IMageEXtractor Manual

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1 Introduction

IMageEXtractor (IMEX) is an App developed for extracting data from scatter plots, enabling automatic extraction, and manual extraction and correction. IMEX is written in MATLAB R2018b, with add-on ‘Computer Vison Toolbox v8.2’ installed.

2 Overview

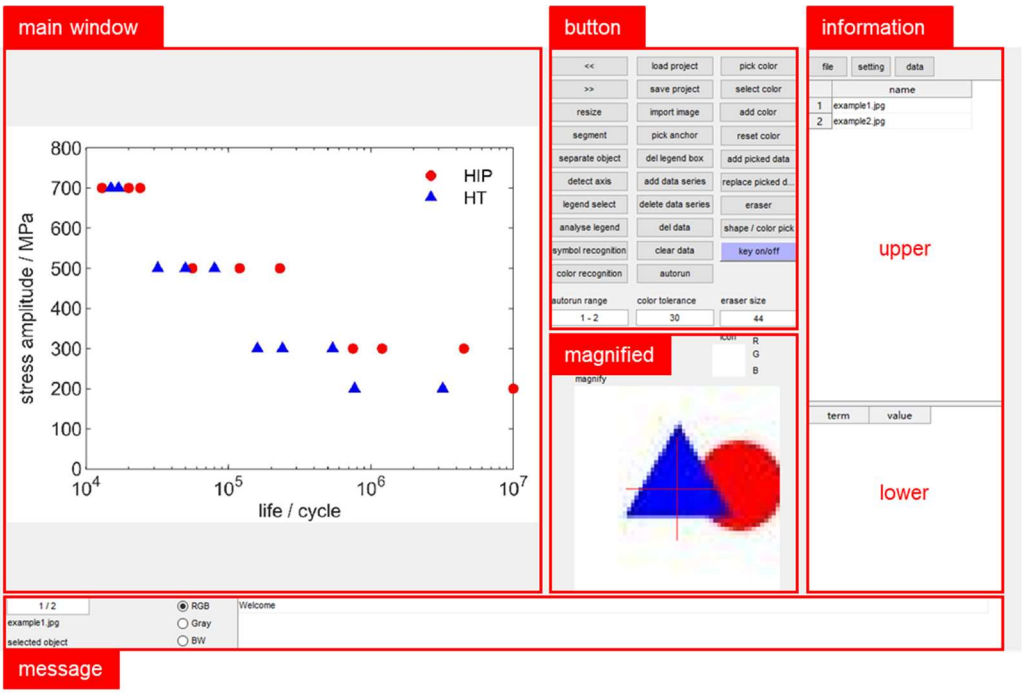

Figure 1. Major panels of IMEX.

The major panels of IMEX are shown in Figure 1. The main window shows the image to be processed. The button panel includes functional buttons and related input boxes.

The information panel displays the information on files, settings and data (Figure 2). Use the button at the top to switch between files, settings and, data information. Selecting an item in the upper panel will trigger the lower panel to show the

corresponding detail data.

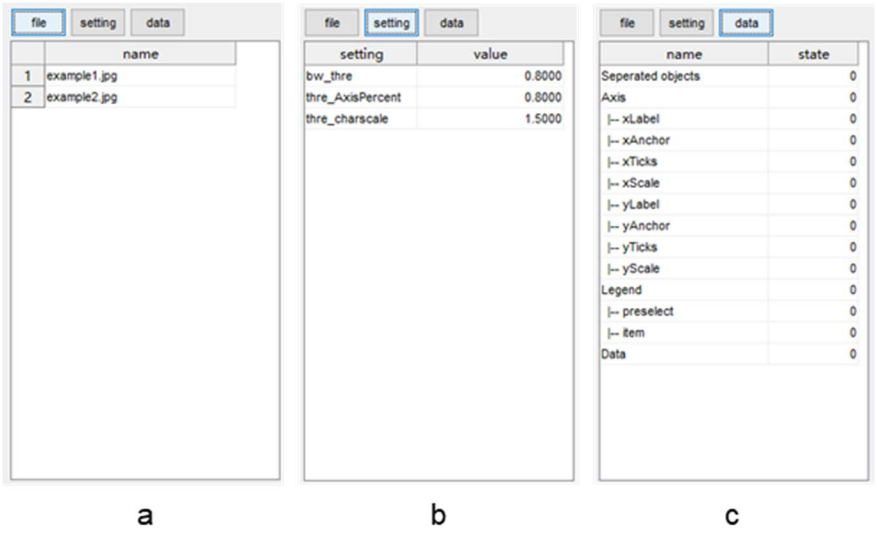

Figure 2. Information upper panel. (a) file, (b) setting and (c) data information.

The magnified panel displays the magnified view at the cursor position, marked by a red cross. In the upper left, there is also a small window to display the symbol of a data series and the RGB value of a pixel.

The message panel displays the message during app execution (Figure 3). In the first column, the first box shows the ID of the current image and the total number of images in the current project. It is an editable text box and entering a valid ID will trigger the main window to display the corresponding image. Below the text box, the image name and ID of selected object is shown. The second column includes 3 radio buttons to switch the color mode in the main window. The third column shows the real-time message during execution.

Figure 3. Message panel.

3 Usage

3.1 Main window

The left button of the mouse can be used to add data points or select objects in the main window, such as data points, axis anchors, selected regions.

Holding the left button and moving the mouse will box select objects or regions.

Other functions of the left button will be activated for some buttons, which will be introduced in the following sections.

The middle scroll is used to zoom in or zoom out the image.

Holding the right button and moving the mouse will pan the image.

3.2 Quickstart

imex.m is the main file and imex.fig is used for the layout of the graphic user interface (GUI). Running the imex.m in MATLAB will launch a blank IMEX GUI. The quickstart involves steps shown in Figure 4.

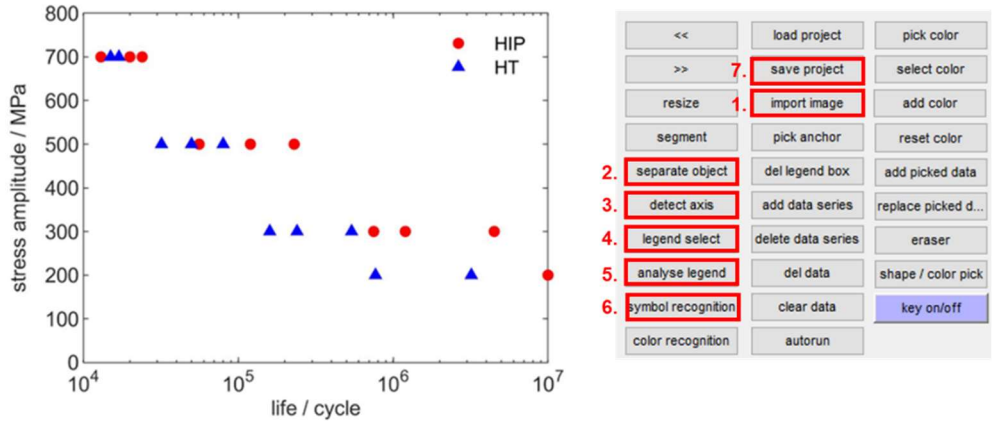

Figure 4. Steps of the quickstart.

1. Import image: click the import image button, a dialog box appears. Select the 'example' folder we provided and IMEX will import all images under the folder.
2. Separate object: click the separate object button. A binary copy of the image is created. Connected black pixels in the binary image are identified as an object. Objects will be used for subsequent analysis.
3. Detect axis: click the detect axis button. The position of axis, axis ticks and axis labels are recognized automatically.
4. Legend select: click the legend select button, the button is highlighted in blue. Use the left mouse button in the main window to box select the legend region (Figure 5). Click the legend select button again to finish the selection and the button will recover to gray. It is noted that color pixels irrelevant to the legend should not be included, which could influence the result of the analysis.

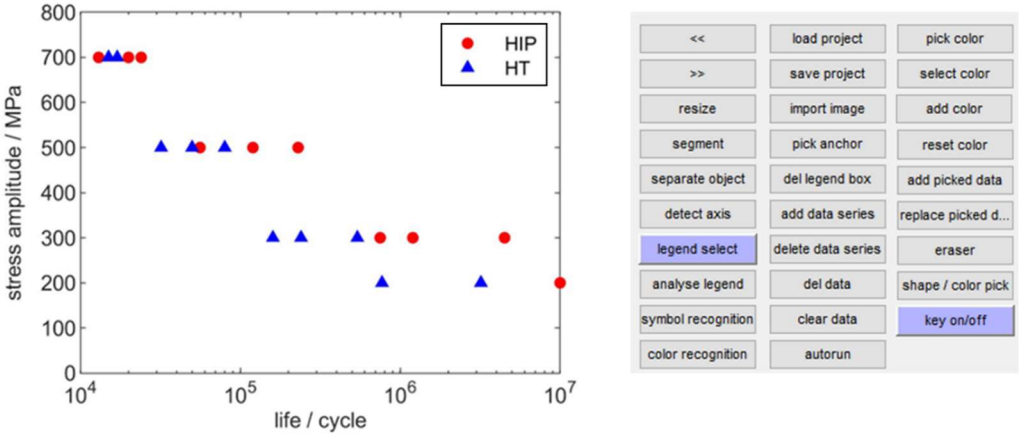

Figure 5. Box select the legend region.

5. Analyse legend: click the analyse legend button, the symbols and corresponding annotations are analysed and stored as templates for the image. Click the ‘item’ in the information panel, the symbols and annotations will be wrapped by black boxes in the main window and the text of the annotation shown in the information lower panel.

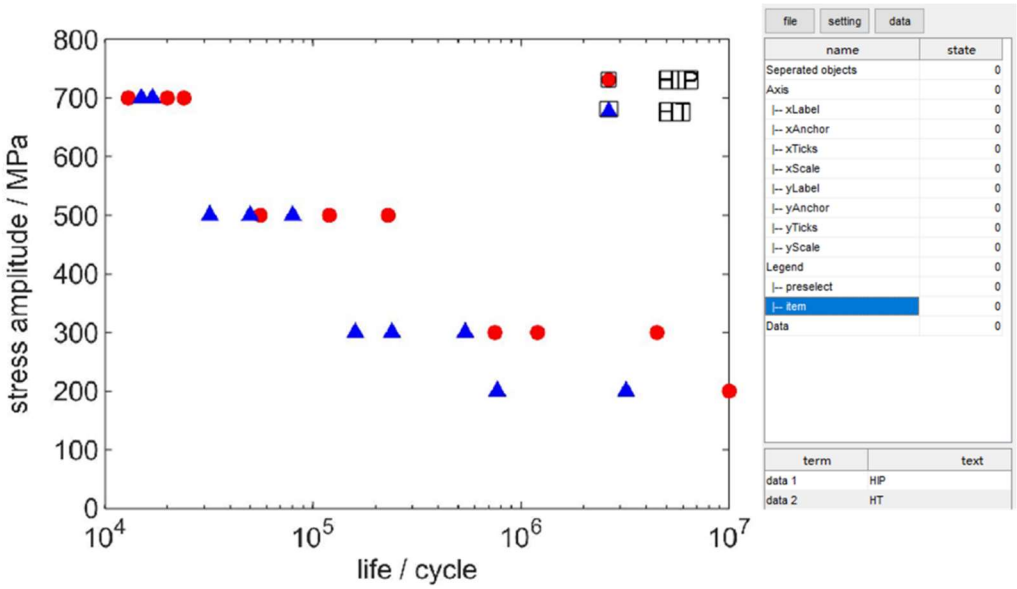

Figure 6. The result of legend analysis.

6. Symbol recognition: click the symbol recognition button and the data points will be recognized according to the shape and color of the templates. Select a data ‘series’ in the information panel, recognized data points will be marked by yellow circles in the main window and corresponding numeric data shown in the information lower panel. If no ‘series-*n*’ appear in the information panel, click the ‘data’ button at the top to refresh the page.

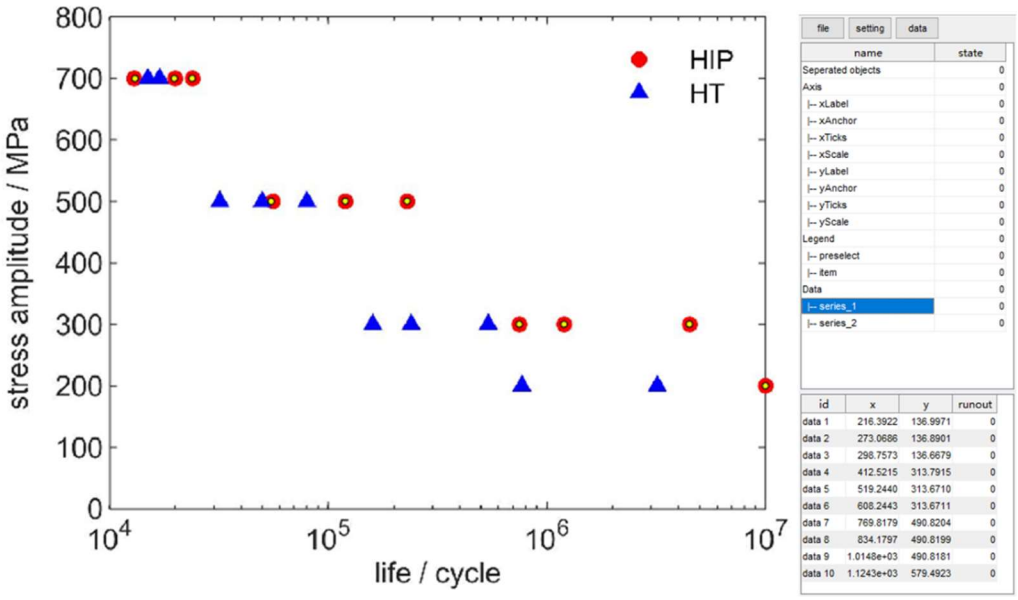

Figure 7. The result of symbol recognition.

When a data series is selected, the left mouse button is activated to select or add data points in the main window (Figure 8). When the mouse hovers over a data point, the cursor appears as a hand. Click the left mouse button at the time will select the data point and the marker of the data point will turn to a yellow cross. Once selected, the position of the data point can be adjusted by ‘w’, ‘s’, ‘a’ and ‘d’ keys and deleted by the ‘delete’ key on the keyboard if the button key on/off is activated in blue. When the cursor appears as an arrow, clicking the left mouse button will add a data point to the data series.

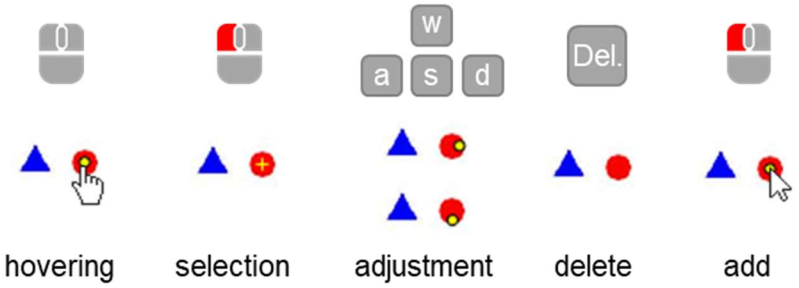

Figure 8. Interactions with the data points.

7. Save project: click the save project button and a dialog box will appear. Choose

the path and enter the filename for the project file, and save it as a MAT file (.mat). The project file records the information of axis and data in pixel coordinates for all images and can be transformed into data in physical units by post-processing. The project file can be loaded for subsequent analysis by using the load project button.

3.3 Functions of buttons

next image:

Switch to the next image.

previous image:

Switch to the previous image.

resize:

Resize the image to fit the main window.

UPCOMING UPDATE