biopool

SERVICES ASSOCIATED TO DIGITALISED CONTENTS OF TISSUES IN BIOBANKS ACROSS EUROPE

End User's Portal

Deliverable 5.1

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1 Document History

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2 Executive Summary

This is the deliverable D5.1 – End User's Portal to describe the development of the Web portal that will allow to the users the access to the central repository's collection of tissue samples shared by the involved biobanks of BIOPOOL network for consultation, display, processing, request, etc.

The following elements of the User's Portal are described in a functional and technical way:

- Information about BIOPOOL, the biobanks and the collection of samples available.
- User's register and ways of access to BIOPOOL.
- Searches of samples in the network, by clinical data or by similar images.
- Visualization of the samples details, including clinical data and associated images.
- Exploration of the images.
- Sample requests

The Web Site and the Image Viewer has been tested in the most commonly used Web browsers like Internet Explorer 8+, Chrome and Firefox.

Glossary

HMP: Healthy Morphological Pattern
PMP: Pathological Morphological Pattern
MD: Macroscopic Description
HD: Histological Description
HC: Histological Classification
TID: Tumour Infiltration Description
D: Diagnosis

3 Home Page

To enter into the Website, a Home Page has been developed with a set of components.

- **Top banner:** In this banner, all the links referring to the project have been included:
  - The page of the project (http://www.biopoolproject.eu/)
  - The Web Site of the European Union (http://europa.eu/index_en.htm)
  - The Web Site of FP7 Program (http://ec.europa.eu/research/fp7/index_en.cfm)
  - The Facebook profile (https://www.facebook.com/biopool.org)
  - The Twitter profile (https://twitter.com/biopoolproject)
  - The LinkedIn profile (http://www.linkedin.com/groups/Biopool-4653576)
  - The link to the handbook, a document with all the instructions to use the Web Site.

- **Biobank network:** a banner with logos and links of the biobanks involved in the project has been developed moreover. Below, the number of samples added by these biobanks are shown by means of an automatic counter.. and an image of a poster presented in the 18th Congress for Hospitals in Spain, held in Bilbao in February of 2013 In the moment when new biobanks are incorporated to the network, their logo will be added in the banner.
  In order to refresh automatically the number of samples each time a user accesses the Web Site, a Webservice (described in D2.4) has been developed.

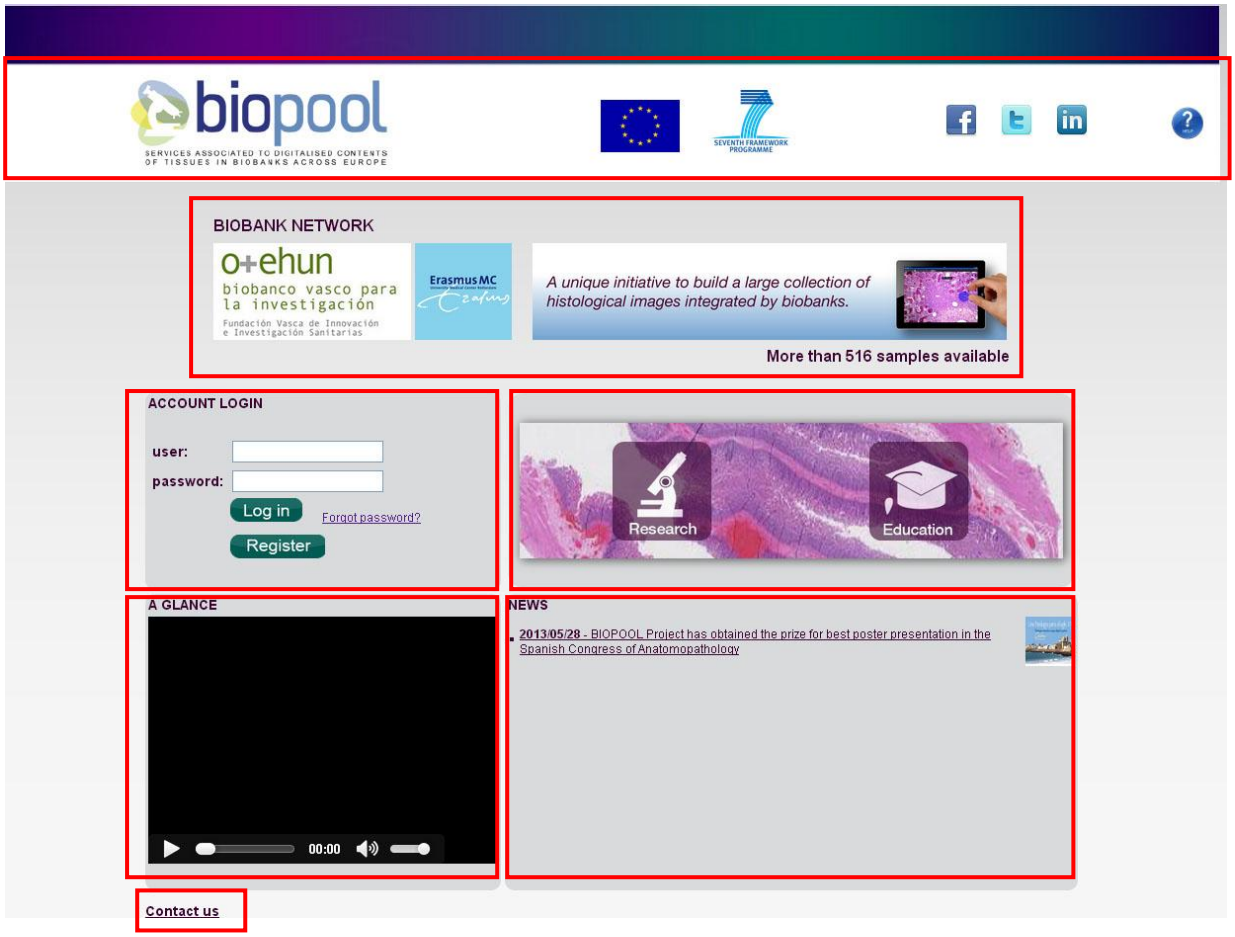

Figure 2 Home Page

- **Account login:** A component to allow the login of the user, a password request or password reminder has been included.

- **Stakeholders:** A component with a background image of a sample and 2 images referring to the users profiles (for now, researchers (including pathologists, clinicians, basic researchers, pharmaceutical companies) and teachers) have been designed. By clicking in one of the image a short description about what BIOPOOL can offer to that user profile will be shown. . During the second period of the project, the functionalities offered by the system will vary depending on the profile of the user and this information will be more extensive.

- **Media area:** A component to show videos, radio interviews or other media dissemination elements has been included. The goal is to show some relevant and attractive information about the project from the Home Page.

- **News:** A component to show news and innovations about BIOPOOL has also been included. From this component, news about new biobanks joined to the network, new pathologies or diseases, congresses where BIOPOOL will be presented, awards achieved or similar information will be shown.

4 Access and security services

An authentication and verification system, sign up / deleting / modification of user names have been included to make the service portal safe and reliable.
There will be a user registry of the BIOPOOL services. The system will work with user and password.

The Web Site works with user and password to register the searches, the requests and the visualization of the samples shared in the network.

4.1 Register Area

Every new user should ask for an user name and password before starting working with the platform. For this reason, the user should access to the Register Area of the Home Page (Fig.2), and after registration, he should include all the necessary data, and later a password will be provided to the user by e-mail. The username cannot have empty spaces.

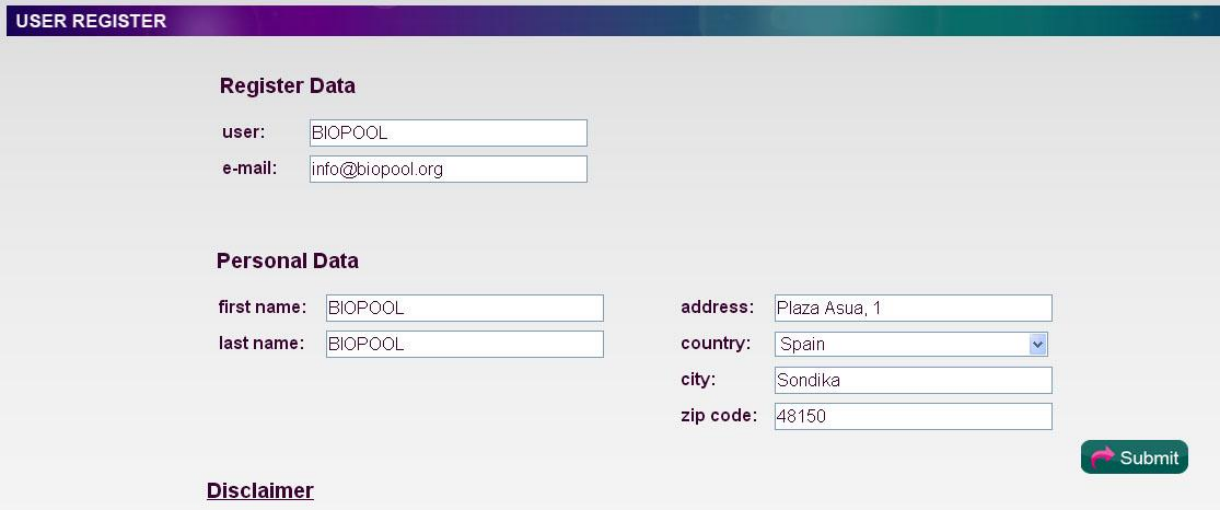

Figure 3 Register area

By clicking the link “Disclaimer”, a privacy policy and the contact data of all the partners of the project are shown.

4.2 Account Login

From the Account Login of the Home Page, the user can access to BIOPOOL by entering the user, the password and clicking “Login”.

Figure 4 Login

This action will call a Web Service to check whether the user and password are registered in BIOPOOL or not. If the user and password are right, the user will access to BIOPOOL Web Site and view all the functionalities. If the user and password are not right, the following popup window will be shown:

Figure 5 Popup shown when the user inputs an incorrect username or password

Once the user is logged into the BIOPOOL search website (Fig.2), in the top right corner, a welcome message will be displayed like “Welcome, xxxx (user’s name)”.

Figure 6 First screen of Search Website- search based on text

4.3 Forgot password?

Into the Account Login section it has been developed a link to provide , the user with a new password in case he/she has forgotten (Fig. 6).

Figure 7 Forgot password

The Email address will be requested to the user and once the user types it, an Email with the current password will be sent (Fig. 7.).

Figure 8 Recover password

5 Searches

A Web interface has been developed to find samples and/or images in BIOPOOL network based on the histological pattern of the tissue (image) and associated clinical data. Two types of searches can be invoked from the website: text and image searches. If the user wants to search by text, he can use a free text area in order to type the words of interest, or he can use pre-defined drop-down lists to select the desired values. Regarding the image search, the user is able to upload an image, and by selecting a region of that image (or the whole image itself) and after pressing the search button, the website will show a list of results, ordered by similarity.

5.1 Search by text

The website allows two types of text search. With the first one, based on free text, the user can type any free text in a text box and make searches using those words. Besides, thanks to the autocompletion functionality, the system will show a list of available words as the user types. The second type of search is based on the selection of a set of values from a variety of drop down lists.

5.1.1 Text Search engine process description

The following schema shows the process for search with textual criteria.

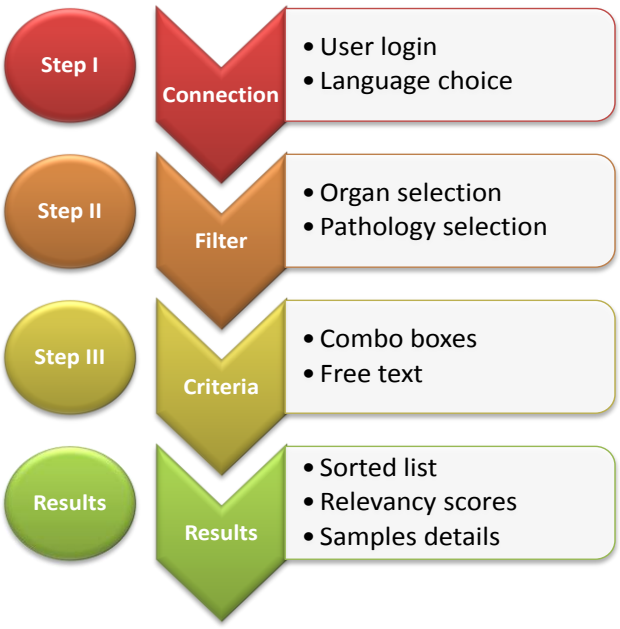

Figure 8: Textual search process

Step I refers to the user connection: login and language choice for the display (interface and results).

Step II Presents the organ and pathology selection which have been defined as filters for accessing the samples.

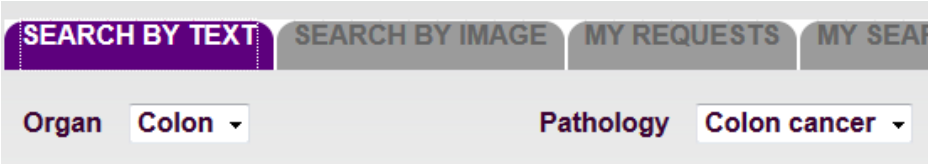

Figure 9: Search by text tab

Step III gathers all means of identifying search criteria on textual values. There are combo boxes presenting the possible values and a text area for typing free text.

5.1.2 Query definition

During the first year of the project, searches will be possible in English, and this will be extended to other languages in second year.

Organ and pathology are filters (compulsory criteria). This means that it selects part of the database.

The additional criteria are sorting ones. The result of the query is a list of samples matching with at least one of these criteria. The set of criteria acts as a filter.

In the list, the samples matching with the maximum number of criteria appear at the top. At the end of the list we find the samples matching only one criterion. These criteria are associated with an 'OR'.

The interface offers a free text area to enter textual queries in natural language and 3 tabs for defining criteria with combo boxes.

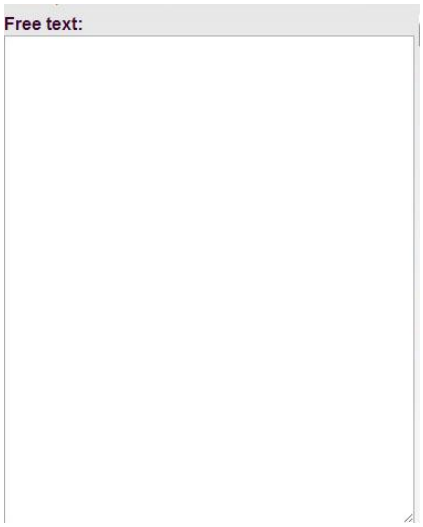

Figure 10: Search by text (Free text)

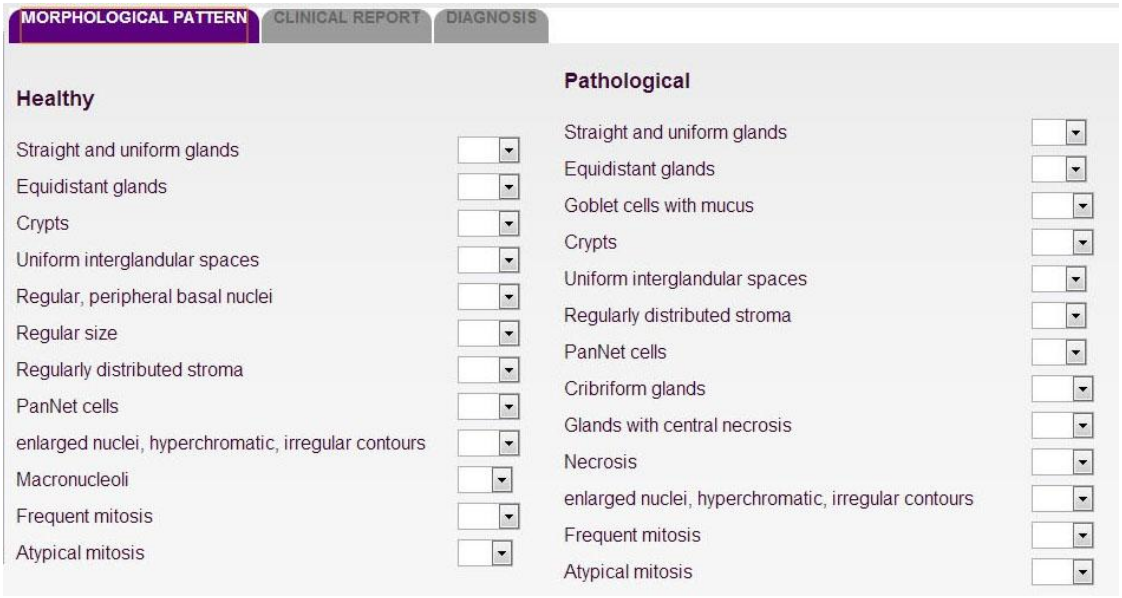

Figure 11: Search by text (Morphological Pattern combo search)

Free text area provides auto-completion (filtered by language). As defined between the partners, this auto-completion starts from the third letter entered in the text area. Synonyms are enabled by the search engine behind such as colloid carcinoma equivalent to adenocarcinoma mucinous. Interpretation of the text is also performed by the search engine. It is mostly activated for numerical values so that ranges, upper limits or lower limits are understood by the system.

Note: Please refer to D3.2 for more detailed description of the text search module behaviour.

5.1.3 User Process description

As it was mentioned in previous deliverables, the clinical data are filled and associated to the samples in the biobanks. Once a sample arrives to the BIOPOOL Central Index the clinical data are processed in order to standardize the data and send them to the text search engine (see D 2.4).

When the user enters the search by text tab, a combo box with the organ will be shown and the user shall select one of them.

Figure 12: Search by text (select the organ)

At the moment, first year of the project, only “colon” is available. The list of organs will be read from the text search engine, calling to the Web Service “OrganListing” and exchanging xml files (see D 2.4)

Once the organ is selected, other combo box with the pathology options will be shown:

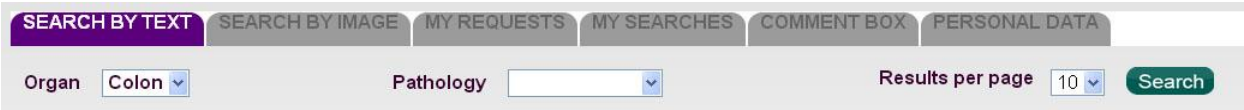

Figure 13: Search by text (select the pathology)

For now, only “colon cancer” is available. The list of pathologies will be read from the search text engine, calling to the Web Service “PathologiesListing” and exchanging xml files (see D 2.4).

The user could manage the number of results that wants to be shown per page (right now, is configured to show 10, 20 and 30 results per page).

Once the pathology is selected, the user will see a text box on the left of the screen, and a set of drop down lists on the right, as can be seen in the Figure . If the user types any text in the text box of the left and clicks the search button, the system will invoke a free text search based on the typed words. On the contrary, if the user decides to select values from the set of drop-down list (divided into sections Morphological Pattern, Clinical Report and Diagnosis), the system will invoke the search using the selected values.

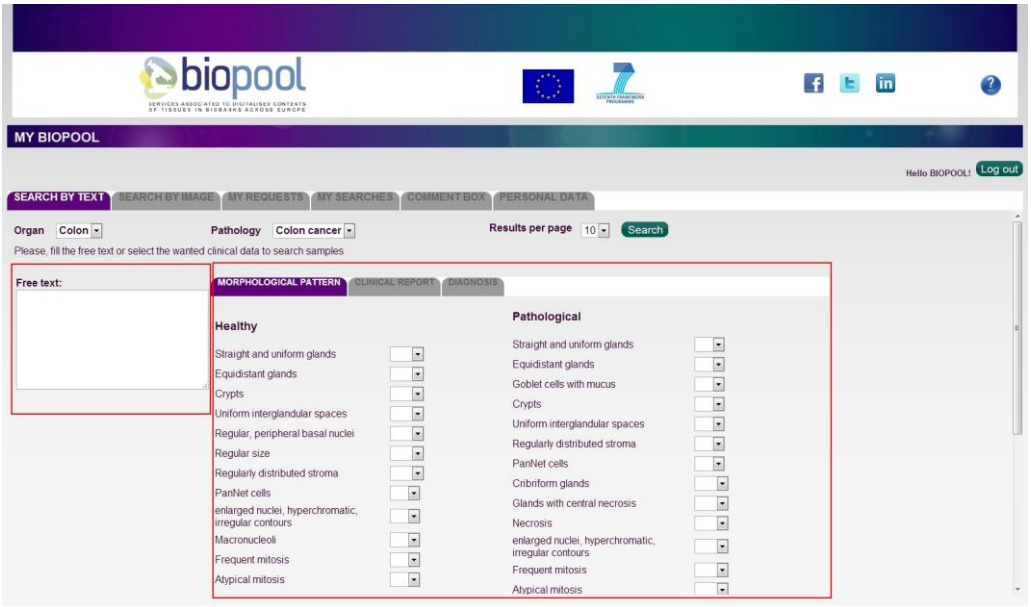

Figure 14: Text search user interface

Also an explanation for the user is shown to clarify that the user shall fill the free text or select the wanted clinical data.

To identify and show the clinical data associated to the selected pathology, the Web Service "MainSearch" of the text search engine is called indicating the organ, the pathology and exchanging a xml file with the clinical data (see D 2.4).

Free text area

By using the free text area (see left part of Figure), the user is able to invoke searches typing the desired fields, instead of selecting fixed values from drop down lists. Besides, as the user types, an autocompletion list will suggest him the most similar expressions. The user, then, can select a value from the list or type whatever he wants.

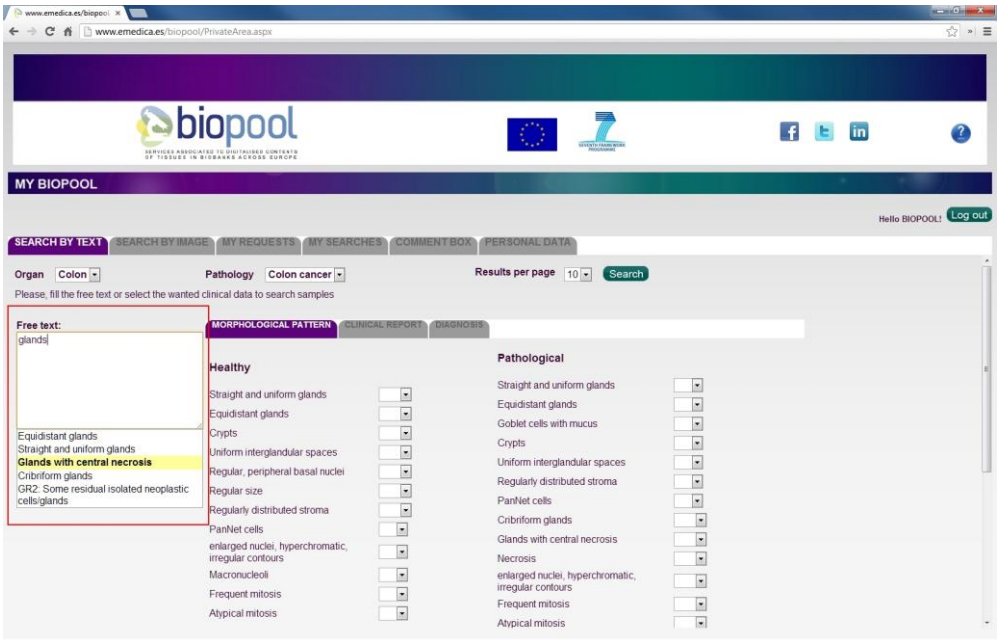

Figure 15: Using the free text search functionality

Combo box option

The lists of combo box are displayed based on the xml file returned by the text search engine for the selected pathology. The process has been designed to read the xml file considering that the data of the file may change in the future, for example, by adding a new field of clinical data related to the pathology. The entire data grouped by sheets of "Morphological pattern", " Clinical Report" and "Diagnosis" will be retrieved and shown this way. In each of these tabs, the data will be grouped again as the xml file indicates "Healthy", "Pathological", etc.

The showed combo boxes data have different fixed options, that are explained next:

- An empty value or Boolean values. If the empty value is selected, the search will not consider that field.

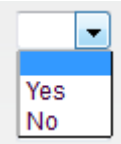

Figure 16: Search by text (Boolean values)

- List of predefined values

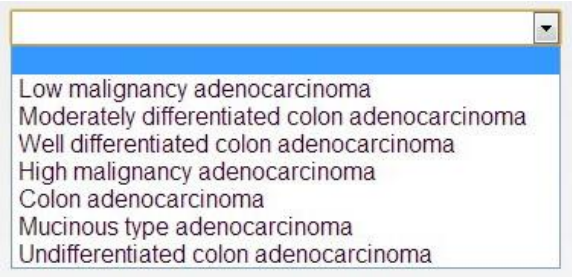

Figure 17: Search by text (Predefined list)

- Range values

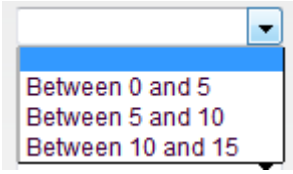

Figure 18: Search by text (Ranges)

Clicking the "Search button" the Web Service "MainSearch" of the text search engine is called again with all the criteria data selected by the user (these information will be included into the xml file). Before that, a check is realized automatically to ensure that at least one of the clinical data or the free text has been filled.

The text search engine will return as result of a search:

- A list of matched results in a XML file
- All the clinical data associated with each of the BIOPOOLID
- The relevancy scores grouped by "Healthy Morphological pattern", "Pathological Morphological Pattern", "Macroscopic Description", "Histological Description", "Histological Classification", "Tumor Infiltration Description", and "Diagnosis".

The search criteria will be shown in the top of the screen, it has been configured to show six selected criteria at most and if the user wants to view more used criteria, the link "More" should be clicked.

The star button ☆ (Fig. 15) will allow the user to save the search as a favourite (criteria data and results) and it will be listed and showed in the "My Searches" area.

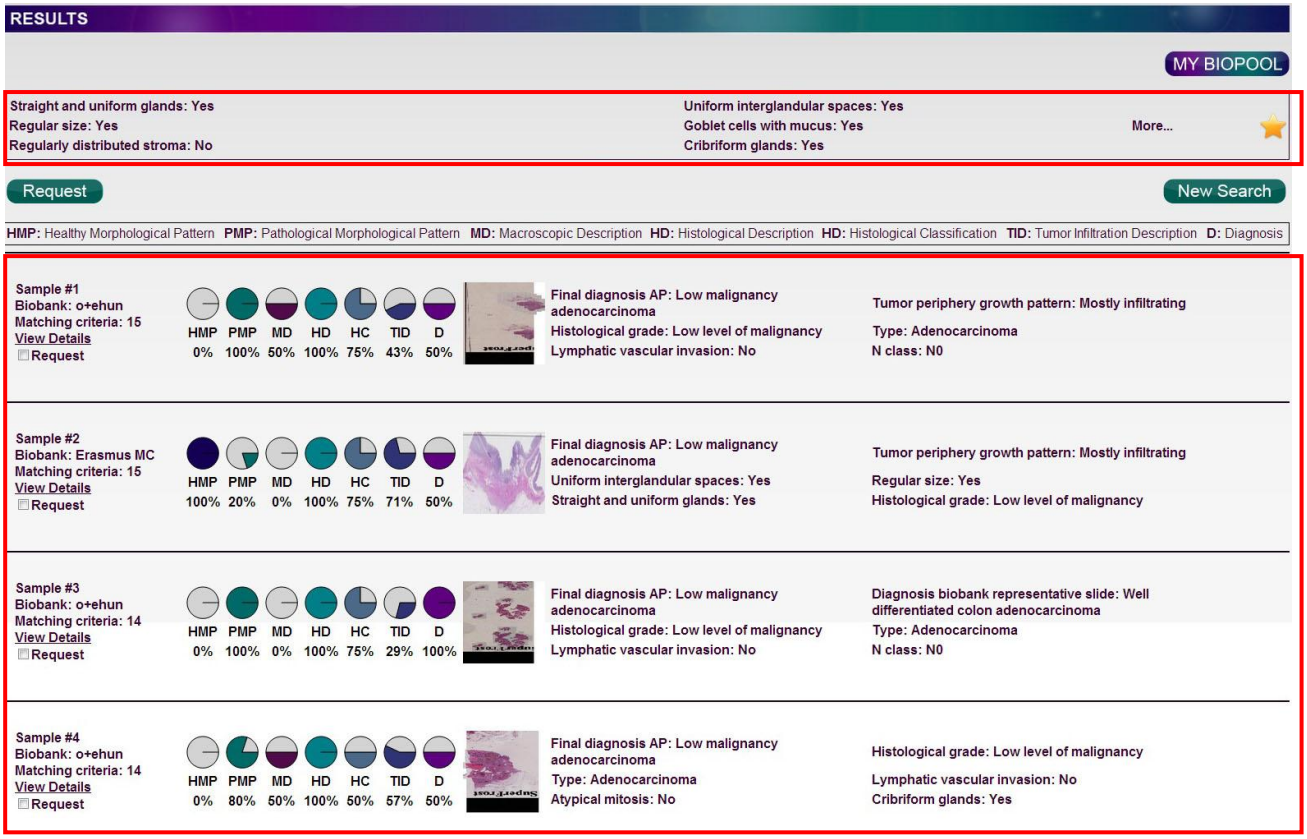

Figure 19: Text search interface with results after a query

Below, all the obtained results will be presented in a paged list (Fig.12). The initial items of the list will be those with higher number of matching criteria.

For each of the retrieved sample results the following information will be shown:

- A number for identification of the result (Sample #1, Sample #2…)
- The biobank that shared the sample. Neither the BIOPOOLID nor the sample identifier in the source biobank will be shown to the user, in order to protect the identity of the sample and the donor, and fulfil completely the legal issues.
- The relevancy scores (Each score refers to the matching percentage between the query criteria and a set of attributes) computed by the search engine.

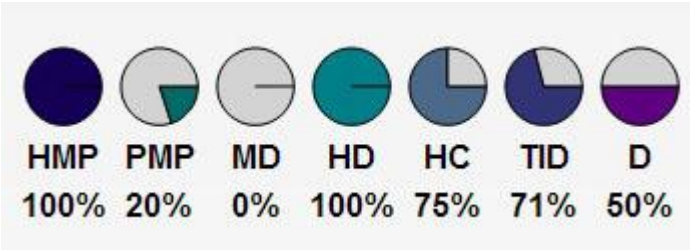

Figure 20: Search by text (Relevancy scores).

The meaning of each acronym is as follows:

HMP: Healthy Morphological Pattern
PMP: Pathological Morphological Pattern
MD: Macroscopic Description
HD: Histological Description
HC: Histological Classification
TID: Tumor Infiltration Description
D: Diagnosis

- A thumbnail image of the sample, read from the Centralized Index with the BIOPOOLID. By clicking on it, the whole sample could be explored and navigated in full screen. This will be described in the section Image Display and Processing of this document.

Figure 21: Sample thumbnail

- A link "View Details" to show in a new page all the information about the sample (clinical data and image) together with the BIOPOOLID.
- A checkbox "Request" to request the sample to the source biobank.

If the user wants to contact the biobank that shared the images, he must select that sample by ticking "Request" box or by clicking "Request" button.

The "New search" button will give the possibility of starting a new search by text.

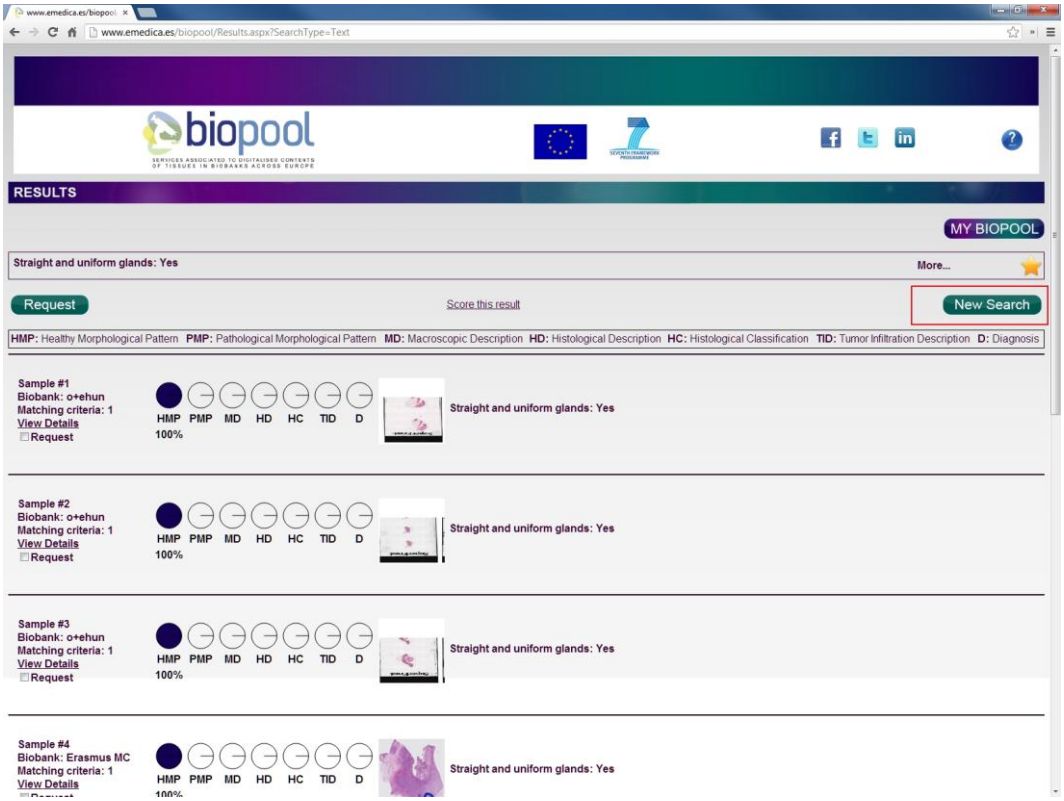

Figure 22: New search

5.1.4 Sample details

Clicking the link “View details” in the result list of the search, the whole information about a sample will be shown with the following information:

- The pathology
- The biobank that owns the histological sample.
- A thumbnail image of the sample. By clicking on it, the whole sample shall be explored and navigated in full screen.
- The related clinical data according to their structure “Morphological pattern”, "Clinical Report” and “Diagnosis”.

The circles that are placed before the name of each clinical data represent how the provided results match the input criteria:

  - Transparent colour (empty), the specific clinical data is not one of the criteria data of the search.
  - Red colour, the specific clinical data does not match with the search
  - Green colour, the specific clinical data matches with the search.

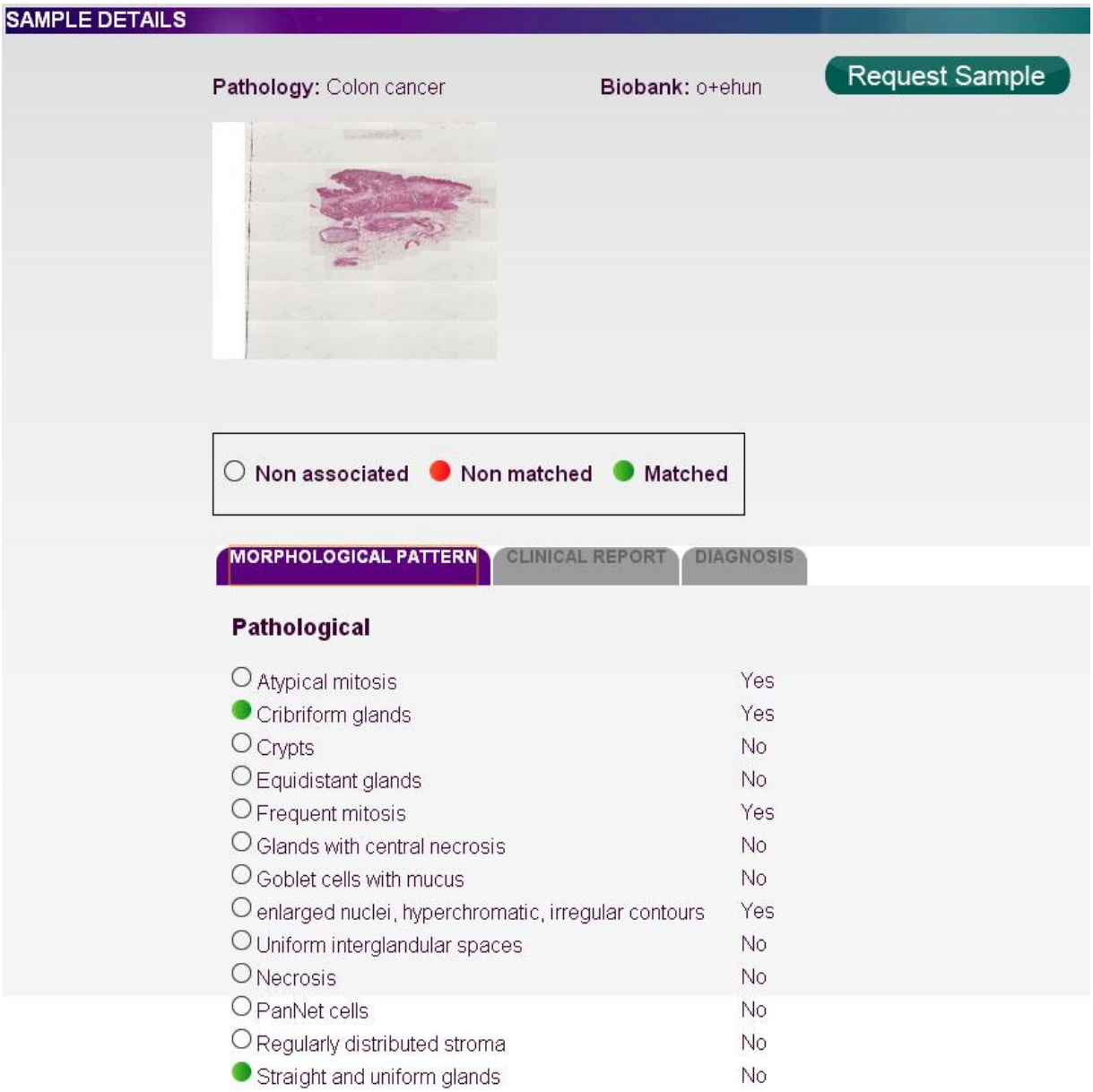

Figure 23: Search by text (Sample detail)

The thumbnail image of the sample will be read from the Centralized Index (the BIOPOOLID will be used internally). By clicking on it, the whole sample could be explored and navigated in full screen with a Web Viewer. This viewer will be described in the paragraph Image Display And Processing of this document.

5.2 Search by image

A Web interface has been developed to find samples in BIOPOOL network based on image criteria.

5.2.1 Image Search engine process description

The process followed by the Image Search Engine is the following:

1. The user selects the organ and the pathology.

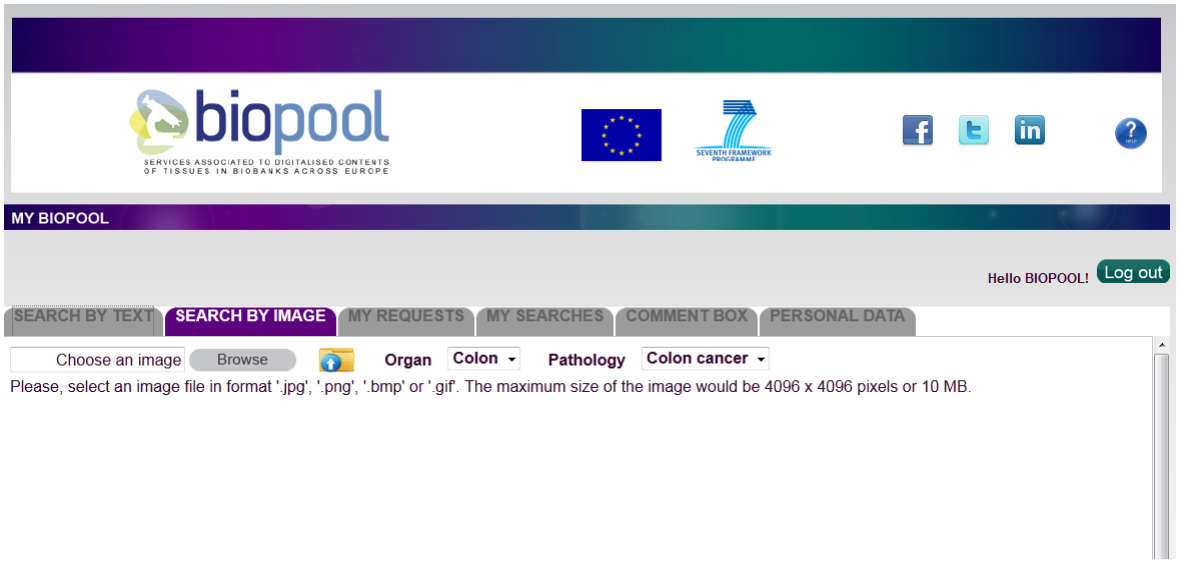

Figure 24: Search by image tab

2. The user selects an input image.
3. The user selects the region of interest and the image is sent to the image search engine.

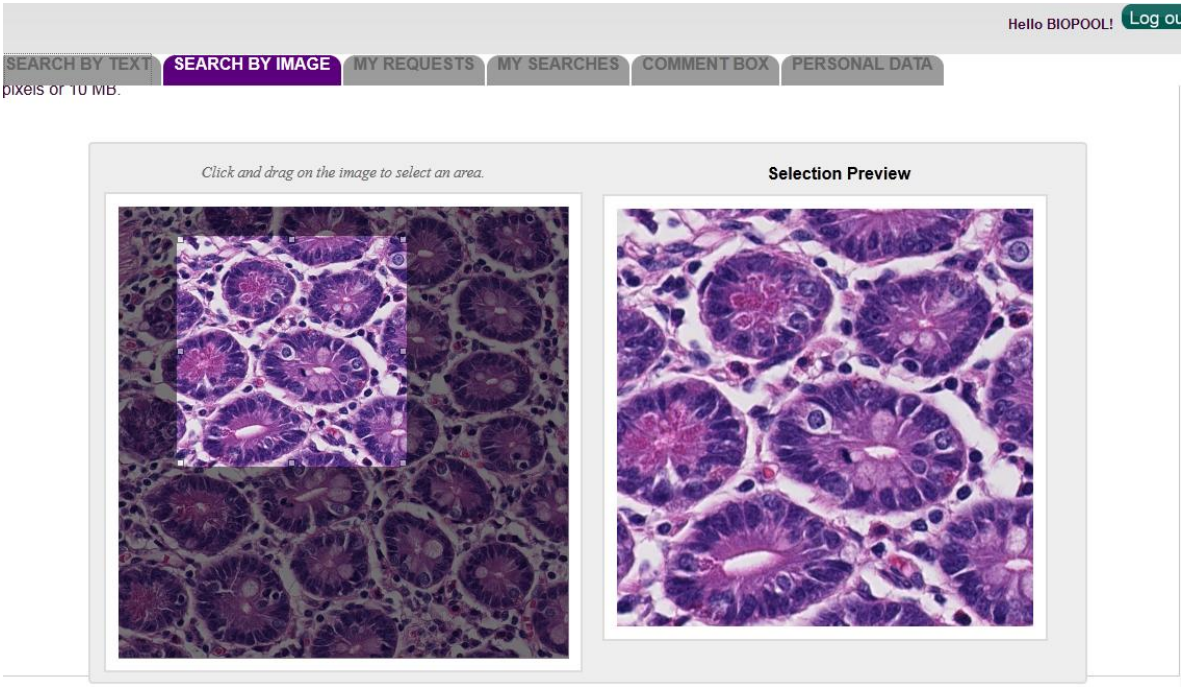

Figure 25. Region of interest selection

4. The image search module calculates the vector that characterise the input image.
5. The input vector is compared with the set of vectors present in the database.
6. The image module provides an ordered list with the most similar samples in the database.
7. The list of these samples is shown to the user's (described in the previous section).

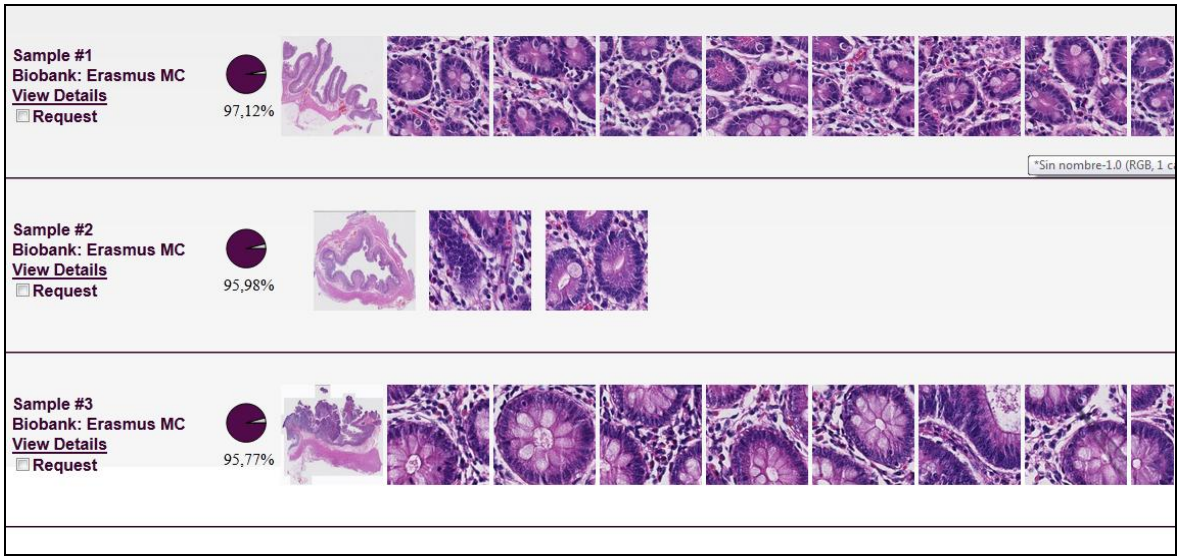

Figure 26. Image search results

5.2.2 *Query definition*

The user just has to select as an input to the query the organ, the pathology and the region of interest of the query image. The user can use as a query image any image of the organ selected with the following requirements:

- Image formats: *.jpg, .png, .bmp* and *.gif*
- maximum size, 4.096 x 4.096 pixels or 10 MB size
- minimum size, 1.000 x 1.000 pixels.

In order to have more accurate results the user has to use well focused microscope's images at a zoom of 40x.

Note: Please refer to D4.2 for more detailed description of the image search module.

5.2.3 User Process description

With the image search functionality, users will be able to upload their own image with specific morphological contents in the BIOPOOL system. The image must have one of the following formats: jpg, png, bmp, gif. The maximum size of the image must be 4096 x 4096 pixels, and the its weight must not be more than 10MB. A Region Of Interest (ROI) can be selected in the uploaded image. BIOPOOL system will then search on the pool of images, and retrieve those ones that have similar morphological content to that of the query image and a list of the images that match better will then be presented to the user.

When the user accesses to the search by image tab, a combo box with the organ will be shown and the user shall select one of them:

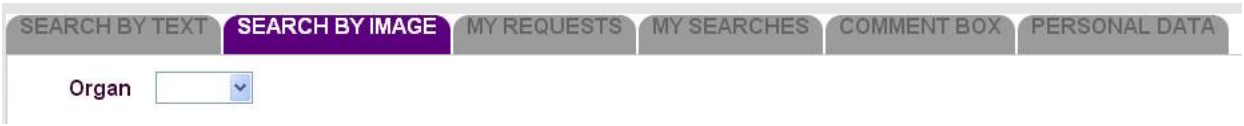

Figure 27: Search by image (select the organ)

At the moment, only "colon" is available. The list of organs will be read from the text search engine, calling to the Web Service "OrganListing" and exchanging xml files (see D 2.4)

Once the organ is selected, other combo box with the pathology will be shown:

Figure 28: Search by image (select the pathology)

At the moment, only "colon cancer" is available. The list of pathologies will be read from the text search engine, calling to a Web Service and exchanging xml files (see D 2.4)

After that, the image of the user (on which the query will run) can be uploaded to the system.

Figure 29 Search by image (Select the query image)

By clicking in *"Browse"* button, it is possible to select an image available in the user's computer. There are certain restrictions to the image:

- only *.jpg, .png, .bmp* and *.gif* image files will be accepted
- maximum size, 4.096 x 4.096 pixels or 10 MB size
- minimum size, 1.000 x 1.000 pixels.

After selecting the image, the user shall click the "Upload" icon (folder) . To upload the image to the Centralized Index, a call to a HTTP Multipart Form Data will be realized automatically.

Figure 99: Upload button

Then the image will be visualized in the screen and the user could select the Region Of Interest (ROI) inside the uploaded image, by doing a drag and drop, in the following way:

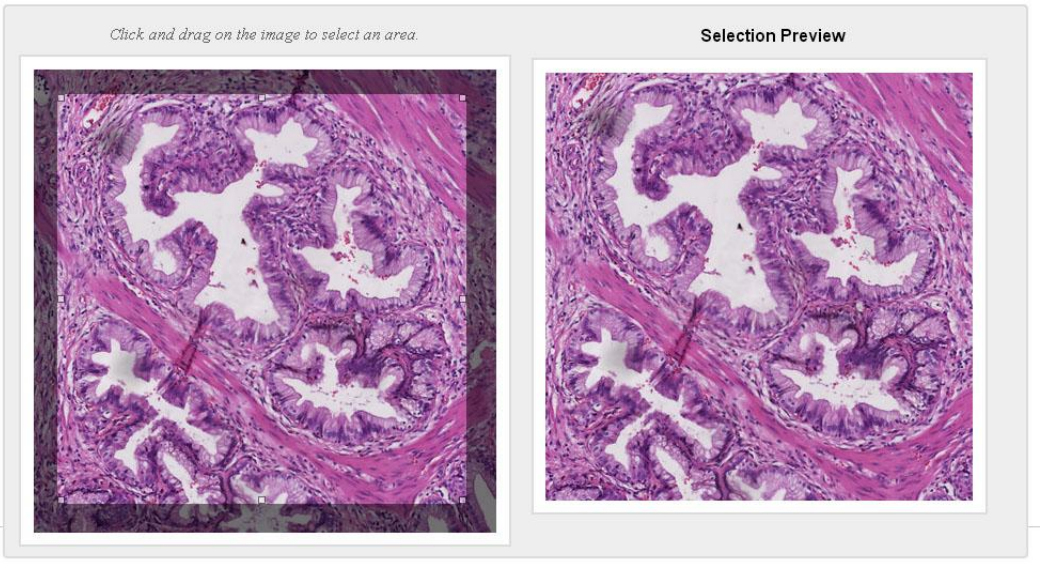

Figure 30: How to select a ROI for the search

For this purpose a process with JQuery (which is a multi-browser Javascript library, designed to simplify the client side scripting of HTML) script has been designed.

After uploading, input from the following dropdown menu must be selected:

- Magnification ➔ at this stage only "40x" is available to concentrate on visual description algorithms' development at this fixed scale. During the second year of the project, scaling issues will be dealt by Tecnalia.

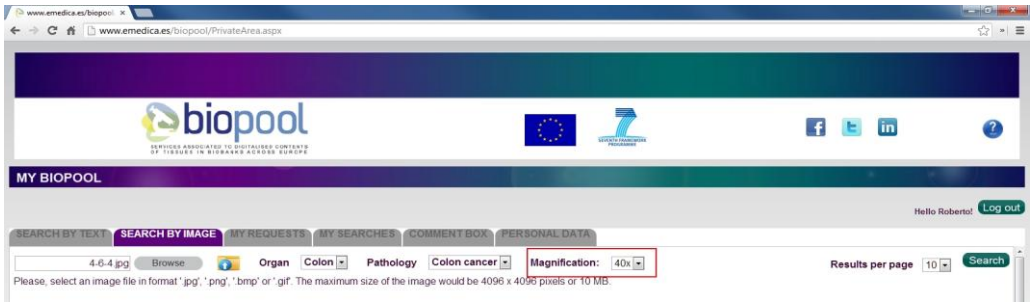

Figure 310: Magnification selection drop down list

In the second stage of the project more options will be available.

As previously described in search based on text, the user shall select the number of results to be shown per page (10, 20 or30 results).

The only remaining action is to click on the *"Search"* button. This action will upload the image to a FTP Server in the Image Search Engine and will call the Web Service "Query By Example" of the image search engine with an xml file including the selected parameters (organ, pathology, FTP path of the image and magnification).

After doing this, the Image Search Engine retrieves the images that best fulfil the query requirements. They are ranked by the score obtained and by the biobank that owns the biological sample.

The information returned by the image search engine will be a xml file with the following information:

- Total number of samples.
- For each sample:
  - BIOPOOLID.
  - Total number of matching results, corresponding with the ROI offsets.
  - % Similarity with the query image.
  - ID piece of the sample, matching with the query image, indicating the row and column in the sample.
  - ROI Offset.

With all this information, the following interface is displayed:

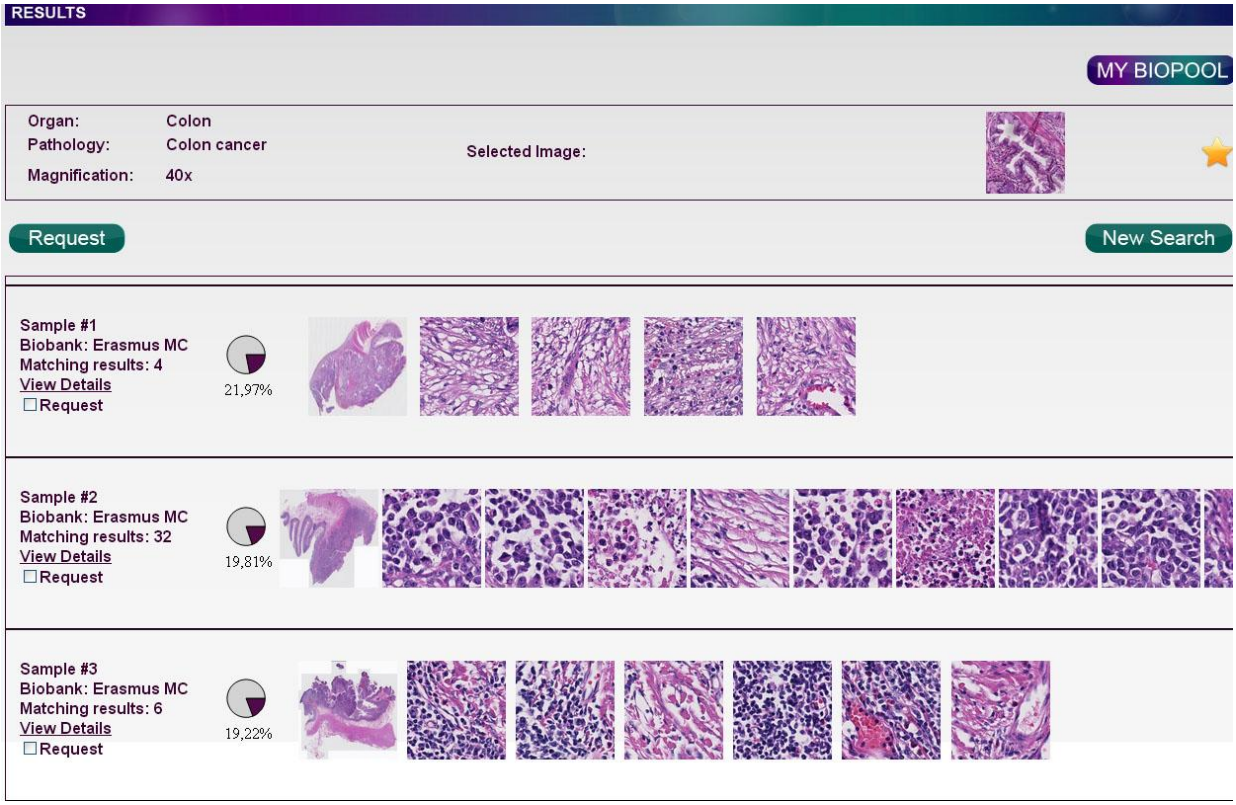

Figure 32: Results retrieved after search by image

In the upper part, the query image and the related parameters of the search will be shown.

Below, in every row, the most similar images will be retrieved indicating the localization of the sample (Biobanks' name). Several images in the same row mean several pieces of tissue belonging to the same biological sample where similarities have been found.

For each of the sample results the following information will be shown:

- A number of the result (Sample #1, Sample #2…)
- The biobank that shared the sample. Neither the BIOPOOLID nor the sample identifier in the source biobank will be shown to the user, in order to protect the identity of the sample and the donor, and fulfil the legal issues.

The percentage of similarity with the query image.

- The associated images with the thumbnail of the sample and all the ROI offsets will be read from the Centralized Index with the BIOPOOLID.

  The whole slide is shown on the left and by clicking on it or in one of the pieces of each sample below, the explorer goes directly to this area, and is possible to navigate in full

screen. This will be described in the paragraph Image Display And Processing of this document.

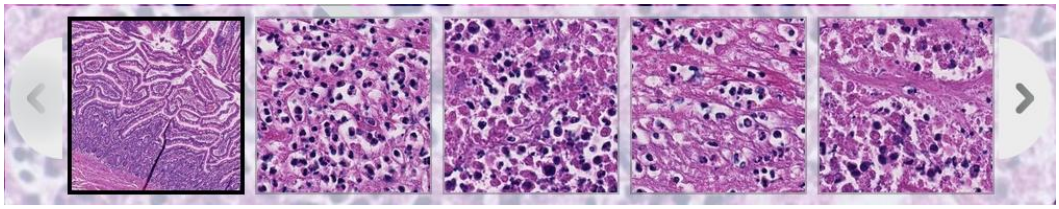

Figure 33: Thumbnail and ROI offsets returned by the search

- A link “View Details” to show in a new page all the information about the sample (clinical data and images) collected with the BIOPOOLID.
- A checkbox “Request” to request the sample to the source biobank.

If the user wants to contact the biobank that shared the images, he must select that sample by ticking “Request” box or by clicking “Request” button.

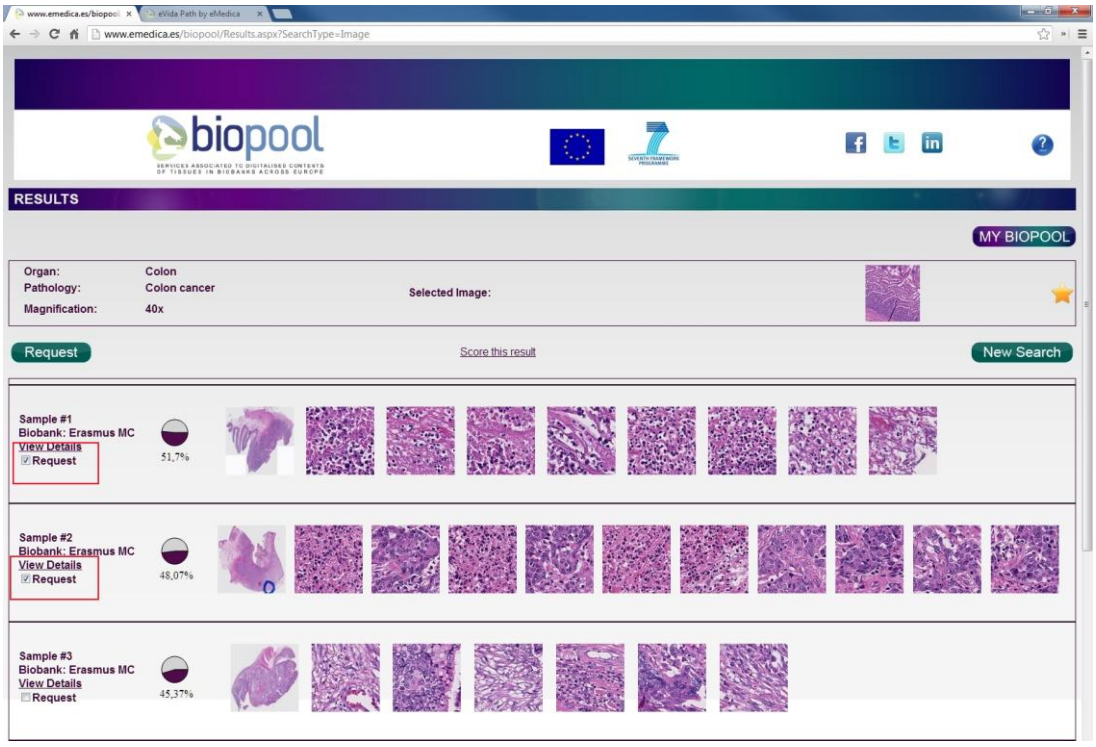

Figure 34: Using check boxes in order to request samples to the biobank(s)

“New search” button gives the possibility of starting a new search by image sample.

5.2.4 Sample details

Clicking the link “View details” in the result list of the search, the whole information about a sample will be shown with the following information:

- The pathology and the source biobank.

- A thumbnail image of the sample. By clicking on it, the whole sample shall be explored and navigated in full screen.
- The image query.
- The ROI offsets matching with the image query.
- The clinical data according to their structure “Morphological pattern”, "Clinical Report” and “Diagnosis”.

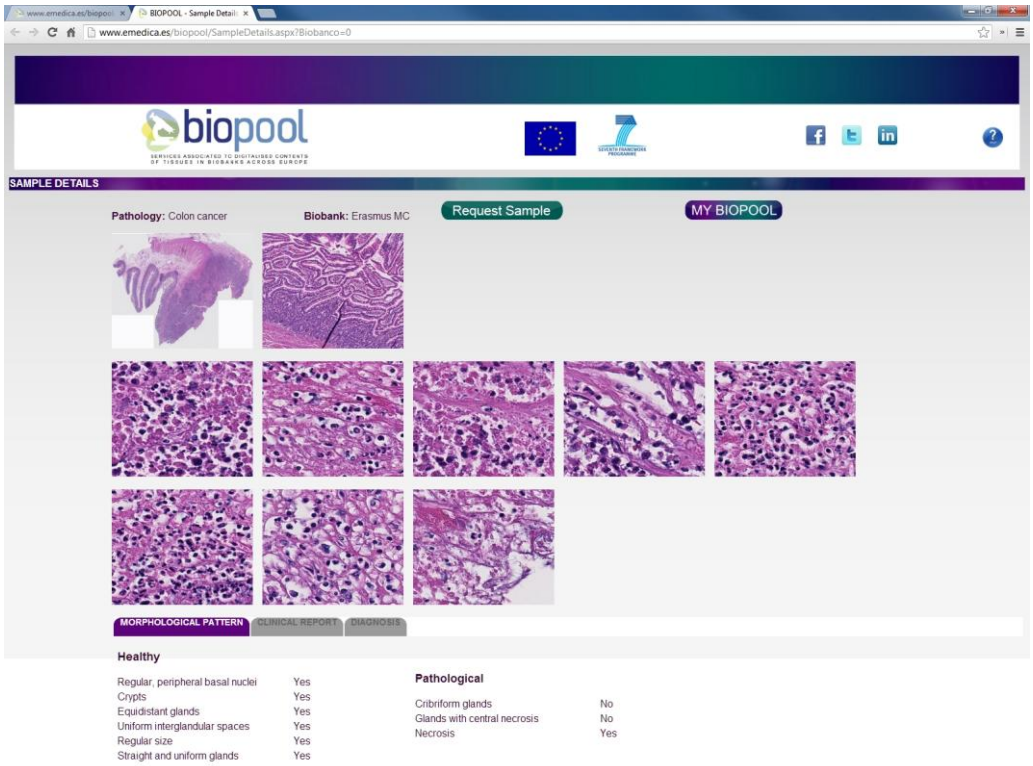

Figure 35: Search by image (Sample Details)

If the user wants to contact with the biobank, he must click “Request” button.

By clicking on the thumbnail image of the sample, the whole sample can be explored and navigated in full screen. By clicking on the pieces of the sample, they can be explored and navigated in full screen.

This will be described in the paragraph Image Display And Processing of this document.

5.3 My Searches

The favourite searches (by text or by image) stored by the user, can be viewed in the tab *“My Searches”,* ordered by date. The order could be changed clicking the header of the table.

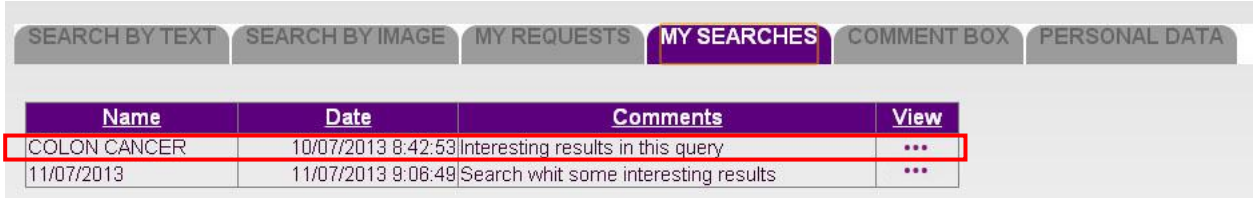

Figure 36: "My Searches" History tab

To read the searches of the user, the Web Service "GetUserSearches" has been developed (See D2.4).

Selecting one of the rows of the table or clicking the cell with "…", the specific search will be displayed, loading the search criteria and the search results saved the indicated date.

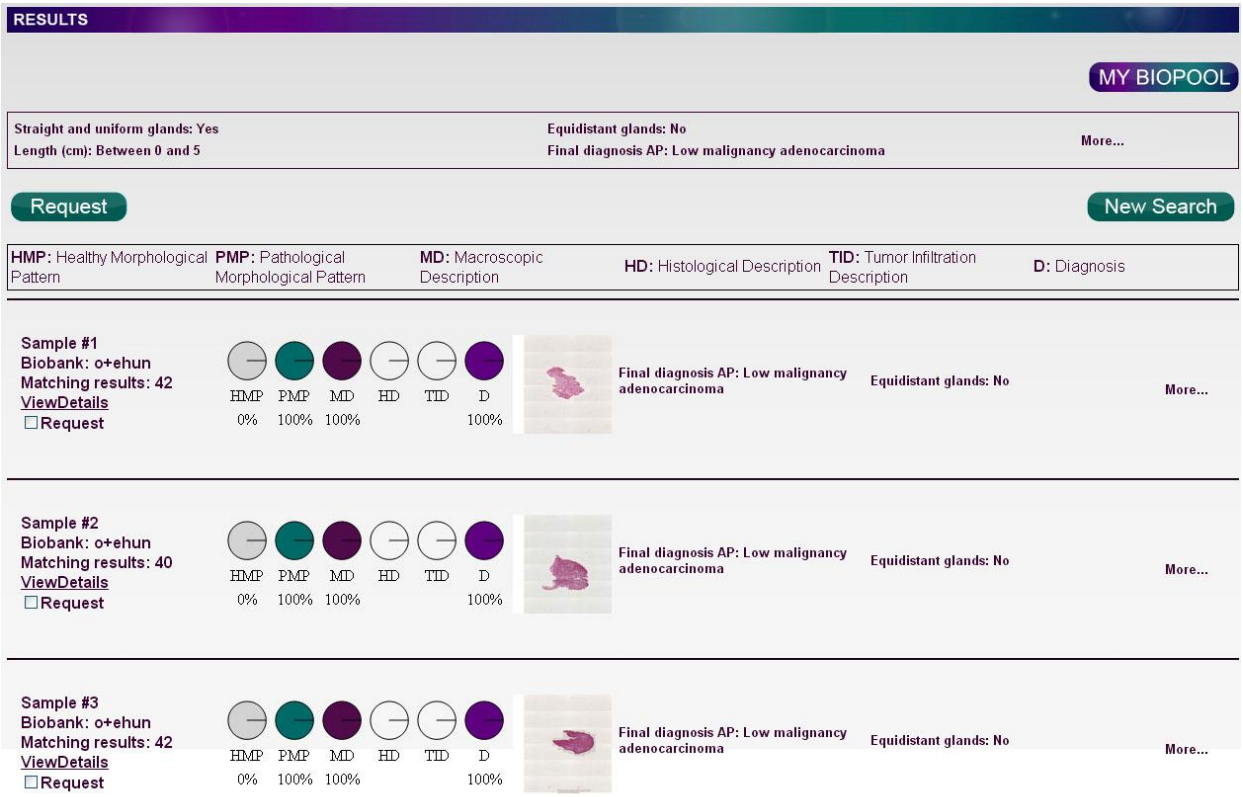

Figure 37: Search results of a saved search

6 Image Display And Processing

The images of the sample details or the images of the search results can be explored in full screen with a Viewer.

This Image Viewer has been developed based on the requirements defined during the course of the project and D1.2 Functional requirements of the system. The main requirements that have determined the technical solution for the Image Viewer are the following:

- The images (huge size) shall not be downloaded in the PC to be shown. So, the image processing shall be done in a server.
- No components or Active X shall be installed in the PC´s of the users in order to facilitate the use of BIOPOOL. So, the viewer shall be based on Web technology.
- The viewer shall work in the most used Web Internet browsers (Internet Explorer, Chrome and Firefox).
- The interaction with the images (huge size) shall be fast and with no refresh.
- The viewer shall allow to interact with the images like a map:
    - Navigation through the images, amplifying (more magnification) or reducing (less magnification) the details of the sample
    - Movements around the sample to view one area or another area.
    - Visualization of a reference in a Window guide to show the currently-enabled area with the full image in the background for reference.
- The query image shall be shown in the screen.
- The pieces of the sample (returned by the image search engine) shall be shown in the screen.

With all these requirements, a Web Image Viewer has been developed in order to read the pyramidal structure of images from the Centralized Index with the BIOPOOLID and display them with enough quality to allow the researchers to evaluate the interest of incorporate the samples to their researches and to allow the teachers to teach their students in pathological anatomy. So, the quality shown is the 50% of the original acquisition in the microscopes. This reduces the size needed for storing the pyramidal structure of images in the Centralized Index and the image processing.

The images will be shown with a BIOPOOL watermark in order to protect the ownership of the sample. In the exploitation plan, the way of acquiring the original sample without that watermark will be defined and during the second year of the project the Web Site and the Web Viewer will be adapted depending on the profile of the user.

At the moment, the visualization and exploration of a sample will be displayed as follows.

6.1 Samples searched by text

The visualization of a sample searched by text will show a general view of the sample, with the minimum magnification level of the sample in a first step.

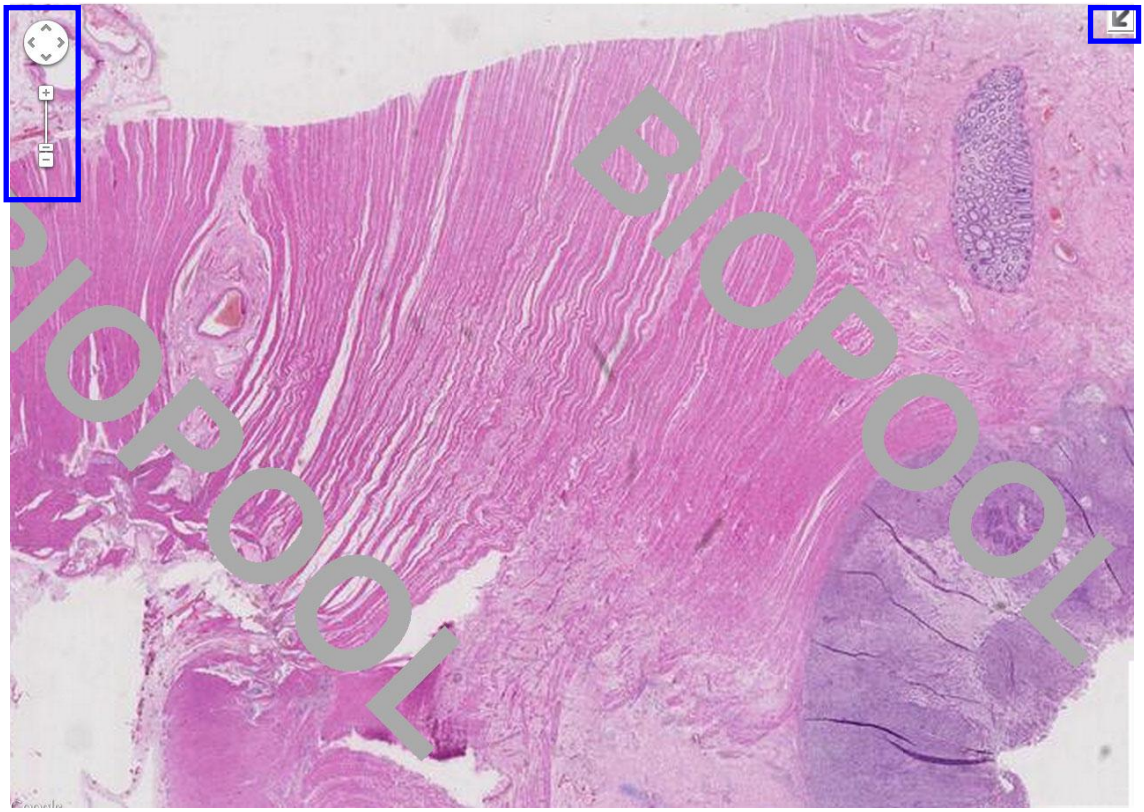

Figure 38: Exploring Whole Sample Image

Clicking in the arrow in the left-top corner of the viewer, a navigation window will be shown to facilitate the position reference in the whole sample. Clicking again in this arrow, the navigation window will be hidden.

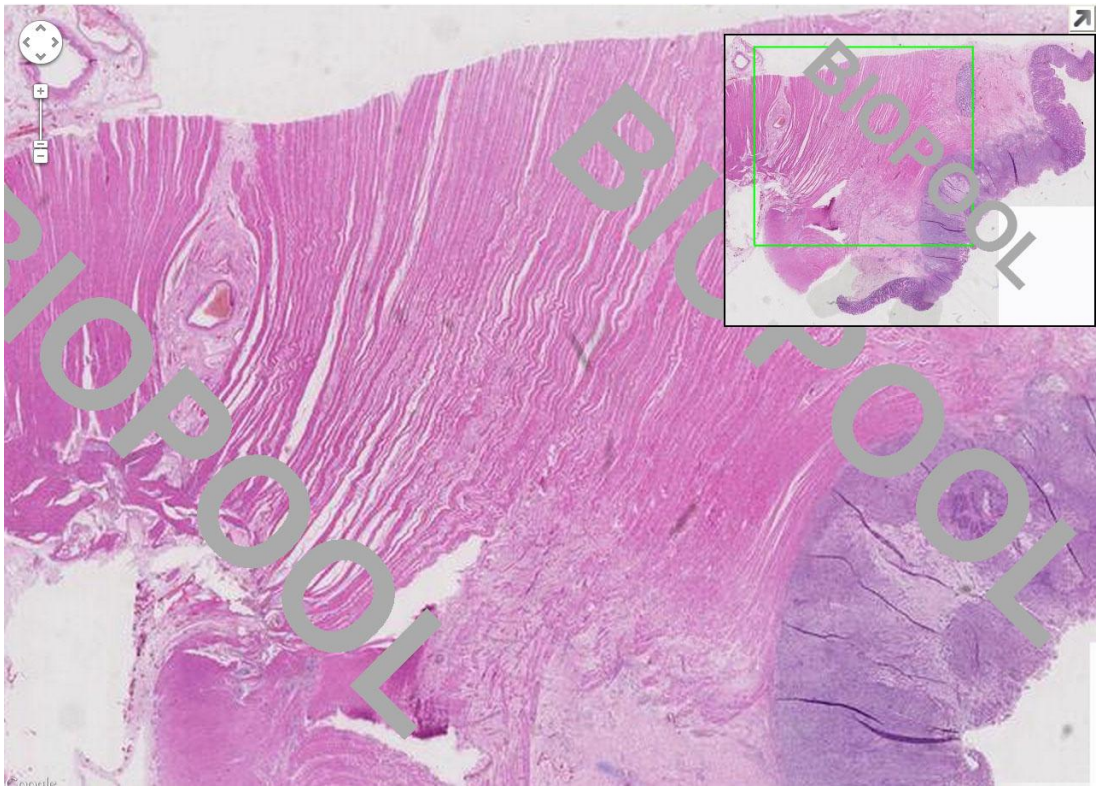

Figure 39: Exploring Whole Sample Image with navigation window

While the user navigates in the full image, the reference position will be automatically calculated in the navigation tool and marked.

With the mouse wheel or with the zoom tool in the left top corner, the user can navigate through the image, increasing or decreasing the magnification level (as in Google Maps). The number of magnification levels depends on the Biobank that sent the sample to the system.

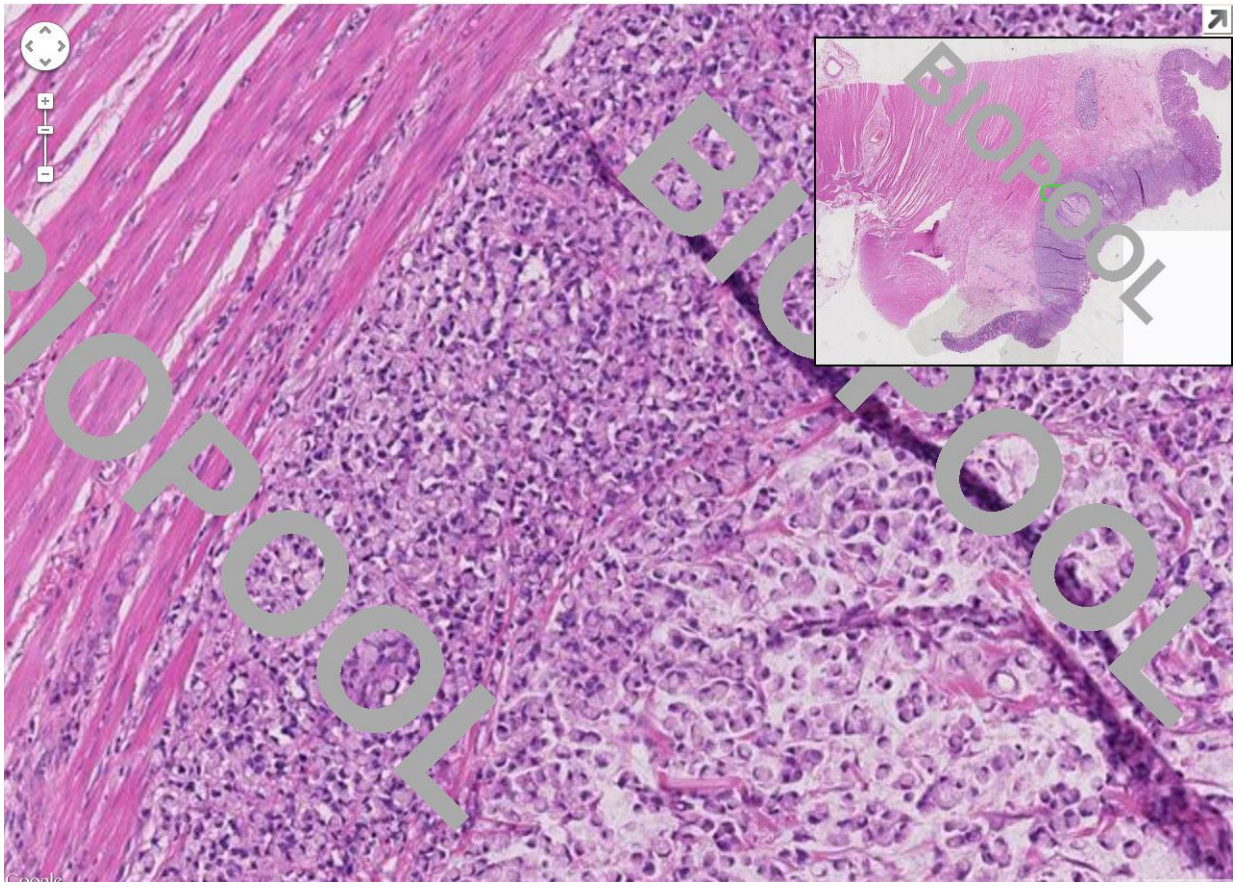

Figure 40: Image Magnification

6.2 Samples searched by image

The visualization of a sample searched by image will included also a carrousel with the query image and the offset images returned by the search engine in the search. This carrousel will be shown in the bottom area of the screen.

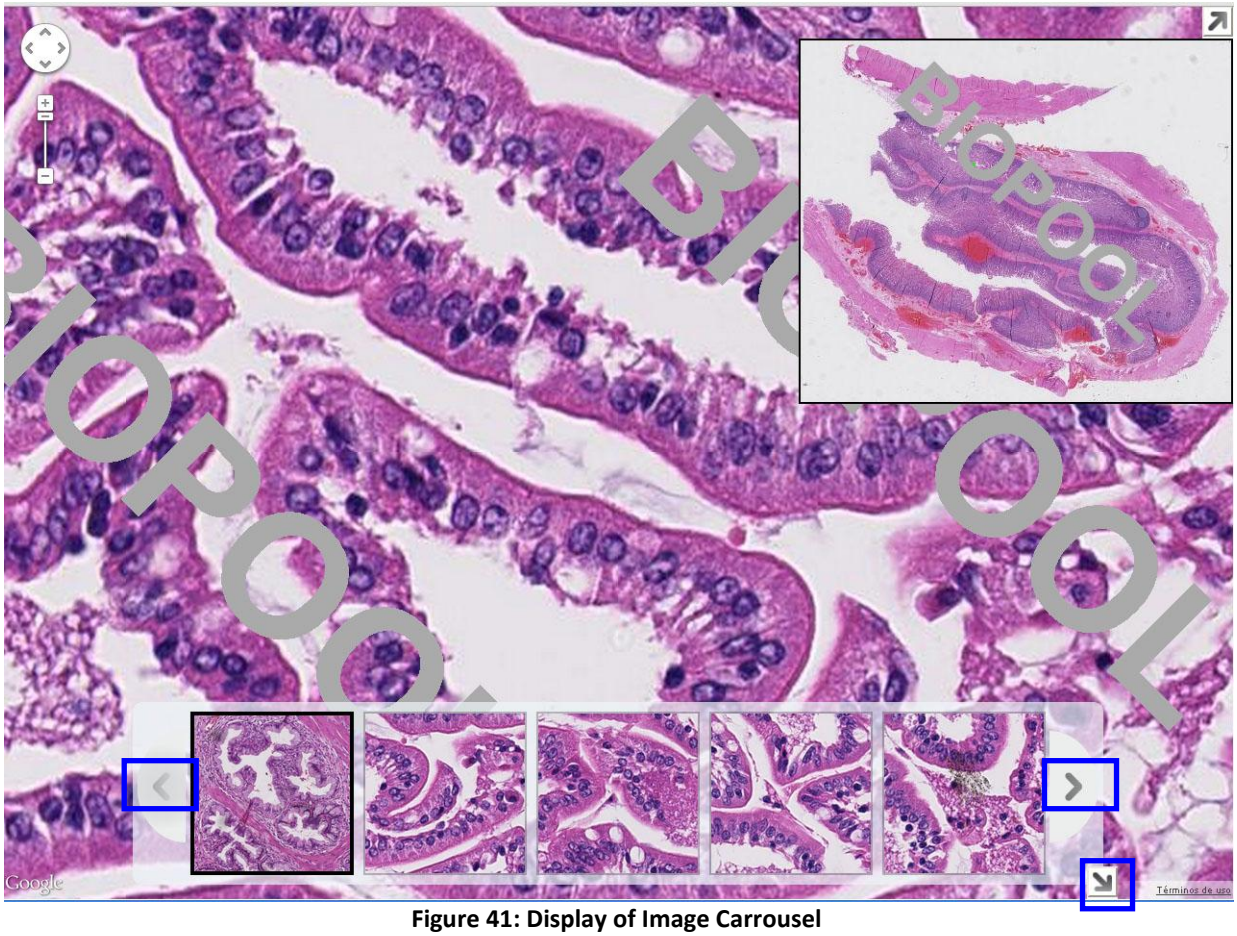

Figure 41: Display of Image Carrousel

The first image in the carrousel always will be the query image to have the referenced image used to find that sample, and it will be highlighted in black colour.

The following images will be the visually similar images returned by the search engine.

To hide/show the carrousel the down-right corner arrow can be used.

To move between the offset images, the left and right arrows of the carrousel can be used.

Clicking on each of the ROI images, the associated image will be displayed in the full screen in order to explore it and a process to calculate the position based on row and column in the whole sample has been developed.

7 Requests

7.1 Sample Requests

Once the user has selected some samples to be requested after searching by text or image-upload, the following interface will be shown with the biobank contact details and 2 text boxes to enter a subject and comments.

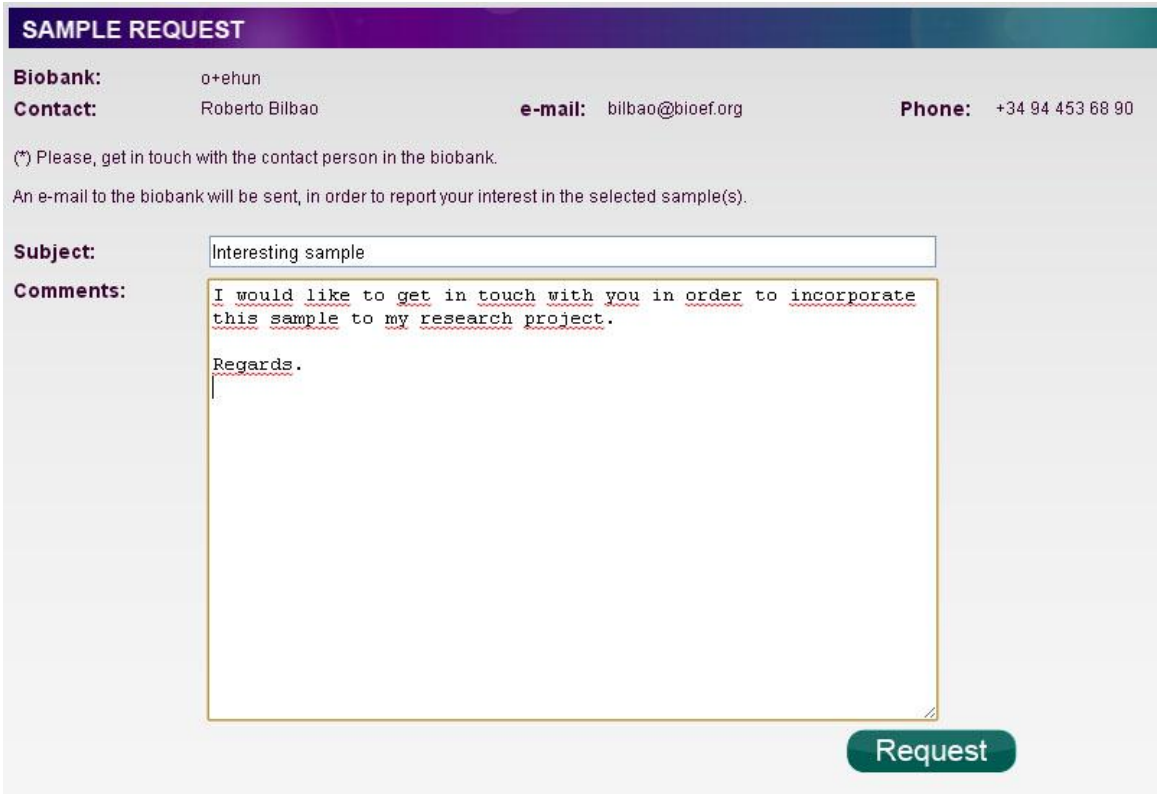

Figure 42: Request for Samples window

By clicking *"Request"* an e-mail will be sent to the biobank in order to report the interest in the selected sample(s) with the information about the user and the date/hour of the request.

This e-mail is just only to report to the biobank about the interest of the user, but the user will have to get in touch with the biobank to get the sample(s). For this, the system will provide to the user the biobank's e-mail and telephone number.

A serial number will be associated to each request internally and the information about the request will be saved in the section *"My Requests"* of the user with the Web Service "SendRequest" described in D2.4.

7.2 My Requests

"My Requests" will show the requests of the user, ordered by date. The order could be changed by clicking the header of the table.

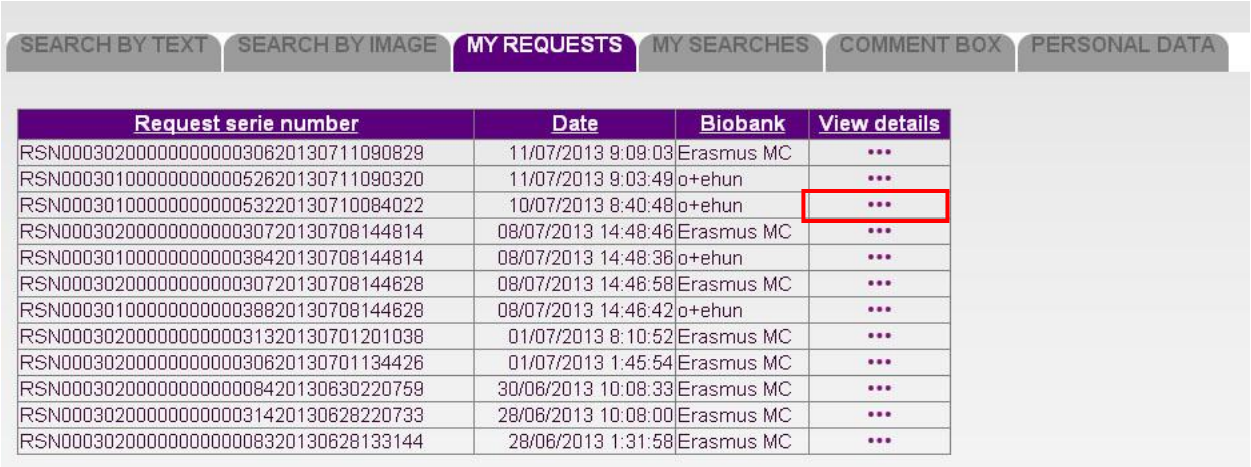

Figure 43: "My Requests" History tab

To read the requests of the user, the Web Service "GetUserRequest" has been developed (See D2.4).

Clicking the "…" in the column *"View Details"*, the details of the request will be shown with the request serial number, the date and hour, the pathology, the source biobank and the subject and comments entered by the user.

Figure 44 Details of a saved request

All this data will be read with the Web Service "RequestDetails" has been developed (See D2.4). Clicking *"View Details"* of the request, sample details will be shown.

8 Personal Data

The data entered by the user in the registration process will be accessible in the “Personal Data” tab. There, the user can change every data, including the password that the Web Site assigned in the first moment.

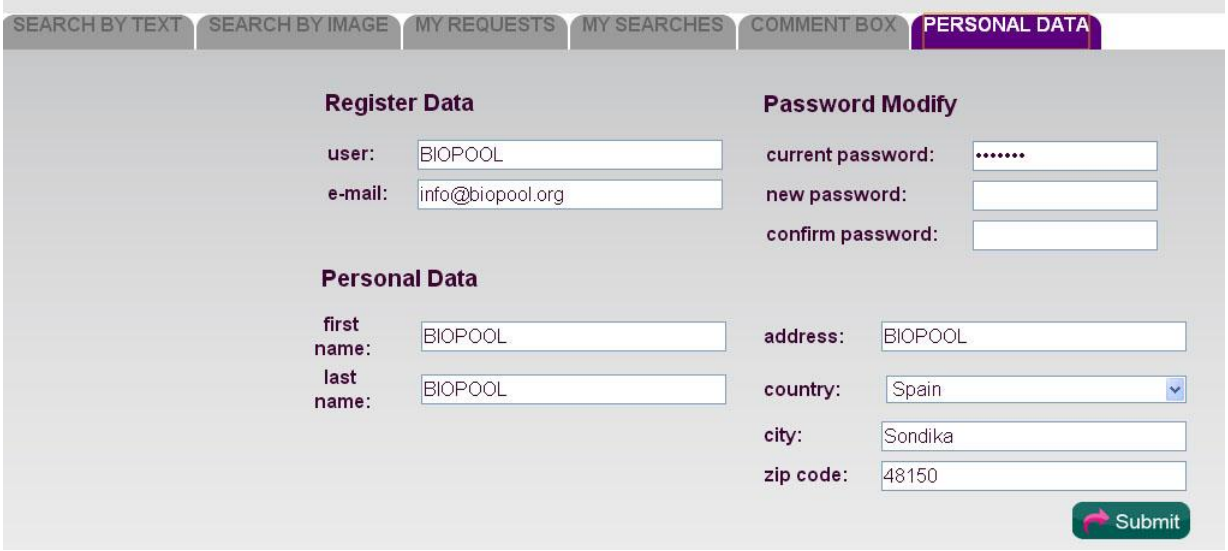

Figure 45: Personal Data

This data will be updated with the *“Submit”* button calling to the Web Service “ModifyPersonalData “ (See D 2.4).

9 Comment box

The ***"Comment box"*** will allow the user to send suggestions and/or comments to the system administrator.

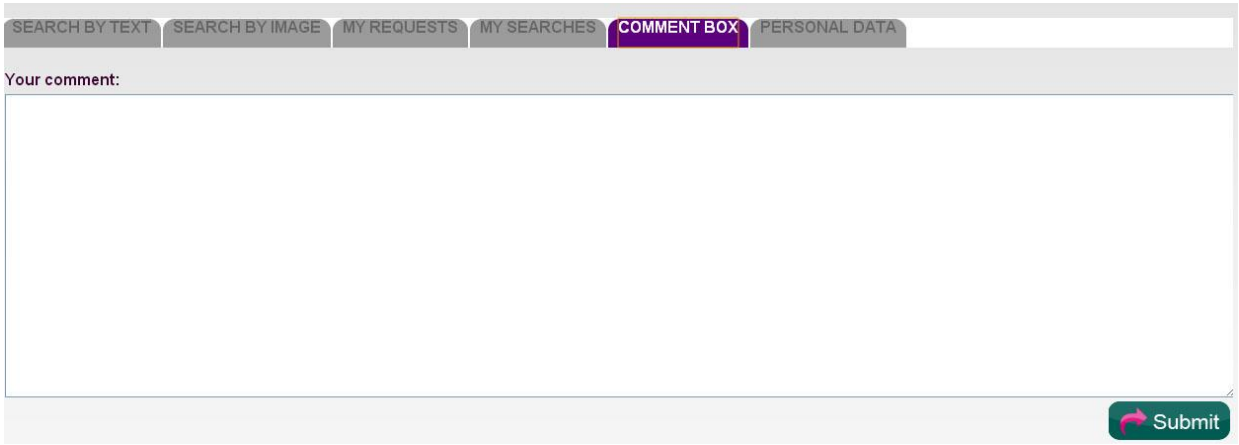

Figure 46: Comment Box tab

10 Score Results

By using the "Score this result" hyperlink that is located on the top of the Results page, the system will show the user another form in order to let him score the result.

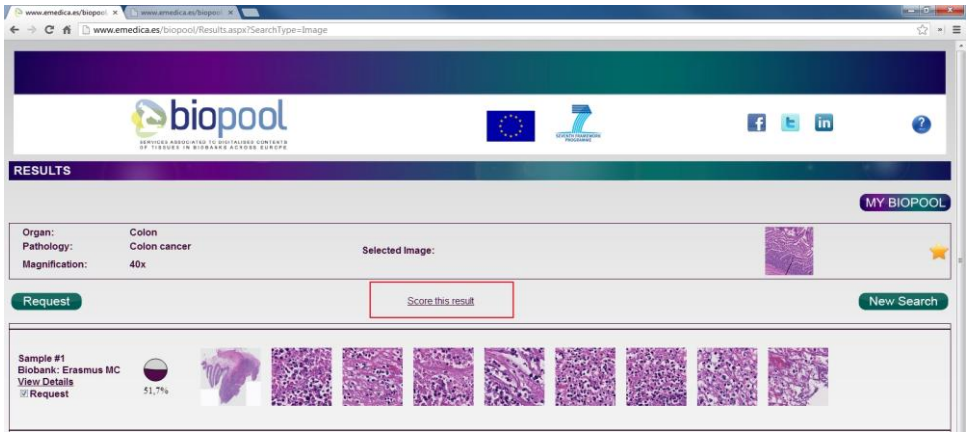

Figure 47 Score this result hyperlink

This functionality has been added to evaluate the whole platform by the pathologist and facilitate to the consortium their feedback about the precision of the searches done through the Web Portal (See D6.3).

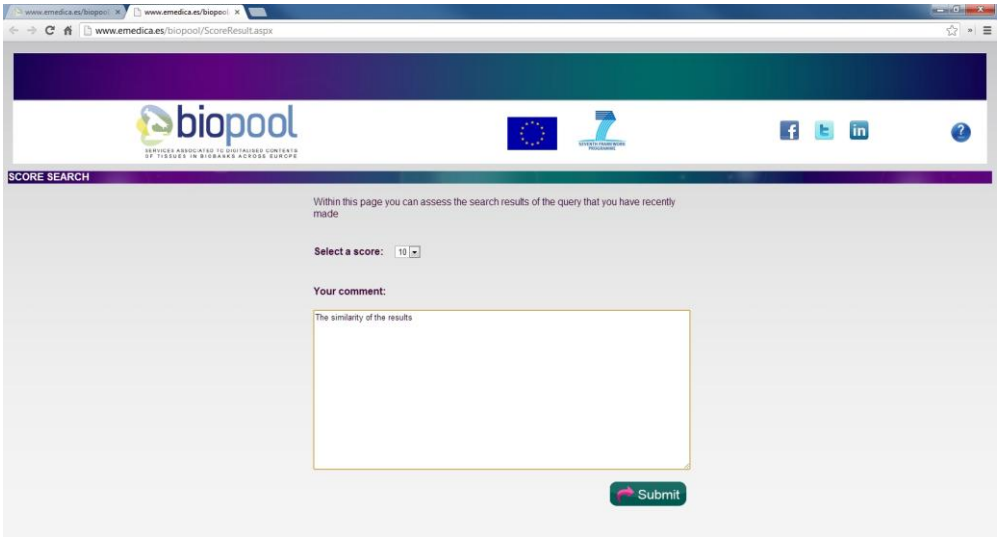

Figure 48 Score this result form

The pathologists can select a score between 0 and 10 about the result of each search and enter comments about the quality of the results received.

All this information will be managed using the Google Analytics, this tool gives other interesting information about BIOPOOL's site traffic and traffic sources and generates detailed statistic.

11 Online Help

If the user has any doubt about using the Website, clicking the ***"Help button"*** in the top banner will access to the handbook.

Figure 49: "Help" button

12 Development environment

The development environment used to develop the Web Site and the Web Viewer has been the following:

- Web Site:
  - ASP . NET and Java Script for the presentation layer of the Web Site
  - VB .NET for the Web Services
  - C# for the data layer
- Image Viewer:
  - Google API to process and display the images of a sample and the navigation window
  - Java Script to display the carrousel of images
  - HTML5 to integrate all the elements and improve the interaction of the user in all the Internet navigators.
- mySQL to store the data about the users, the favorite searches, the requests, etc.