



PAPARA(ZZ)I™ 1.5 - User Manual

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PAPARA(ZZ)I

Program for Annotation of Photographs and Rapid Analysis (of Zillions and Zillions) of Images

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Chapter 1 Installing PAPARA(ZZ)I™

PAPARA(ZZ)I™ is a stand-alone program that runs under 64-bit Windows operating systems. To start the installation, simply run either *papara(zz)i_mcr.exe* (the MATLAB runtime is included in the installer) or *papara(zz)i_web.exe* (the MATLAB runtime is downloaded from the internet if not already present on the computer).

Important: *although the PAPARA(ZZ)I installer is virus free, antivirus programs sometimes block its execution. If this is the case, de-activate the antivirus before running the installer.*

Chapter 2 Getting started

2.1 Starting PAPARA(ZZ)I

Upon starting, PAPARA(ZZ)I prompts the user for a *username* and for the path to the folder that contains the images (*image folder*). The username is used by the program to differentiate annotations made by the different users.



Figure 1: Welcome screen of PAPARA(ZZ)I prompting the user for a username.

2.2 List of keywords

A list of keywords must be loaded before any annotation can be made (unless connected to WoRMS). The list of keywords is a simple text file with one keyword per line. Keywords can be organised into groups separated by empty lines. Group titles (i.e. non-selectable keywords) can be defined by inserting a “_” character before and after the keyword (example: *_Group Title_*).

2.3 Connect to WoRMS

PAPARA(ZZ)I can connect to and query the World Register of Marine Species (WoRMS) in order to use standardised taxa names. To do so, select the “Connect to WoRMS” option from the drop-down menu at the top of the left panel. If the connection is successful, a list of taxa appears in the left panel. It is possible to navigate through the register from this list:

- Double-click on one taxa to display the children of the selected taxa.
- Select the “Higher rank” button to display the parent taxa.
- Select the “More results...” button to return more results in case the list of taxa is too long (it is only possible to query the register for a limited amount of taxa).
- Select the “WoRMS Taxon search” button to display additional search options. Once the desired taxon has been found, double-click on it to display it in the list in the left panel.

Remark: this option requires an access to the internet.

Chapter 3 Direct Image Analysis

3.1 Add an annotation

Select the desired keyword on the left panel and select the desired location in the image. A yellow circle appears.

Remark: application can be closed anytime. All annotations are saved automatically.

3.2 Select/View an annotation

To select an annotation, simply do LEFT-CLICK on the annotation circle. The associated keyword is displayed in the info bar. The annotation can be de-selected in the same way.

3.3 Modify an annotation

To modify the keyword associated to an annotation, do SHIFT + LEFT-CLICK on the annotation and select a new keyword on the left panel.

3.4 Delete an annotation

To delete an annotation, select it first (LEFT-CLICK), then do RIGHT-CLICK on it. The annotation circle disappears from the image and the annotation is deleted from the files. This action cannot be undone.

Remark: any associated size measurement is also deleted. However the measurement line will not disappear from the image until the image is refreshed.

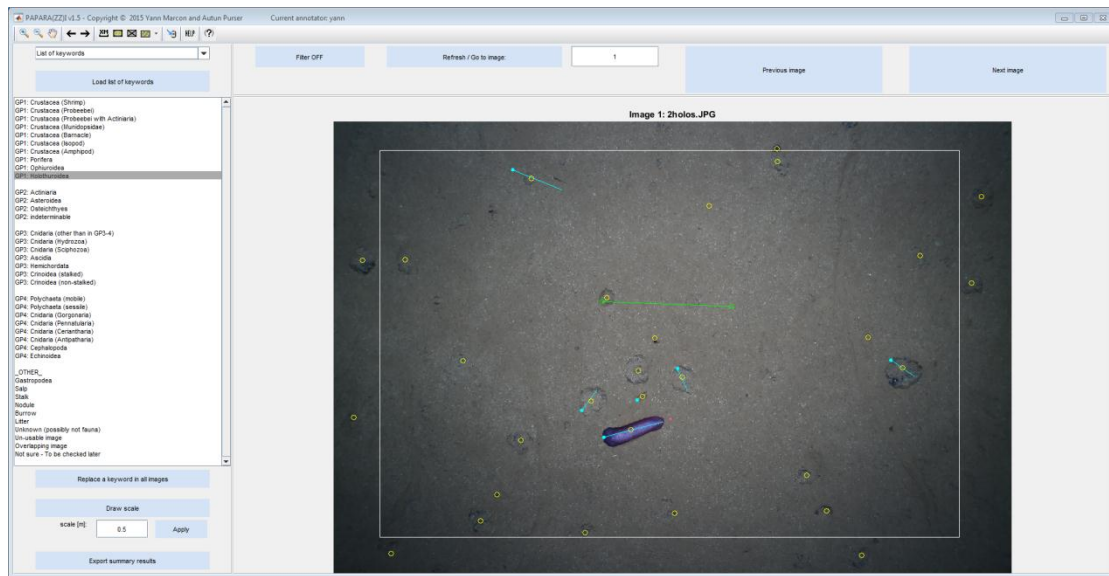


Figure 2: Main graphical user interface of PAPARA(ZZ)I, with annotations (yellow dots), scale bar (green line and dots), size measurements (blue line, the dot indicates the front side of the feature), and usable area (white rectangle).

3.5 Making a size measurement

Size measurements must always be associated with an annotation. Therefore, the annotation must be selected before starting the size measurement. To draw a size measurement, first select the **XM** button. Then select first the front end (e.g. fish head), and second the rear end (e.g. fish tail) of the selected feature. A measurement line will appear on the feature. A dot appears at one end of this line, and indicates the front of the feature.

To modify a size measurement, simply draw a new one (the previous measurement will be automatically removed).

Results of the size measurements are available in the summary files produced during the data export. The orientation of the size measurements is used to compute the angle of direction of the features in relation to the upper side of the image. Resulting angles are available in the data export files.

Remark: size measurements require the image to possess a scale bar. Otherwise, sizes cannot be computed.

Remark: angles measurements are of interest when combined with the heading information of the camera in order to calculate the direction of each feature in relation to the North.

3.6 Image scale


To add a scale bar, select the “Draw scale” button in the left panel. Then select the start and end points of the scale bar on the image. The length of the scale bar must be provided in metres.

The scale bar is used by the program to assess the size of the image area, to compute densities of marked features, and to scale the annotated features for which size measurements exist (see 3.5).

To modify a scale bar, simply draw a new one (the previous scale bar will be automatically removed). The scale bar can be fully removed by deleting the corresponding file:

image folder\username_scale\imagename.txt



3.7 Image Usable Area

In some cases, the corners of an image are too dark or too fuzzy to permit reliable analysis. In order to exclude those areas of the image from the analysis, it is possible to define a “usable area”: select the  button and draw a rectangle on the image. A separate summary file will be automatically created during the data export to summarize the annotations presents in the usable area.

To modify the usable area, simply draw a new one (the previous one will be automatically removed). The usable area can be fully removed by deleting the corresponding file:

image folder\username_rectangle\imagename.txt

3.8 Flagging an image as unusable

Unusable images (e.g. bad quality) can be flagged as unusable and ignored during the data export. To do so, simply select the  button. All existing annotations will disappear from the image and a large black cross will appear instead. This action can be undone by de-selecting the  button.

Remark: this action is fully reversible and the previously existing annotations, scale bar, usable area or size measurements are not deleted by this action.

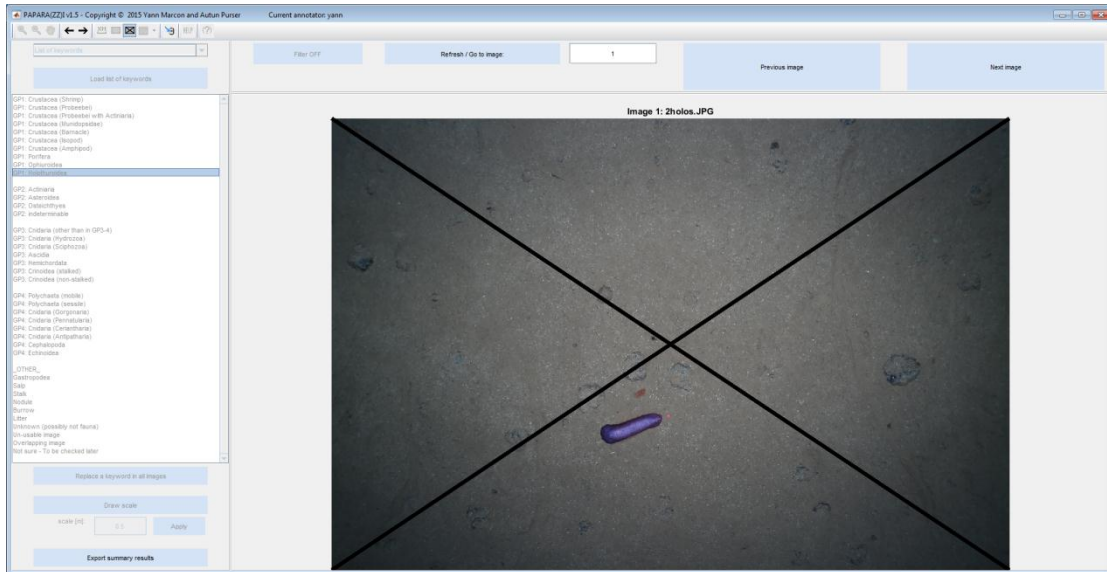



Figure 3: Image flagged as unusable. The annotation interface is greyed out.

Chapter 4 Gridded/Random Point Analysis

PAPARA(ZZ)I offers the possibility to conduct systematic analysis of images using either gridded points or randomly distributed points. To use this functionality, select the desired option in the drop-down menu associated to the  button. Depending on the selected option, a gridded or randomly distributed point array will be automatically generated. This functionality can be turned off by de-selecting the button again.

Remark: this option can take a few seconds if the amount of points is large.

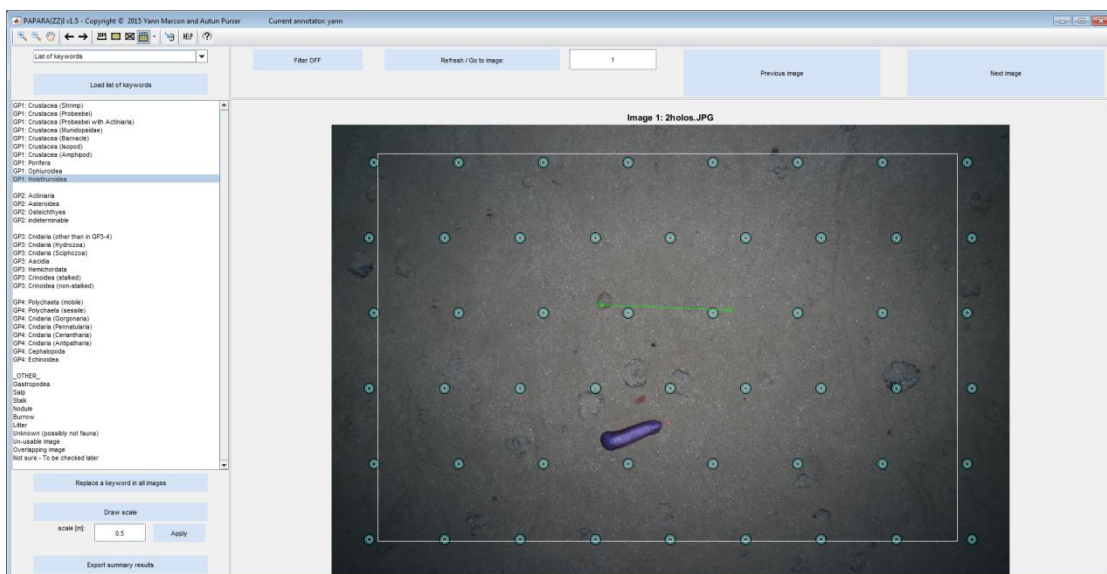


Figure 4: Gridded generated points. The amount of points can be defined by the user. Points are automatically distributed evenly across the image.

4.1 Annotating a generated point

First select the desired point, and then select the relevant keyword from the left panel. The point appearance will turn to a single blue circle.

4.2 Reset the keyword associated to a generated point

To reset the keyword associated to a generated point, select it first (LEFT-CLICK), then do RIGHT-CLICK on it. The annotation circle will be set back to its default appearance and the associated keyword is set back to 'empty'. This action cannot be undone.

First select the desired point, and then select the relevant keyword from the left panel. The point appearance will turn to a single blue circle.

Remark: size measurements can also be associated to generated points.

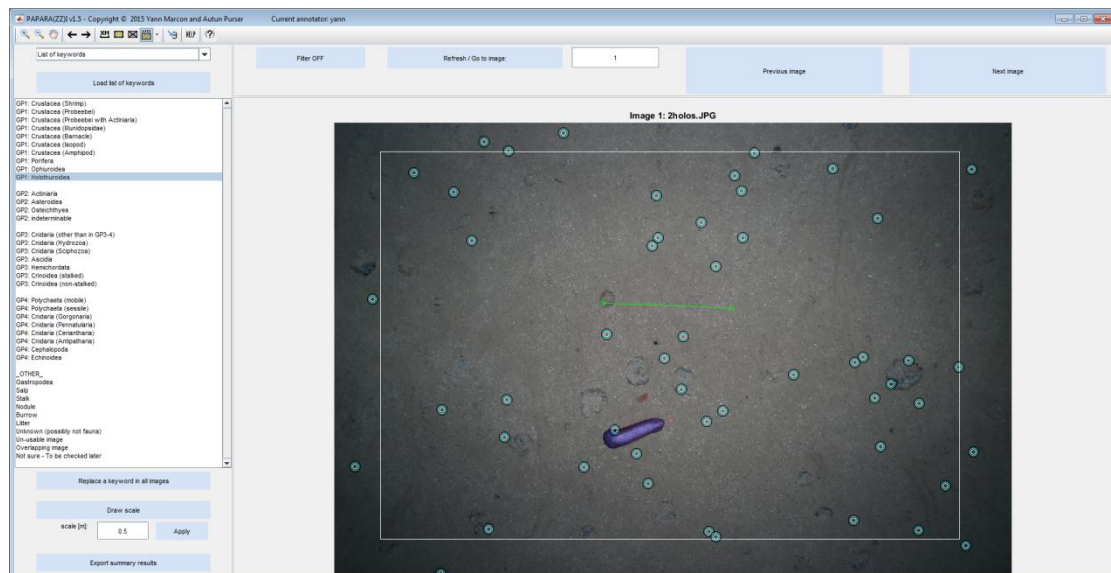


Figure 5: Randomly generated points. The amount of points can be defined by the user.

Chapter 5 Other

5.1 Changing the mouse pointer

If desired, the mouse pointer can be changed to a clearer one. To do so, simply do RIGHT-CLICK on an empty area of the image. The pointer will change. Repeat this procedure to change the pointer back to its original shape.

5.2 Annotations filter

A filter can be used when navigating through the series of images in order to restrict the


display of annotations to a set of selected features only. To do so, simply select the “Filter” button and select at least one keyword (CTRL + LEFT-CLICK to select several keywords). Turning the filter on modifies the behaviour of the navigation buttons (arrow buttons) in such a way that only images containing one or more selected features are displayed. The filter acts only on the display level. The filter does not delete any annotation and it does not affect the behaviour of the data export.

Remark: filter works only if keyword list has been loaded.

5.3 Batch replace keywords

Select the “Replace a keyword in all images” button in the left panel to modify a certain keyword in all annotated images. This function is useful to rename features that may have been erroneously annotated in the set of images.

5.4 Export of analysis results

Exporting the analysis results can be done anytime by pressing the “Export summary results” button in the left panel or the  button in the toolbar. A set of summary files is then automatically created in the following folder: *image folder\summary*.

- *username_summary_analysismode_WholeImage.txt*: this file summarises all annotations for all images (except images that are flagged as unusable). It also provides basic statistics based on the existing size measurements.
- *username_summary_analysismode_UsableArea.txt*: this file summarises all annotations that are contained in the usable area of the images (except images that are flagged as unusable). If an image does not have a defined “usable area”, then the entire image area is used in the calculations. This file also provides basic statistics based on the existing size measurements.
- *username_angles_analysismode_WholeImage.txt*: this file summarises the orientation and direction of all size measurements for all images (except images that are flagged as unusable).
- *username_angles_analysismode_UsableArea.txt*: this file summarises the orientation and direction of all size measurements that are contained in the usable area of the images (except images that are flagged as unusable). If an image does not have a defined “usable area”, then the entire image area is used in the calculations.

The data export only exports results from the currently selected image analysis mode (*direct analysis* or *gridded/random generated points*). To export results of a different analysis mode, simply select the desired mode and press the “Export results” button again.

Remark: angle measurements are provided in degrees in relation to the upper side of the images (positive angles are in clockwise direction).