

LumiScan Annotation Framework



User Guide



Imprint

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1 Introduction

1.1 About This Manual

This document contains important information about the installation and operation of the LumiScan Annotation Framework. Please read the manual carefully before using this software.

1.2 Formatting Convention

This guide uses special formatting to highlight certain words and phrases:

- Keywords/important information and buttons are highlighted in bold (e.g. Select the **Settings**).
- Links and references are highlighted in yellow (e.g. info@hdvisionsystems.com).
- File and path names are highlighted in a special font (e.g. `crop`, `img_lab`, and `raw`).

1.3 Disclaimer

NOTE: By accessing or using these commercial software products, you expressly agree to the following terms and conditions.

Any attempt to use a debugger to examine, analyze, or tamper with the software provided by HD Vision Systems is strictly prohibited and may have immediate and irreversible consequences.

If the software detects the presence of a debugger, security protocols will be activated to protect the intellectual property, functionality and stability of the software. This may result in, among other things, immediate suspension of the associated Software license, loss of data, and, in extreme cases, forced termination of all instances of the Software operating under the same license, as well as legal consequences.

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2 LumiScan Annotation Framework

2.1 Description

LumiScan Annotation Framework is the software that allows you to annotate objects in an image, providing data for training and retraining Neural Network Models that are later used in tasks such as object detection or quality inspection.

The software allows any number of users, customization of annotation settings, and an unlimited number of annotations.

LumiScan Annotation Framework provides seamless data exchange with other HD Vision Systems applications and doesn't require any AI knowledge.

2.2 Requirements

- Windows 10 or higher

2.3 Before Installation

NOTE: Before installing the LumiScan Annotation Framework software, refer to the LumiScan^X manual or the documentation that came with the camera you are using for information on network settings, Windows Firewall, and virus protection.

To license your LumiScan software, you must install the CodeMeter® Runtime Environment. A CodeMeter Runtime Kit installer for Windows 64-bit is available at the following link:

<https://www.wibu.com/de/support/anwendersoftware/anwendersoftware.html>

Before installing, please check your version of CodeMeter Runtime (version 7.60c or higher).

Follow the manufacturer's instructions for installation:

1. Connect the CmDongle to a free USB port on your PC.
2. The LED on the CmDongle will alternate between red and green for about 1-2 seconds. Your PC reports that a new USB device has been found.

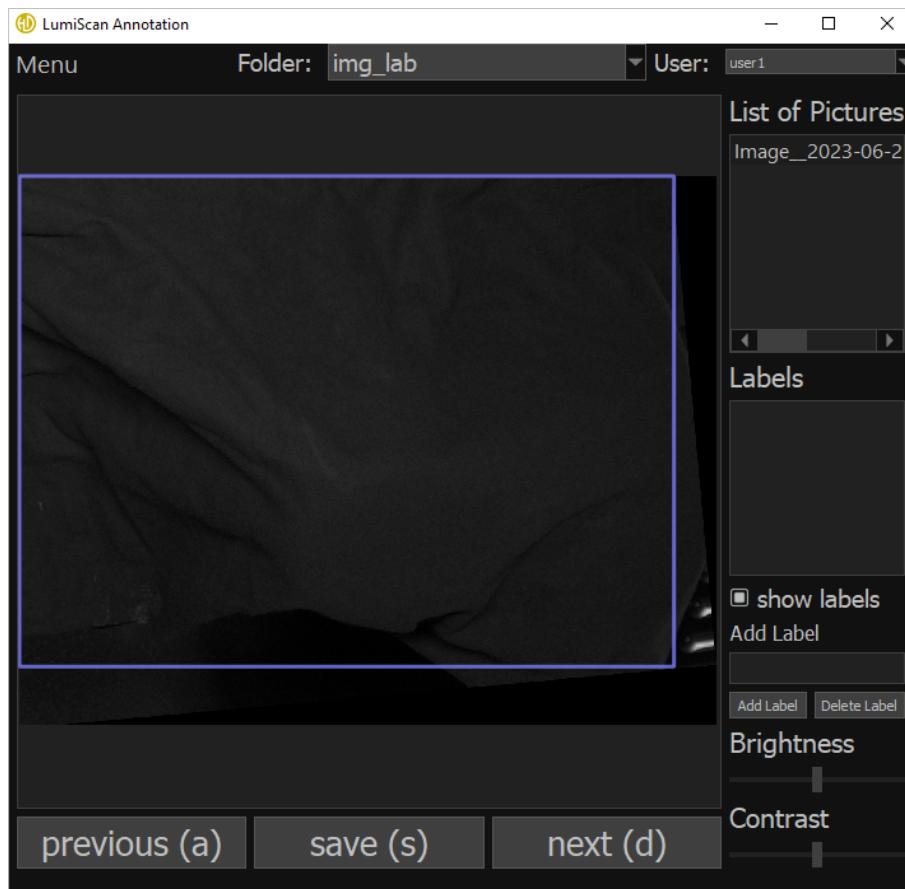
2.4 Installing LumiScan Annotation Framework on Windows

1. Close all open applications on your computer.
2. Navigate to the location of the LumiScan installer.
3. Double-click on the file: `Installer_LumiScan_annotation_va_b_c_d.exe*`.
4. The installation is prepared and the license agreement window opens.
5. Accept the license terms by clicking on **Accept**.
6. If you want to change the default installation location, click **Browse**.
7. Navigate to the desired storage location.
8. Press **OK** to confirm your selection.
9. Otherwise, click the **Next** button to continue.
10. If desired, select the **Start Menu** folder for the program links.
11. If you do not want to create shortcuts, select the **Do not create links** option.
12. Then click on **Install**.
13. When the installation is complete, you will see a dialog box.
14. Click **OK**.
15. Click **Finish**.

* where **a**, **b**, **c**, **d** are variables that depend on the version of the software.

2.5 User Interface

When you start LumiScan Annotation Framework for the first time, an empty window opens.



To start the program:

1. Click on **Menu**.
2. Select the **Settings**.
3. Specify the **Data directory** in the **Settings** window.

The various elements of the user interface are annotated in following [Figure](#) and explained in [Table 1](#).

NOTE: When you first start the program json settings file named **settings.json** (see [JSON Settings](#)) will be automatically generated at:
C:\Users\<USER>\AppData\Local\HD Vision Systems
GmbH\lumiScan Annotation

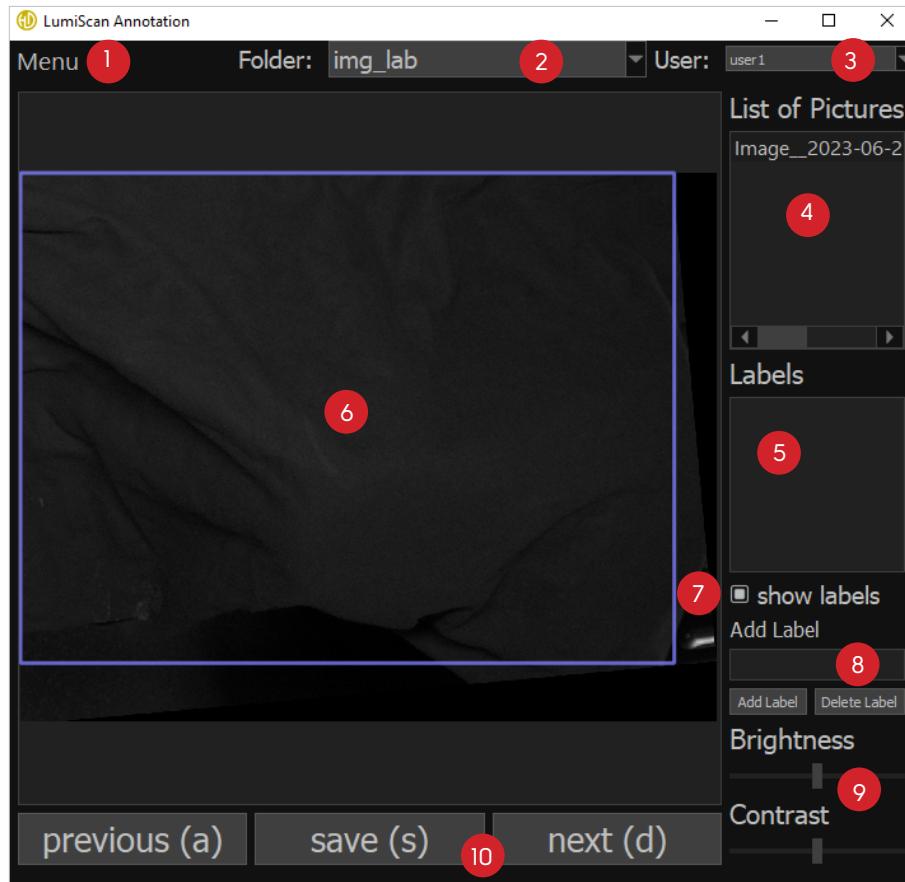
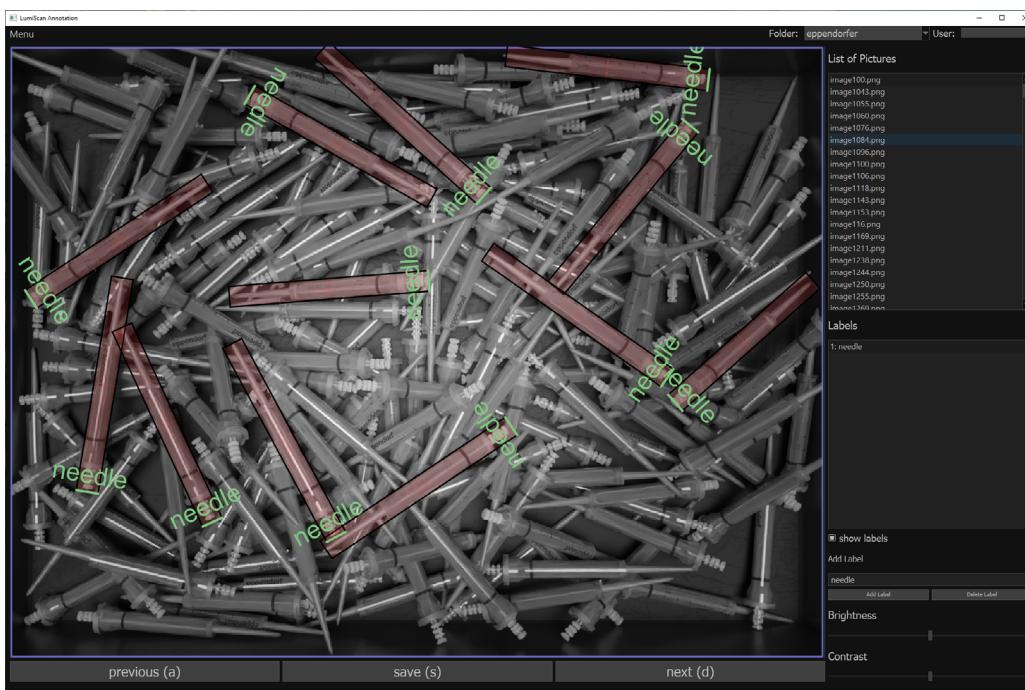


Table 1: LumiScan Annotation Framework: User Interface Description

Nr.	Description
1	Menu: Access to ROI settings, program settings and help.
2	Folder: Combobox for folder selection.
3	User: Combobox for user selection. <ul style="list-style-type: none"> Selected user is saved when changes are made.
4	List of images from the selected folder. <ul style="list-style-type: none"> When a new class is saved, the changed image is highlighted. The highlighting disappears when you change the folder (see 2 in this table) or reload the program. Image can be deleted by right-clicking. NOTE: This will also remove the deleted image from the record
5	List of all available labels in the selected folder.
6	Central view with display of the currently selected image and labels
7	Shows the selected labels.

Nr.	Description
8	Adds a new label.
9	Adjusting the brightness and contrast of the image.
10	Navigation menu (see also Navigation).

An Example



2.6 JSON Settings (Optional)

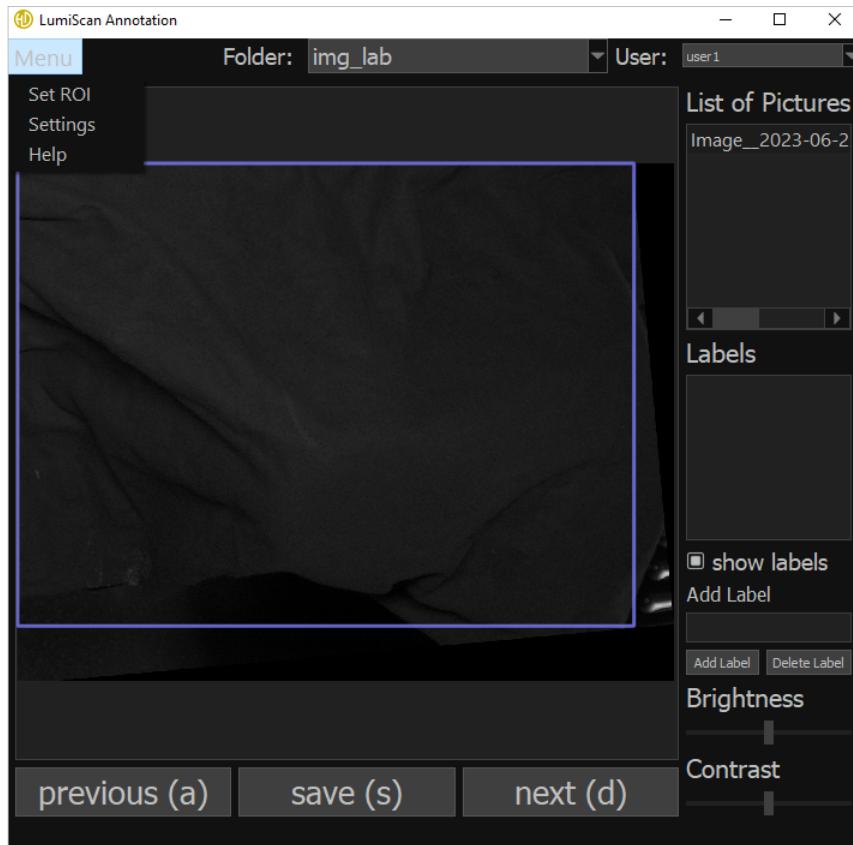
This JSON settings file is automatically created at C:\Users\<USER>\AppData\Local\HD Vision Systems GmbH\LumiScan Annotation the first time the application is started. The `labels` section will be empty at first. You can enter labels there and they will be added automatically. If desired, ROI values can also be specified here and loaded automatically.

See below for an example of the default json settings.

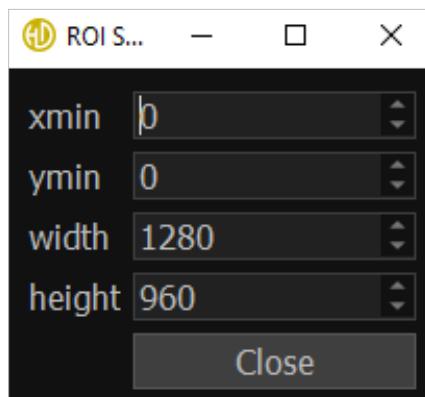
```
{  
  "meta": {  
    "inputFileType": "LumiScan Annotation Settings",  
    "inputFileVersion": "1.6.0.0",  
    "targetMachine": "TargetMachine",  
    "programName": "LumiScan Annotation",  
    "programVersion": "1.6.0.0"  
  },  
  "labels": ["stuff", "labelB", "somethingElse"],  
  "roiSettings": {  
    "x": 1.0,  
    "y": 1.0,  
    "width": 1.0,  
    "height": 1.0  
  }  
}
```

2.7 Menu

You can select ROI Settings, Settings, and Help from the menu.

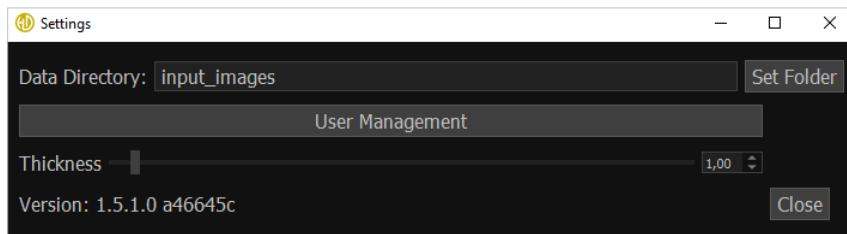


2.7.1 ROI Settings



In this setting window, you can define the region of interest (ROI) for training the neural network. The ROI defines the part of the captured image in which the network will search for markers. By default, the ROI is set to the entire image size. In the center view, the borders of the ROI are colored blue.

2.7.2 Settings



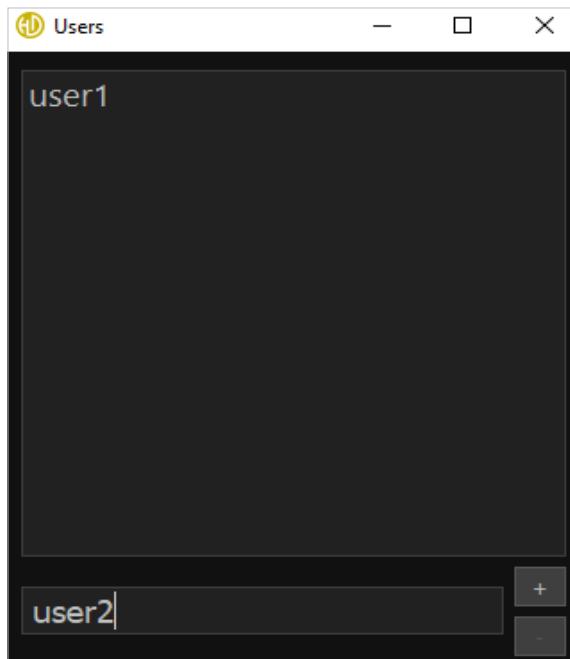
In this settings window you can:

- Specify the directory from which the marker should load images.
- Open the User Management window.
- Modify the Thickness slider to set the thickness of the bounding box frame.

To specify an input folder, click **Set Folder** and select the folder that contains the images.

2.7.3 User Management

After you click the User Management button, the Users window opens, where you can add new users or delete existing ones.



To add a new user, type the desired name in the lower edit box, then click '+'. To delete an existing user, select the user in the list and click '-'.

2.8 Annotating Images

Oriented bounding boxes can be manually changed or added in the central view:

Adding new boxes: There are three steps to adding new boxes:

1. First, double-click with the left mouse button on the position where you want the bottom edge of the bounding box to be. This border will always be green.
2. Without holding down the mouse button, click with the left mouse button on the upper edge of the object to set the height of the bounding box.
3. To determine the width of the bounding box, click on any side point of the object with the left mouse button, again without holding down the mouse button.

The box label corresponds to the active class in the list.

Selecting a bounding box: Existing boxes can be selected with a simple left-click. A selected box is highlighted by a slightly different color and four yellow, circular corner handles.

Modification of existing boxes: As long as a bounding box is selected, you can change its label by selecting another label from the label overview or by typing a new label.

Correcting the bounding box: A selected box can be manipulated in several ways:

- Drag the inside of an active box to move it.
- Dragging the edges of an active box changes its size in that direction.
- Drag the corners of an active box to rotate it around its center.

Deleting the bounding box: Right-click an active box to remove it.

After each saved annotation, the LumiScan Annotation Framework also writes the following information to a JSON file:

- User name
- Unix timestamp
- Image name (PNG)
- Save file name (CSV)

The JSON file is saved in the **raw** directory under the name of the saved image. Sequential comments are appended so you can track who made a change and when.

2.9 Shortcuts for Common Operations

To perform typical bounding box manipulations, such as rotating, moving, expanding, or extruding, you can use the keyboard shortcuts described in the following **table**.

Table 2: Keyboard shortcuts for common operations.

Keyboard shortcut	Operation
Ctrl/Shift + i/j/k/l	Move current box one/ten pixels in the corresponding direction
Ctrl/Shift + u/o	Rotate current box one/ten degrees counter/clockwise
Ctrl/Shift + v/b	Increase/decrease current box height by one/ten pixels
Ctrl/Shift + n/m	Increase/decrease current box width by one/ten pixels

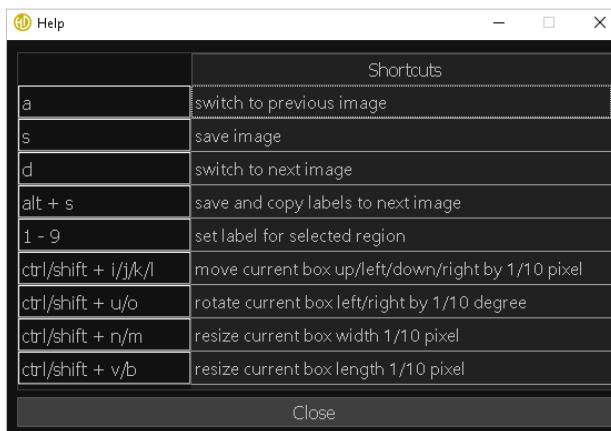
2.10 Navigation

To view the previous or next image, or to save your changes, you can use the button in the navigation menu or the shortcut keys.

Table 3: Navigation Keys

Button	Keyboard shortcut	Operation
previous	a	Switch to previous image.
save	s	Save image.
next	d	Switch to next image.
save & copy	alt + s	Save and copy labels to next image. Useful when content changes little between images.
	1-9	Set label for selected region. This option can also be used to change the label of the bounding box. After selecting the desired box (left mouse button), the name can be changed by entering the desired label number (1 - 9).

This table, along with shortcuts for common operations, can also be accessed via **Menu > Help**.



2.11 Folder Structure

To annotate a single folder of images, simply select the folder containing the png images and start annotating.

To load multiple folders of images, the images should be located on your hard disk in the following folder structure:

```
<Any Folder Name>
|----<Any Folder Name>
|   |
|   |---- .png
|   |---- *.csv
|   |---- .json
|----<some other folders>
```

In this case, you can select a folder that contains one or more folders of png images and then use the folder drop-down menu at the top to select the correct folder you want to annotate.

3 General Disclaimer

1. The manufacturer is not liable for damage to life, body or health or damage to property resulting from improper use. Please note that operating and/or connection errors are beyond our control. We cannot accept any liability for damage resulting from this.
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6. For more information about the warranty, please contact the manufacturer of the product.



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