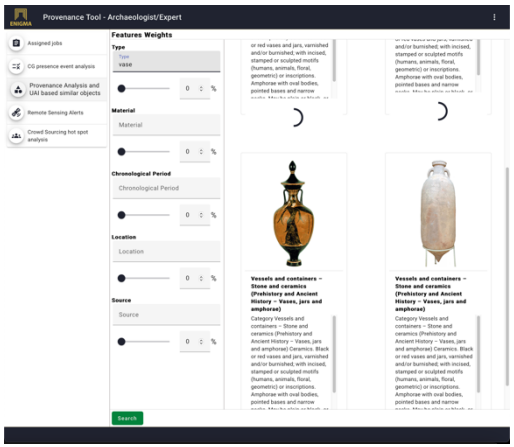

Figure 16: Similarity process and results from the joint workspace

Important notice: The tool brings the most similar objects based on the data that have been recorded through the CG documentation forms. The more information the experts provide the more accurate the similarity checking process will be.

- **Earth observation alerts**

In parallel the experts have access to the earth observation analysis tool that provides potential illegal excavation areas. The tool focuses on areas that are provided by the experts as the possible origin of the object. The areas are highlighted by a red boundary polygon (*Figure 17*).

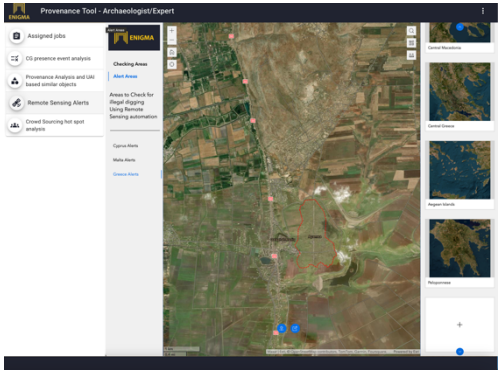

Figure 17: Remote Sensing analysis alerts for possible illegal excavation areas.

The tool incorporates several additional tools for searching locations, and navigating to the map such as zoom in, zoom out, previous view, measurement tools and changing basemaps options (*Figure 18*).

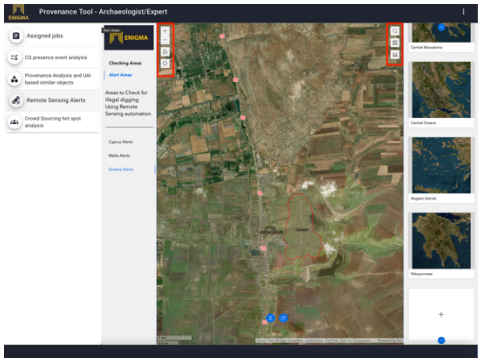

Figure 18: Map navigation and searching tools

- **Crowdsourcing analysis**

The crowdsourcing analysis tool provides analyzed information that comes from the public engagement tool. The public have access to a web app (responsive design-mobile accessible app) where they can add and upload geolocated images of potential illegal excavations or damaged monuments and the system can highlight the areas with high issues concentration. These areas, if they are near to the potential provenance / origin of the CG under investigation, give insights for the experts to draw more accurate conclusions (*Figure 19*).

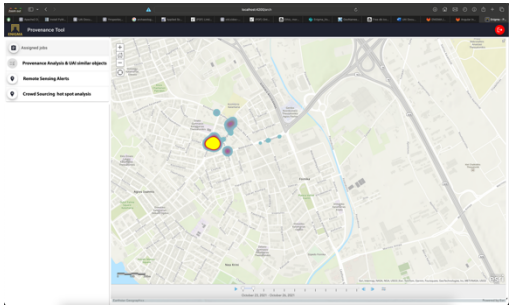

Figure 19: Map crowd data hot spot analysis

As soon as the experts decide whether the CG is stolen or not, or need further investigation, they can use the tool to flag the object and inform the involved parties, LEA Officers, or other experts where they can reassign the object for further investigation. If the experts recognize the provenance of the object and it originates from a foreign country, they proceed to communicate with the corresponding authorities. In this case they have the ability to reassign the object (*Figures 20 and 21*).

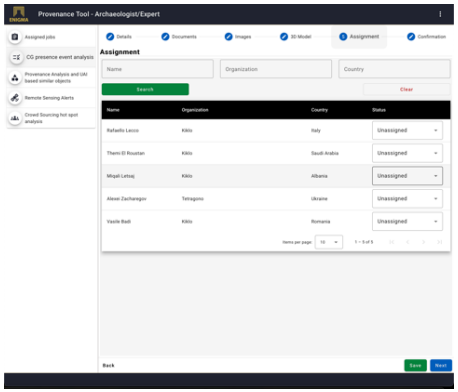

Figure 20: Assignment to other expert form

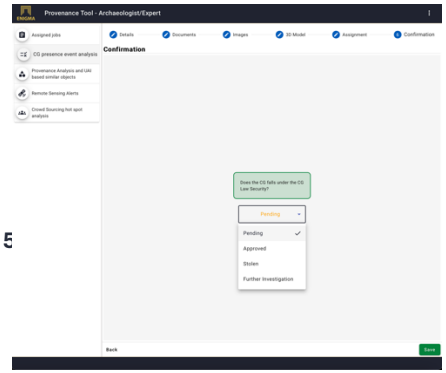

Figure 21: Flag the CG as stolen or not

2.4 ADVANCED FEATURES

- **INSTRUCTIONS TO UTILIZE PROVENANCE TOOLS AND UAI SIMILAR OBJECTS**

The end users retrieve similar objects based on the UAI and the similarity checking algorithm. In order for the experts to retrieve more calibrated / accurate results they have access to the feature importance management controls and searching panel to apply filters (weights) to the overall dataset provided from the main ENIGMA database (*Figure 22*).

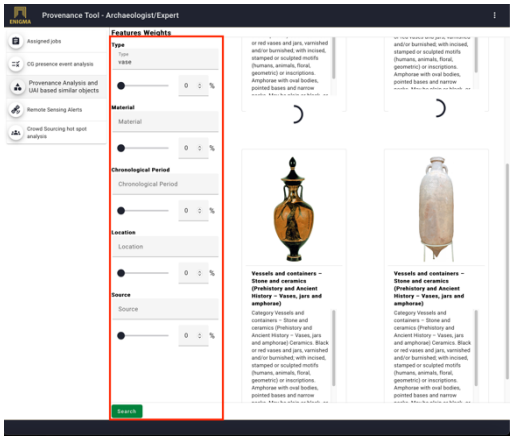

Figure 22: Management controls to access similar objects and filter out based on additional knowledge.

2.5 FAQ AND TROUBLESHOOTING

1. How is the role of the users going to be assigned?

As soon as the users are registered, they have to contact the System administrator and assign the corresponding role. The administrator assigns the role, and the users get access to the provided tools.

2. What is the source of the information that the similarity checking process provides?

The similarity checking process accesses the joint workspace (ENIGMA graph DB) where all the data are hosted and runs the necessary algorithm to recognize the most similar objects to the one that is under investigation.