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Getting Started
AI Loop
For Machine Vision Devices

EN

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1 Use for Intended Purpose

The software weHub (DNNF024) provides direct and seamless communication between the Machine Vision Device and AI Lab (https://ai-lab.wenglor.com/). It enables to upload data (e.g. images) from the Machine Vision Device to AI Lab for labeling of data and for training of AI models. Furthermore, it enables to download models from AI Lab to the Machine Vision Device in order to execute the model on the Machine Vision Device (in Module Image AI within the uniVision job).

Supported Machine Vision Devices:

- B60 Smart Camera
- MVC Machine Vision Controller

The weHub software is available for installation on Windows 10 and Windows 11 PCs. Furthermore, it is also available on the Machine Vision Controller MVC as part of the MVC firmware.

NOTICE

1. For details about the weHub software, check the operating instructions of DNNF024.
2. The weHub software creates a TCP connection to the Machine Vision Device. It uses the port 5558 for data upload and the port 5559 for model download. Make sure that the ports are not in use by another application and that the network does not block the ports.
3. The communication from the weHub software to AI Lab works via HTTPS on the ports 80 and 443.
4. It is recommended to use the weHub software on the Machine Vision Controller MVC only for collecting and exporting data (no internet support at the MVC). Use another PC with internet connection and installed weHub software for the AI Loop or for importing data.
5. Make sure to close the software via the icon tray and restart the weHub software in case of changes at the proxy or VPN settings of the PC.

The following steps are necessary for the AI Loop.

2 Basics about AI Loop

2.1 Introduction

Data is one of the biggest hurdles in AI adoption – especially when the training data does not reflect the complex realities of production environment. The AI Loop solves this by collecting training data and deploying the trained model right back to the camera.

2.2 Steps of the AI Loop

The following steps are necessary for the AI Loop.

Step 1: Define the goal

It all starts with a clear goal to define the visual feature that separates the classes. A strong definition avoids the common pitfall of human disagreement on labels. The performance of the model depends on solid data. It starts with a precise task setup.

Step 2: Set up the image acquisition

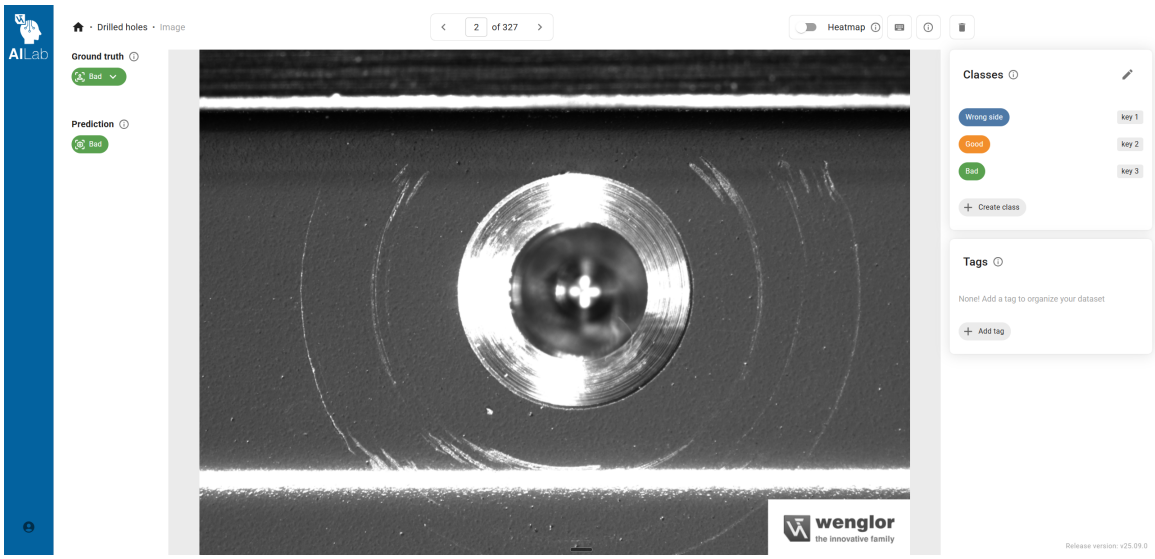
Set up the image acquisition at the camera. The criterion of a good image acquisition is whether it is possible to separate the classes with only the image. Make sure that the test object images cover the full range of class variations.

Step 3: Capture and upload images

Set up the uniVision 3 and weHub software for automatic image upload to AI Lab.

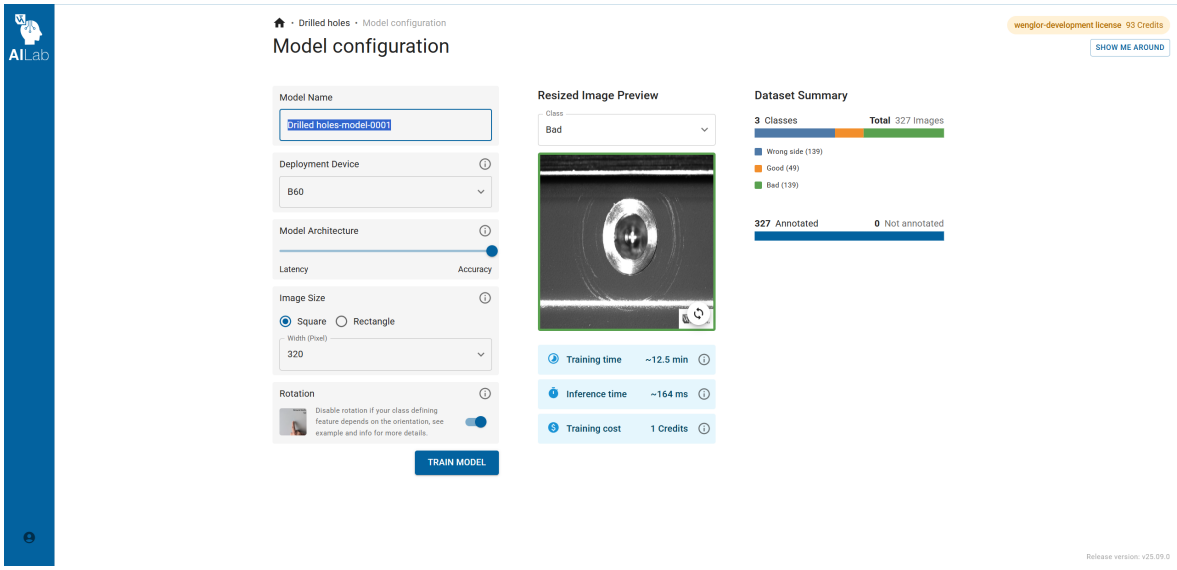
Step 4: Annotate images

Annotate the images in AI Lab. The model learns by looking at the images, making predictions about what they show and comparing them to the ground truth, which is the correct answer by you.



Step 5: Train model

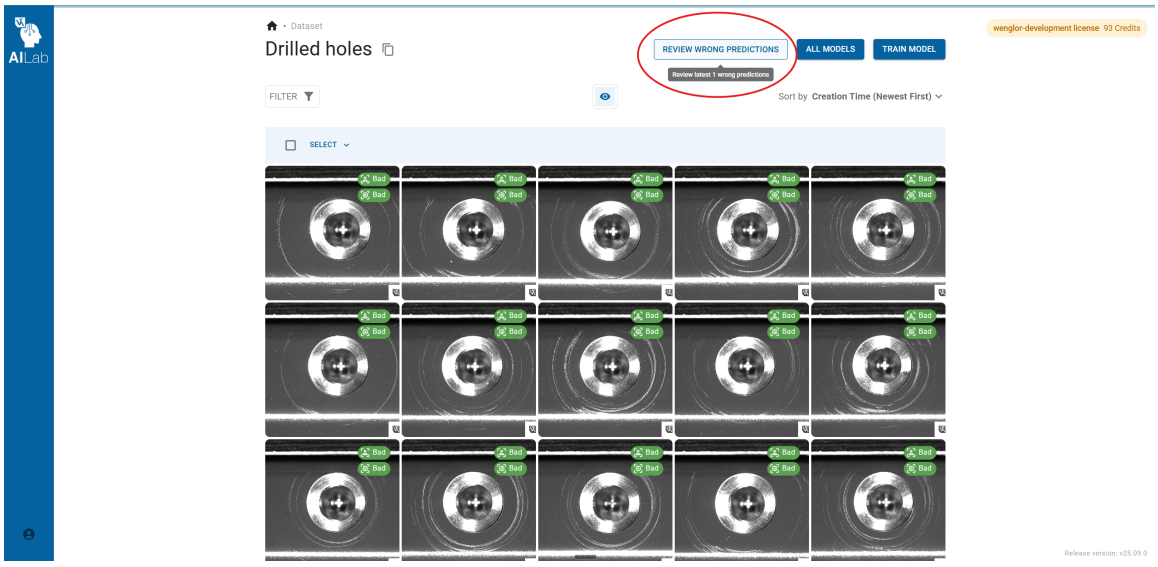
After annotating, continue with training the model. AI Lab requires a minimum of two classes and five images per class. However, a minimum of 50 images per class is recommended for training good models.



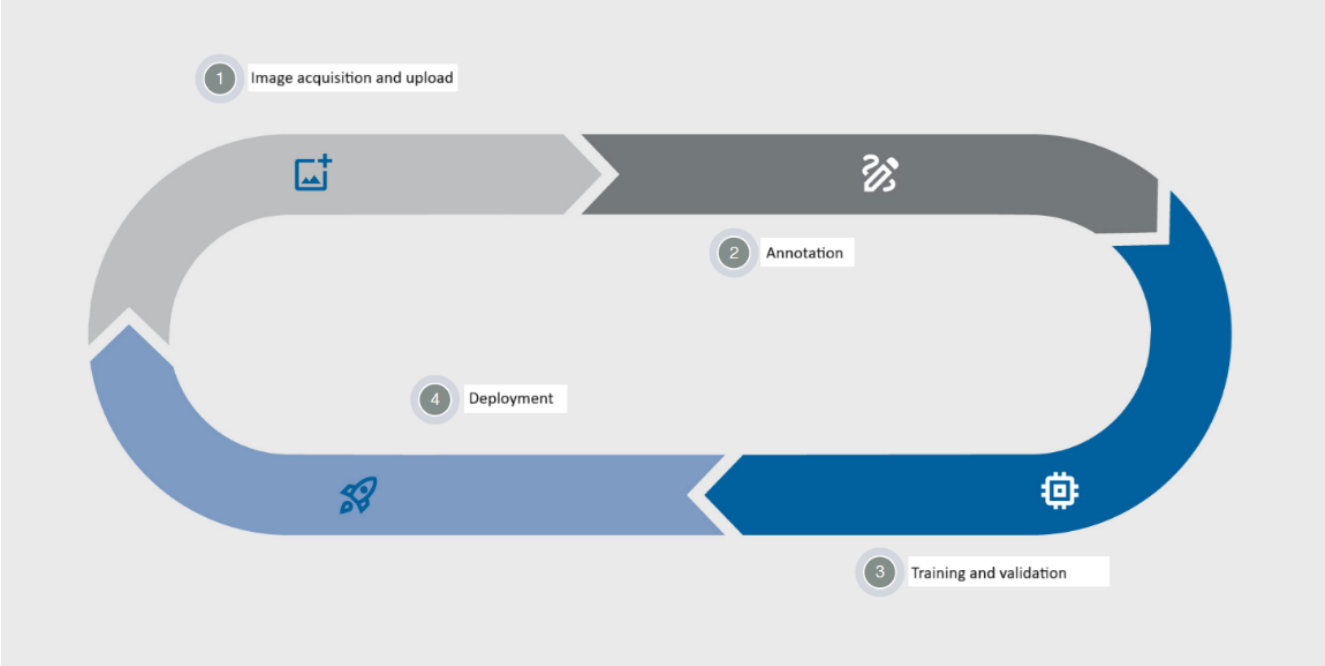
Step 6: Review and develop or iterate

After training, review the model. If it meets your needs, deploy it seamlessly. Go to the uniVision 3 software and load the latest or the primary model.

If the model is not performing well, optimize the data. Click on “Review wrong predictions” to identify issues where the ground truth or the prediction is wrong.



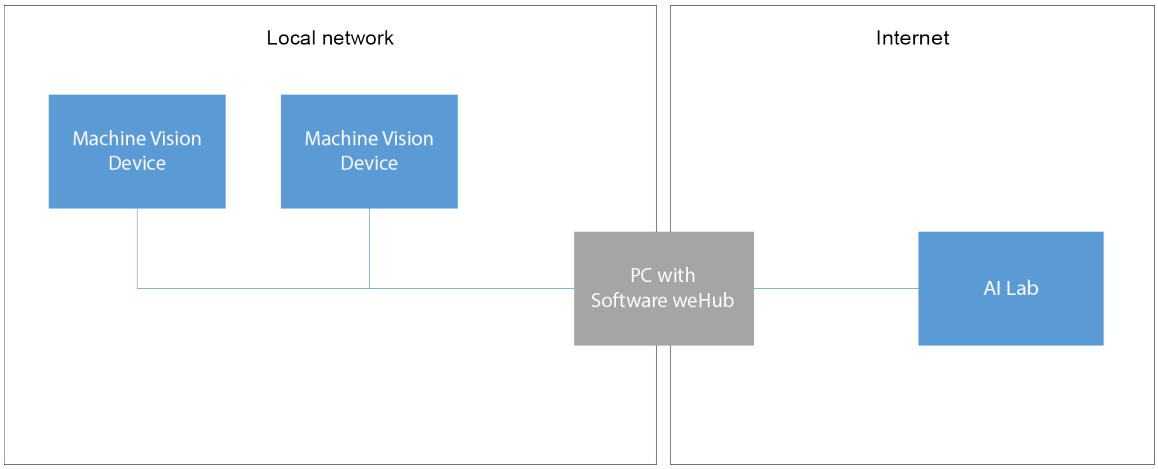
Fix ground truth errors, upload further data, retrain and check again. The data-centric and iterative workflow boosts accuracy gradually, while keeping everything actionable without requiring machine learning expertise.



2.3 Use Cases

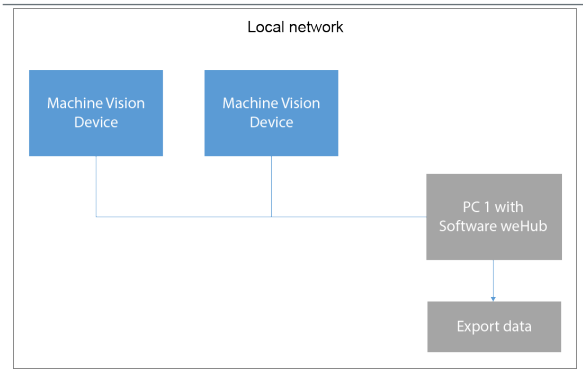
weHub with access to Machine Vision Device and AI Lab

Use the weHub software with access to AI Lab (requires internet connection) and to the Machine Vision Device in the local network in order to upload data and to download models (recommended).

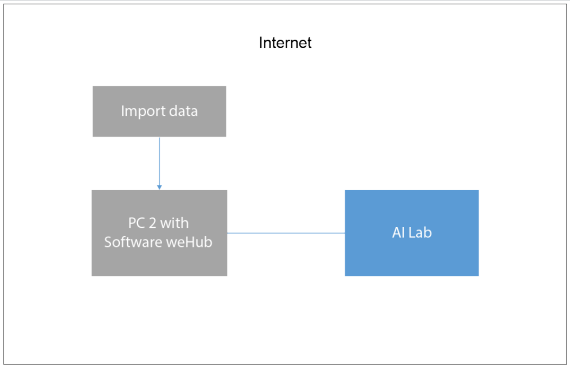


Export data at one weHub and import it in another weHub

Furthermore, it is possible to use one PC with the software weHub to collect and store data (e.g. images) in case of no internet connection at the PC. Once data collection is finished, export the data into a zip file in the software weHub. Copy the zip file to another PC with connection to AI Lab and import it in the software weHub (see section Import and Export Upload Data in weHub [▶ 17]). Importing requires a valid connection to AI Lab as it registers the Machine Vision Devices used for data collection in AI Lab. weHub uploads the data automatically to AI Lab. Model download via weHub is not supported in this use case. Alternatively, download the model in AI Lab, copy the model to the PC with access to the Machine Vision Device and load the model from file in Module Image AI (see section Load Model from File [▶ 22]).



Step 1: Collect and store data in weHub software on PC 1. Export data to zip file.

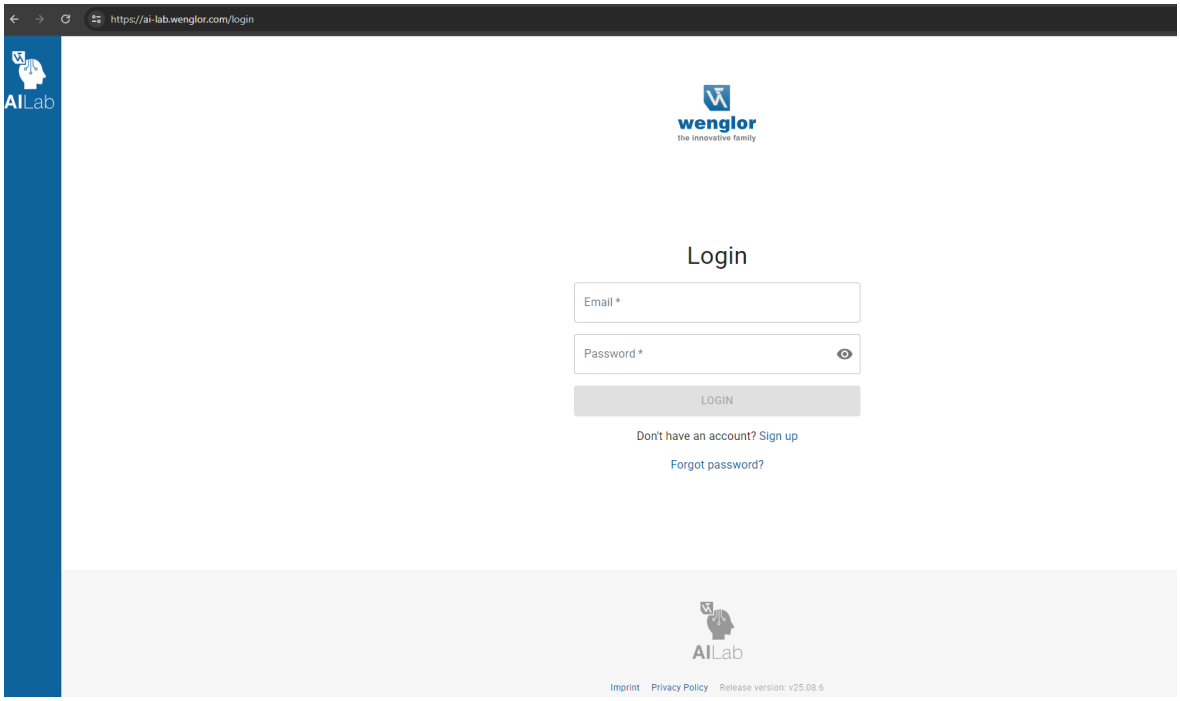


Step 2: Import and upload data to AI Lab on PC 2 (with AI Lab connection).

3 First Steps in AI Lab

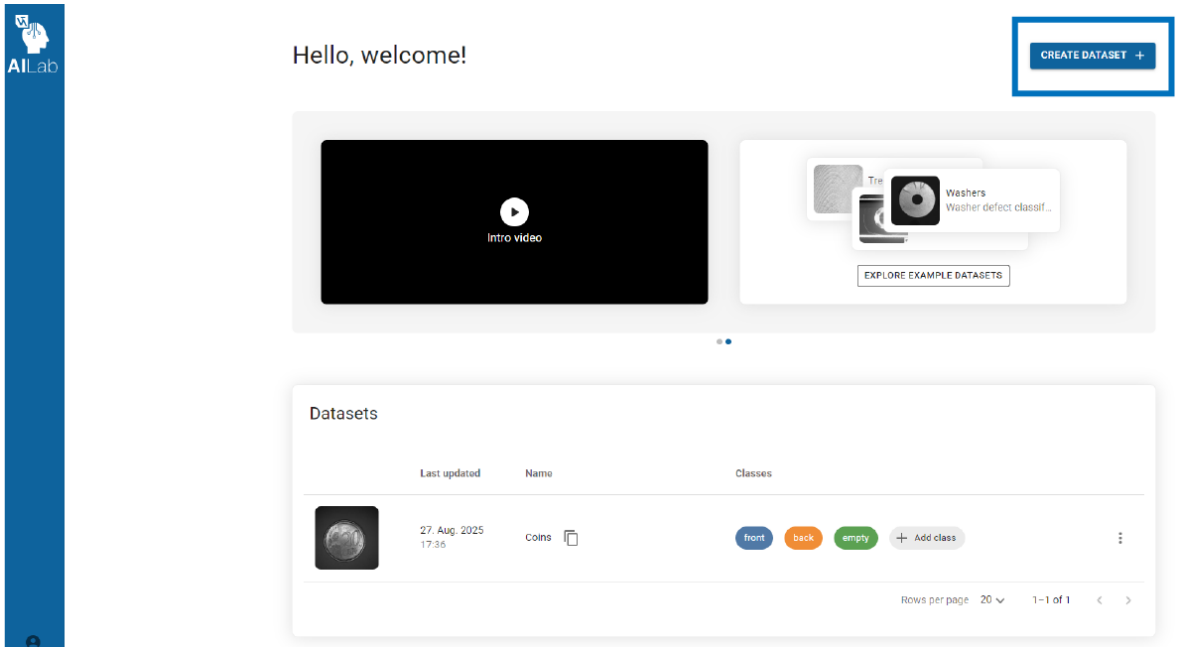
3.1 Registration

Open AI Lab (https://ai-lab.wenglor.com/), sign up and login.

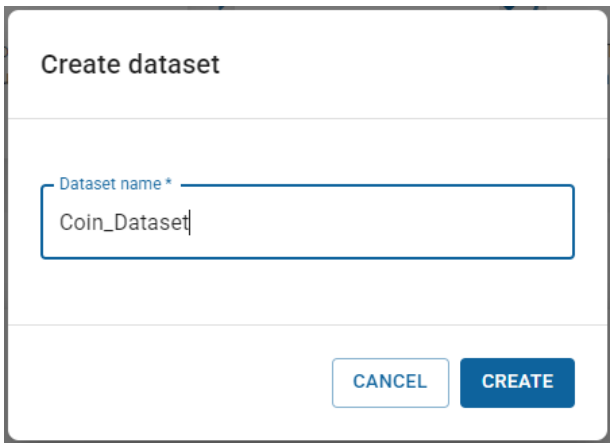


3.2 Create Dataset

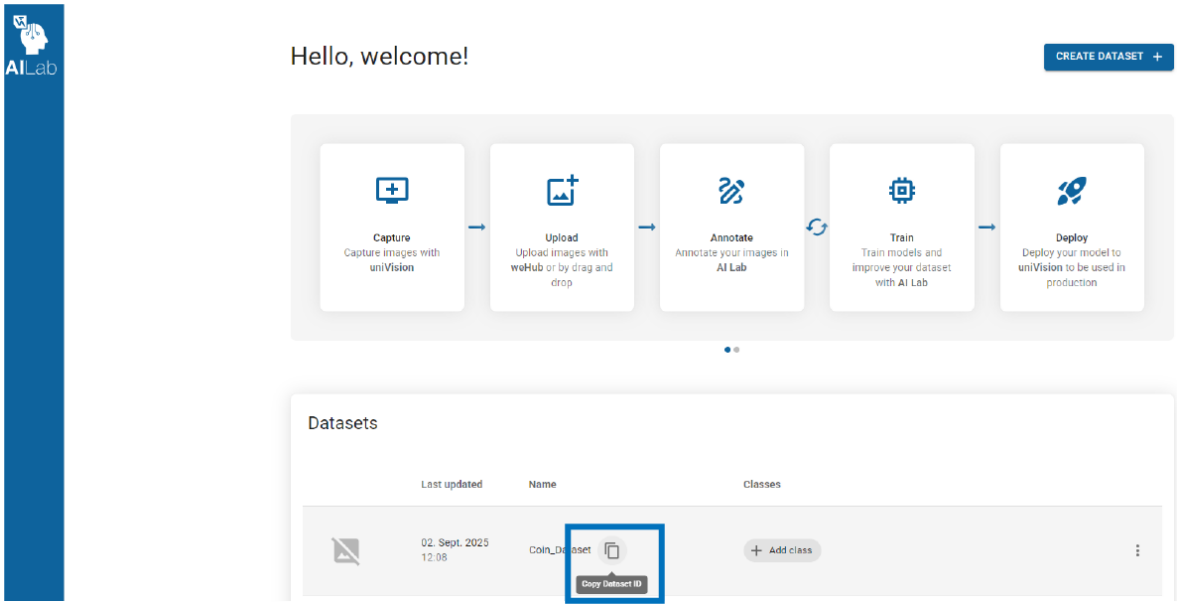
Create a dataset in AI Lab by pressing the button on the top right side.



Enter the name of the dataset.



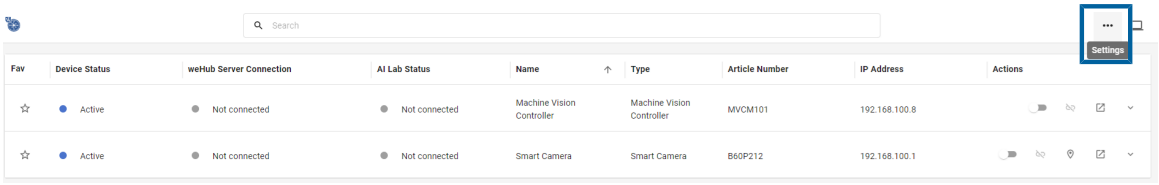
Copy “Dataset ID” from AI Lab in order to paste it later in Module Image AI (see section Enter AI Lab Dataset ID [▶ 15]).



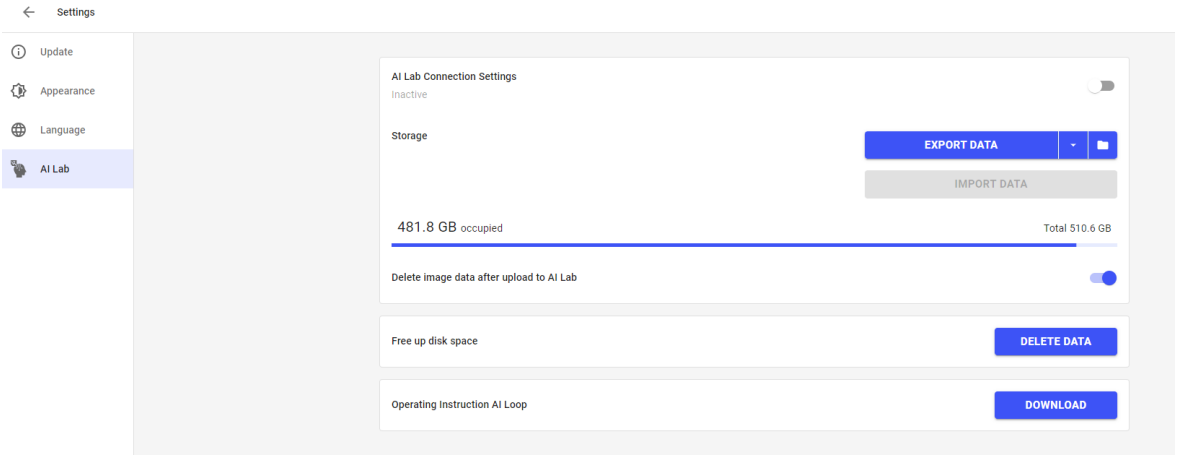
4 Software wenglor weHub

4.1 AI Lab Connection

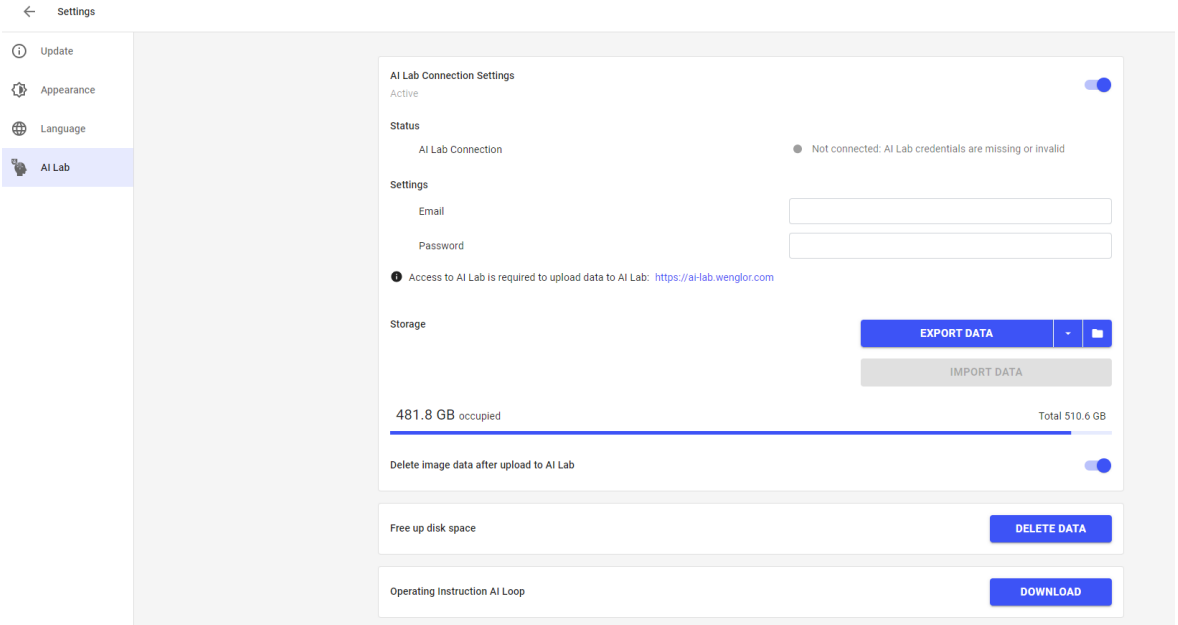
Start the software wenglor weHub (DNNF024). Click on the “Settings” icon on the top right side.



Select the side menu “AI Lab”.



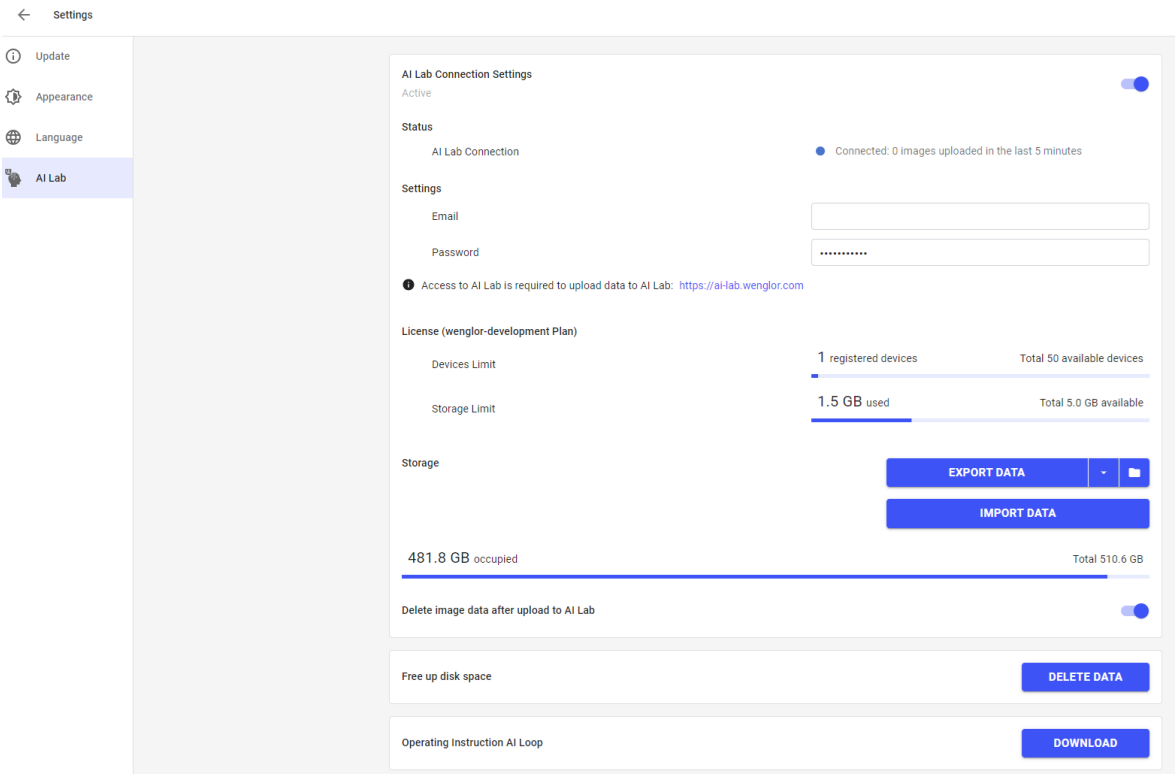
Enable “AI Lab Connection Settings” in order to connect from the weHub software to AI Lab.



Enter your AI Lab login data (“Email” and “Password”) to connect (see section Registration [▶ 8]). In case of a valid connection to AI Lab, the “AI Lab Connection” status switches to “Connected”.

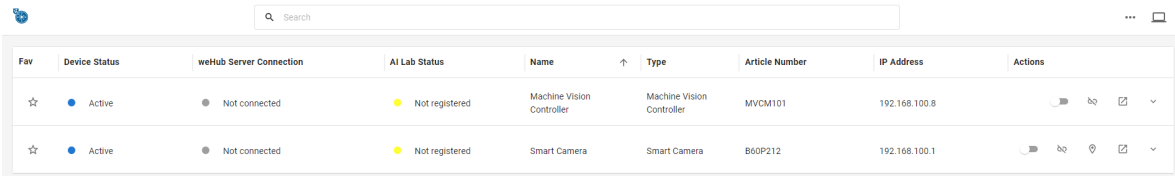
NOTICE

Login is only possible with an administrator account of AI Lab as it requires to register and unregister Machine Vision Devices in AI Lab.

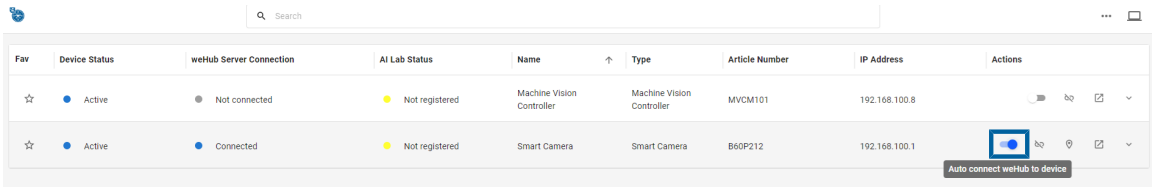


4.2 Connect to Device

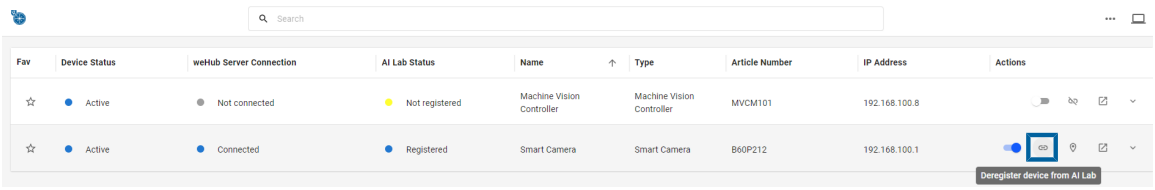
Go back to the main page of the weHub software. The “AI Lab Status” of the Machine Vision Devices shows “Not registered” and the “weHub Server Connection” shows “Not connected”.



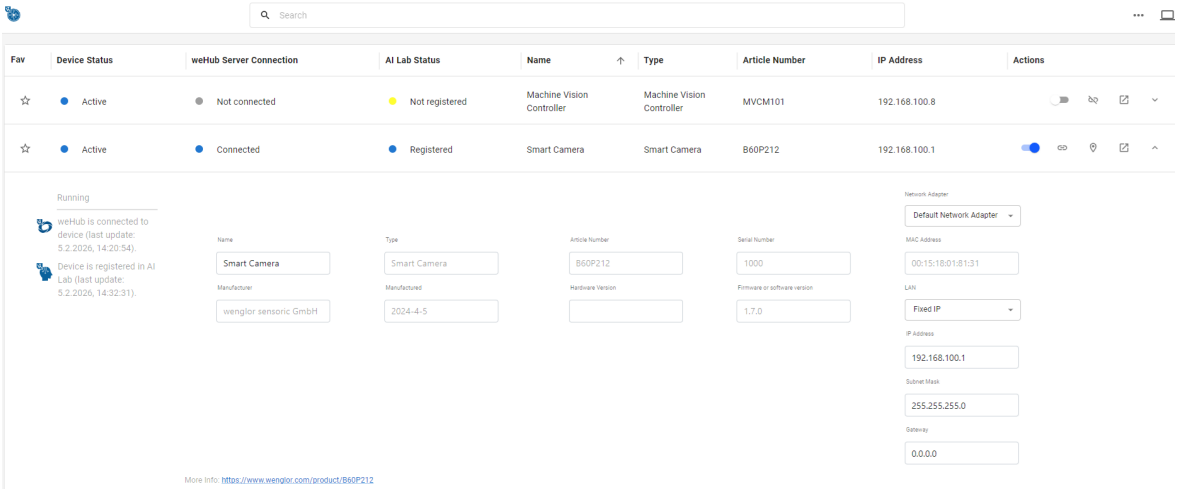
Activate at the relevant Machine Vision Device at “Actions” the slider “Auto connect weHub to device” in order to connect to the device. It is only possible if the weHub Server is active on the Machine Vision Device (see section weHub Server [▶ 13]) and if the device is accessible by the weHub software within the network.



Furthermore, click at "Actions" on the button "Register device in AI Lab" in order to register the Machine Vision Device in AI Lab.

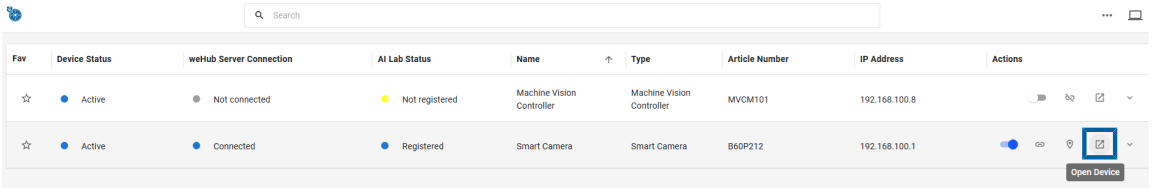


In case of a valid device connection and registration, opening the extended view of the Machine Vision Device provides further info about the connection to the Machine Vision Device and to AI Lab.



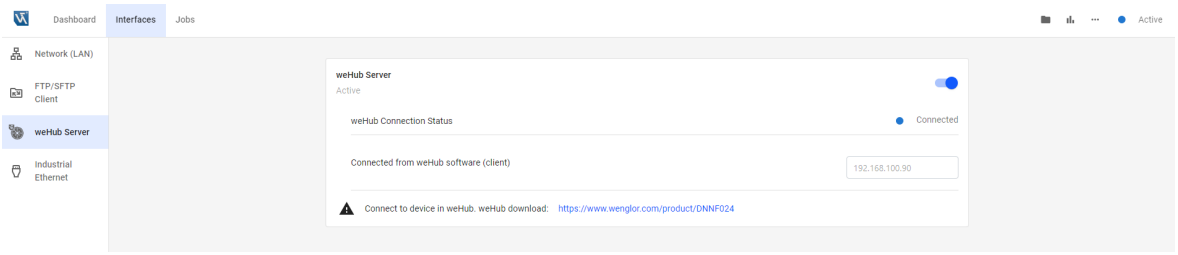
5 Device Website of Machine Vision Device

Open the device website of the Machine Vision Device via clicking on “Open Device” in the weHub software.



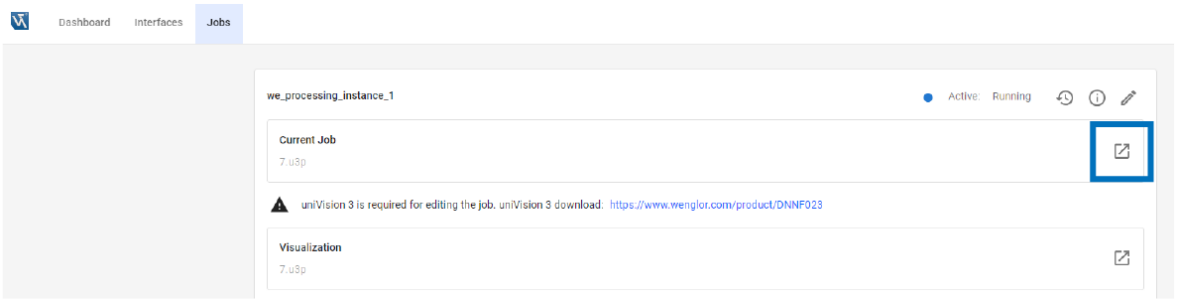
5.1 weHub Server

On the device website of the Machine Vision Device, click on the tab “Interfaces” → “weHub Server” in order to see the weHub Server settings. By default, the weHub Server is active. The “weHub Connection Status” shows if any weHub client software is connected to the Machine Vision Device. If connected, it also shows the IP Address of the device where the weHub software runs.



5.2 Jobs

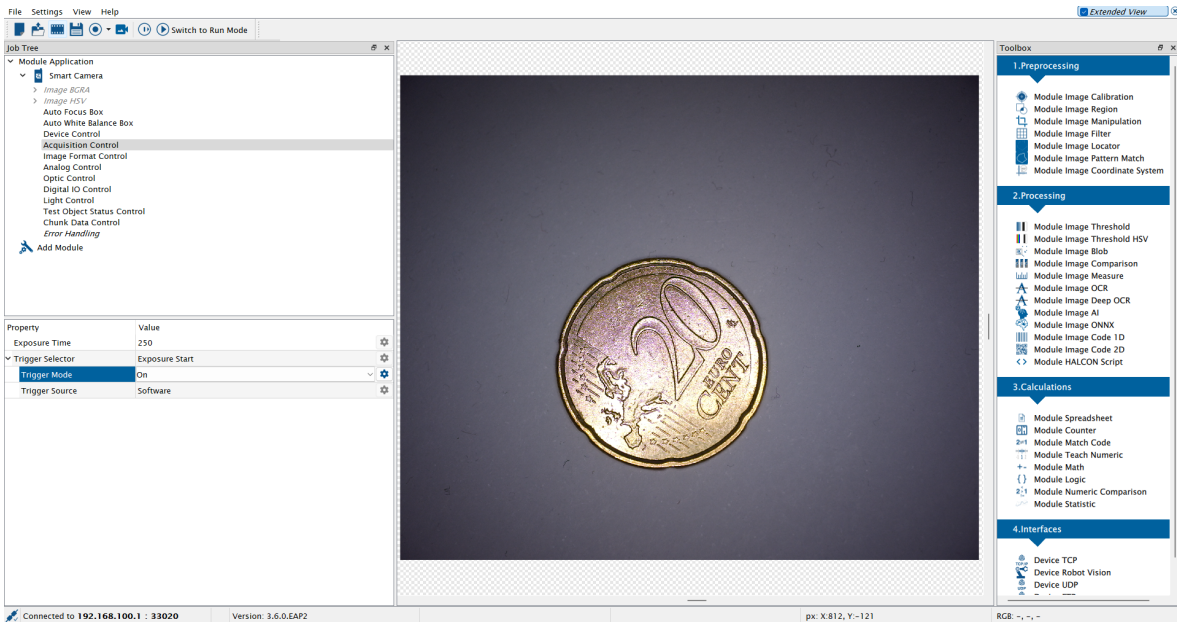
Click on the tab “Jobs” and open the “Current Job”. Make sure that the correct version of the software wenglor uniVision 3 is installed (DNNF023). On the MVC Machine Vision Controller, make sure to create a Processing Instance with the relevant input device at first. For details, see operating instructions of the Machine Vision Controller MVC.



6 Software wenglor uniVision 3

6.1 Camera Settings

Open the camera settings of the input device in the software wenglor uniVision 3. Adjust focus and brightness of the camera to get a sharp and well-illuminated image. Set the trigger mode accordingly at “Acquisition Control”.

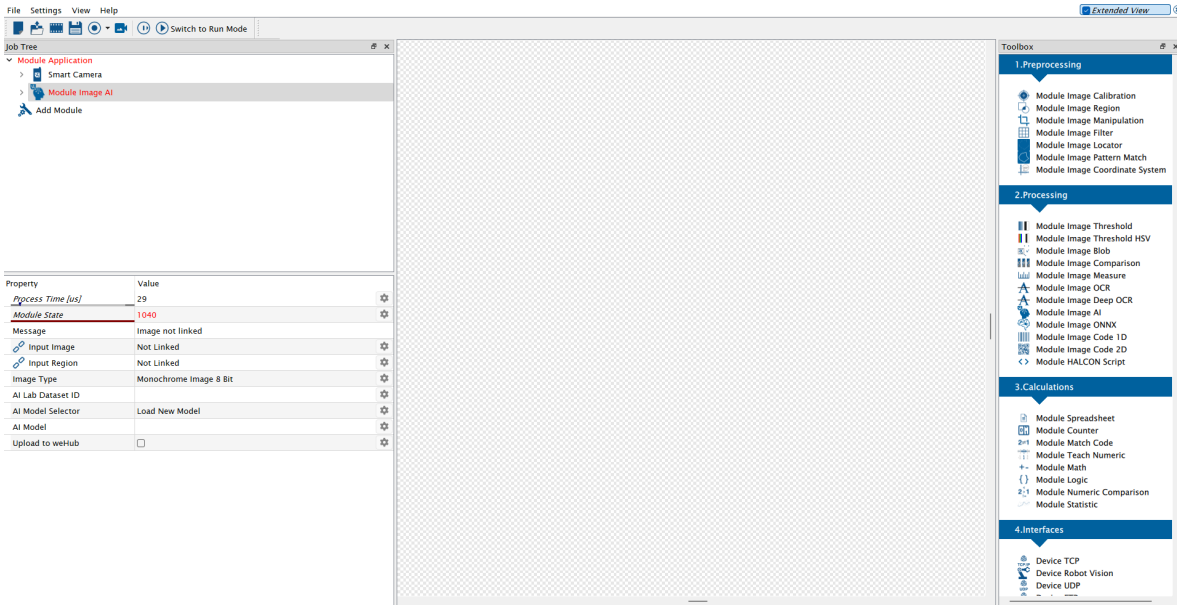


6.2 Pre-Processing Modules

Optionally, add pre-processing modules from the toolbox to the uniVision job in order to define a region of interest (via Module Image Region). It is also possible to track the region by an object (e.g. via Module Image Locator) or to filter the image (via Module Image Filter). For details, see operating instructions of DNNF023.

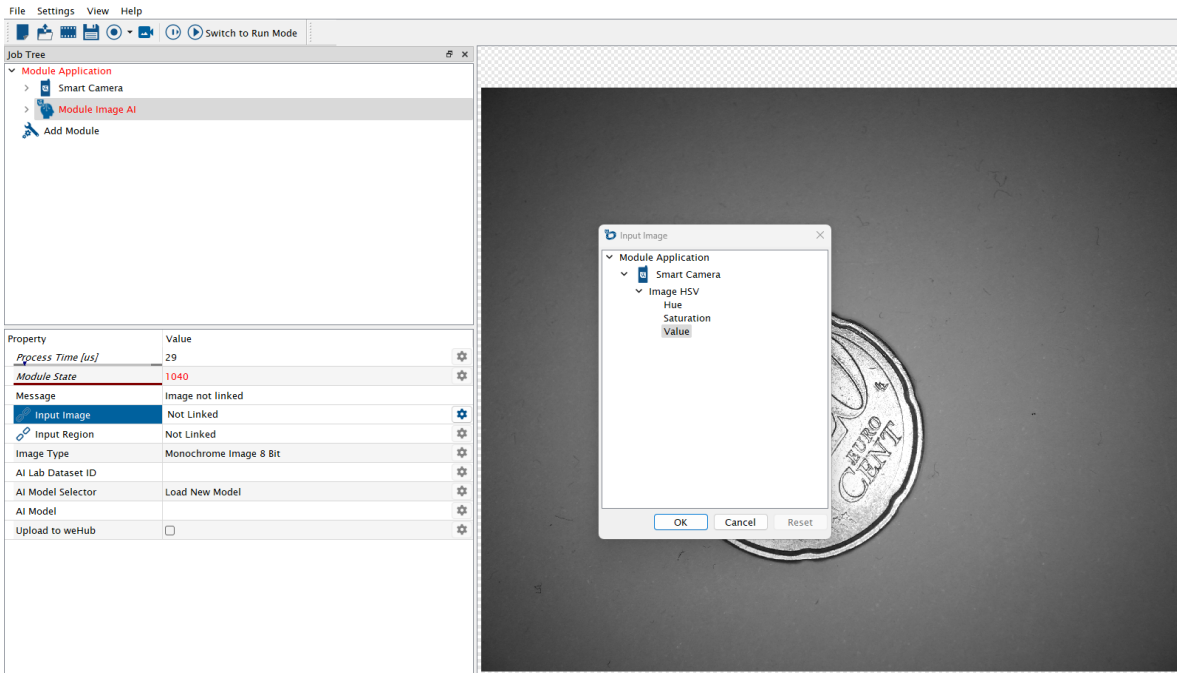
6.3 Data Upload to weHub in Module Image AI

Add “Module Image AI” from the toolbox to the uniVision job.



6.3.1 Link Input Image

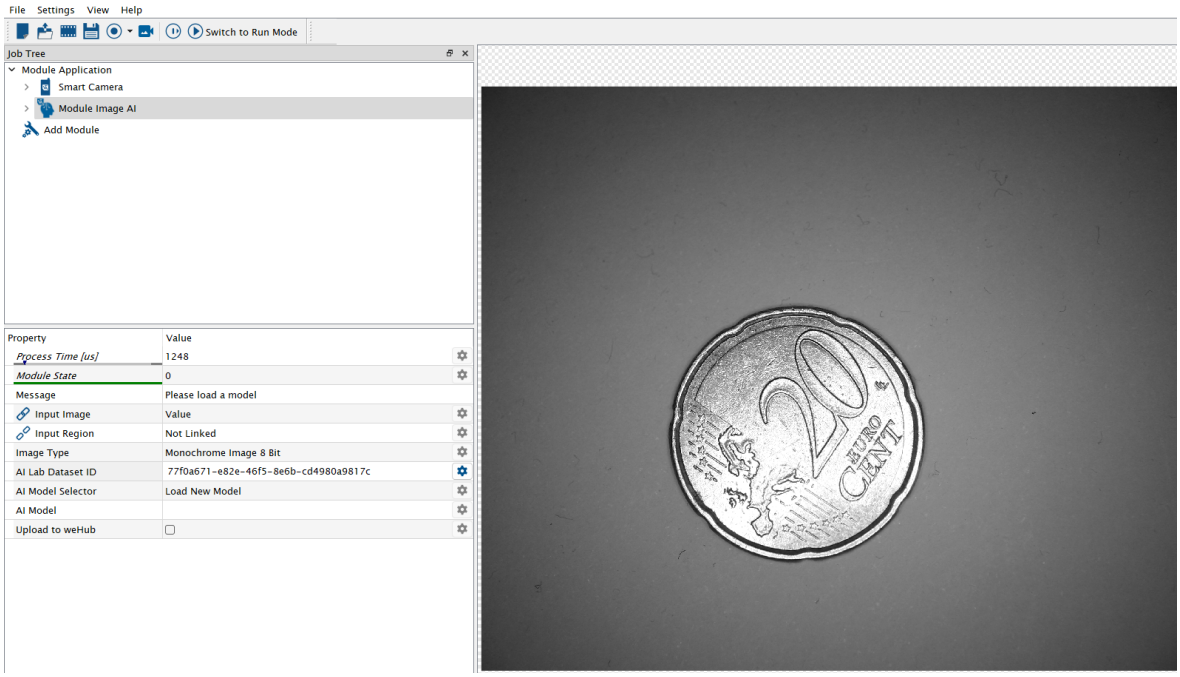
In case of a monochrome camera, directly link the “Input Image”. In case of a color camera, keep “Image Type” to “Monochrome Image 8 Bit” or switch to “Color Image 32 Bit”. In case of “Color Image 32 Bit”, link the “Input Image” to the “BGRA” image of the input device. In the example, the “Value” channel of the HSV image from a color camera is linked to the monochrome input image of Module Image AI.



6.3.2 Enter AI Lab Dataset ID

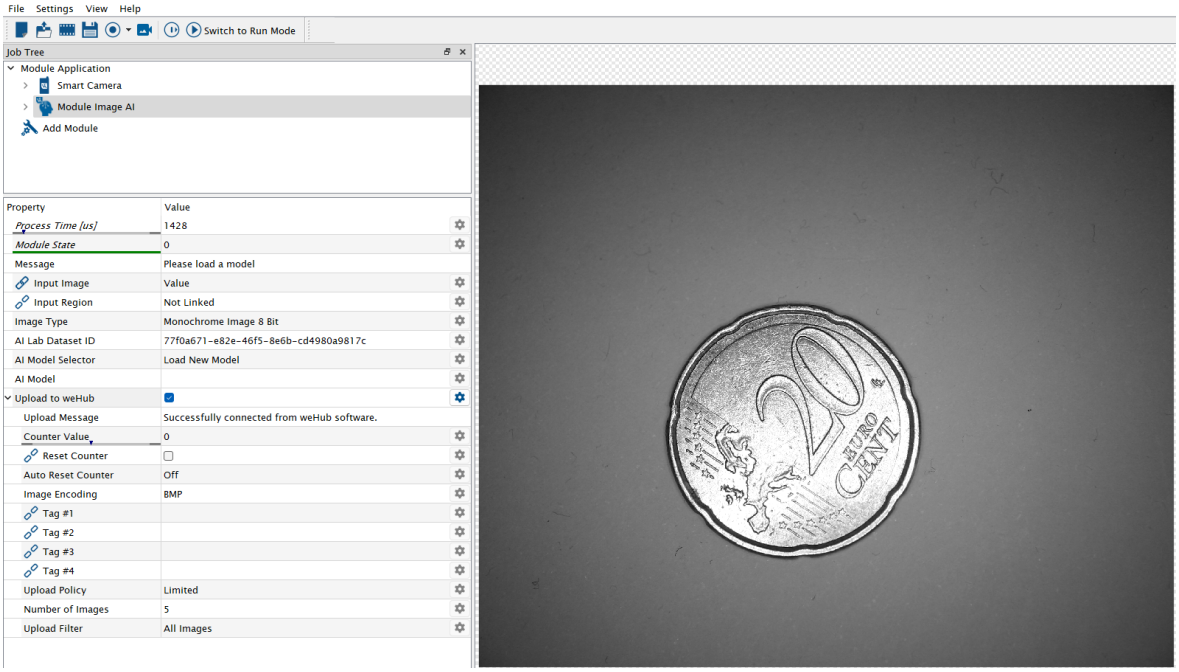
The AI Lab Dataset ID is the key for the AI Loop between the Machine Vision Device and AI Lab. It defines for the Machine Vision Device to which dataset to upload data to AI Lab and from which dataset to get the model.

Copy the Dataset ID at AI Lab (see section Create Dataset [▶ 8]) and paste the “AI Lab Dataset ID” in “Module Image AI”.

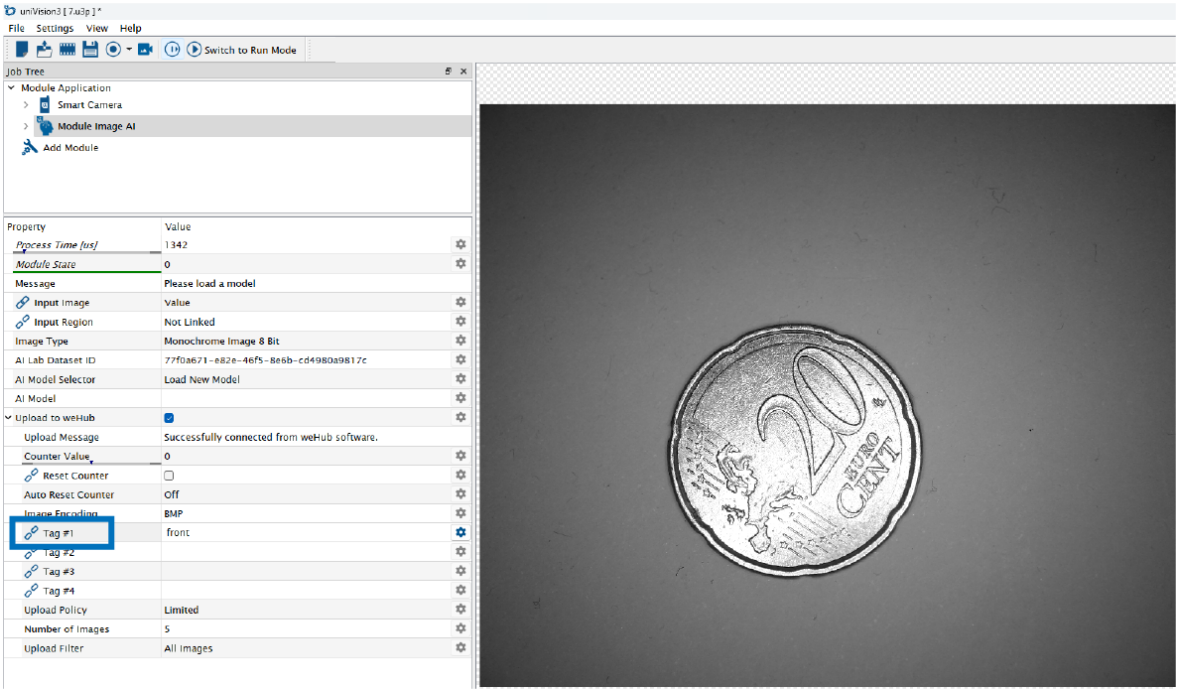


6.3.3 Activate Upload to weHub

Activate “Upload to weHub” in order to upload data from the Machine Vision Device to AI Lab via the weHub software. By default, image upload is limited to five images in order to prevent unintentional upload of a large amount of data. Reset the counter so that the counter starts again at zero for further uploads or adjust the upload settings according to your needs.



Add tags (fix or linked with job result) in order to annotate the data in AI Lab later in an easy way. The example shows the fix tag “front” for the front side of the coin. For such example, interesting classes are “front”, “back” and “empty”.



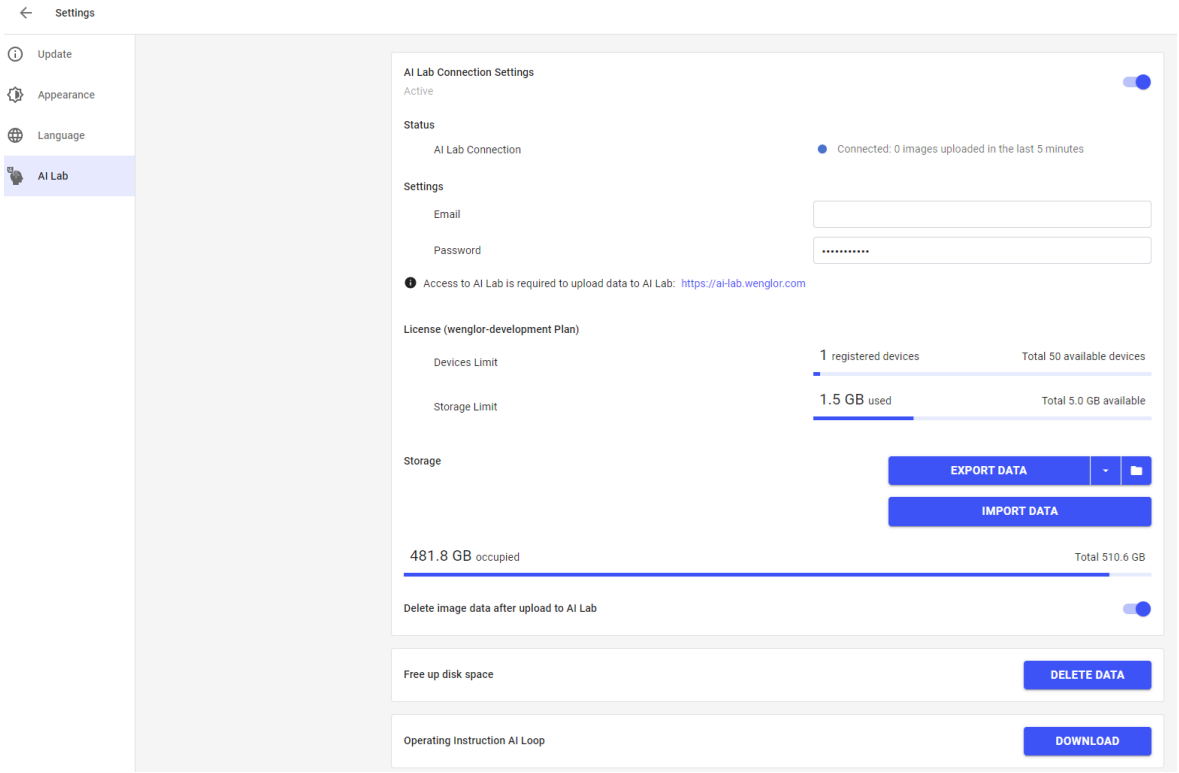
Capture several images of each class and upload the data via the weHub software to AI Lab.

7 Import and Export Upload Data in weHub

If the PC with the software weHub has no internet connection, use the weHub software to collect and store the upload data locally. Once data collection is finished, export the data into a zip file in the software weHub. Copy the zip file to another PC with connection to AI Lab and import it in the software weHub. Importing requires a valid connection to AI Lab as it registers the Machine Vision Devices used for data collection in AI Lab. weHub uploads the data automatically to AI Lab.

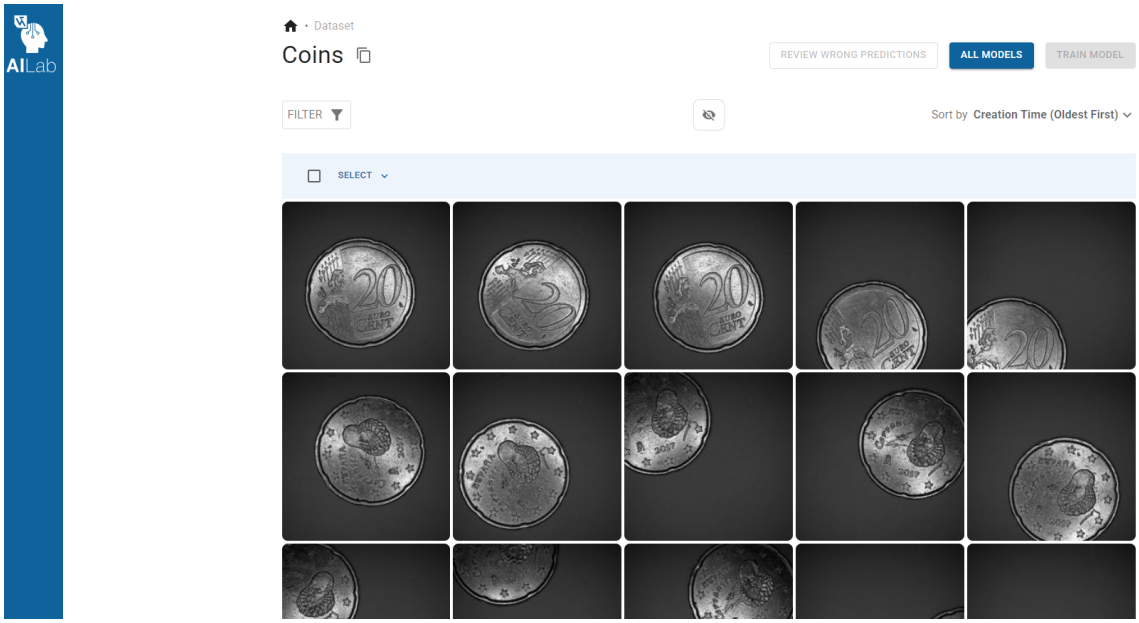
Open the software wenglor weHub, click on the “Settings” icon and then in the side menu on “AI Lab” to access the export and import functionality:

- Export data: Exports the data to a zip file (without deleting them).
- Export and delete the data: Exports the data to a zip file (and deletes them).
- Import data: Opens the upload file window to import backup files. It requires to delete existing data (e.g. images) in weHub. The import data functionality is only available in case of a valid connection to AI Lab as weHub registers the Machine Vision Devices used for data collection in AI Lab during the data import.



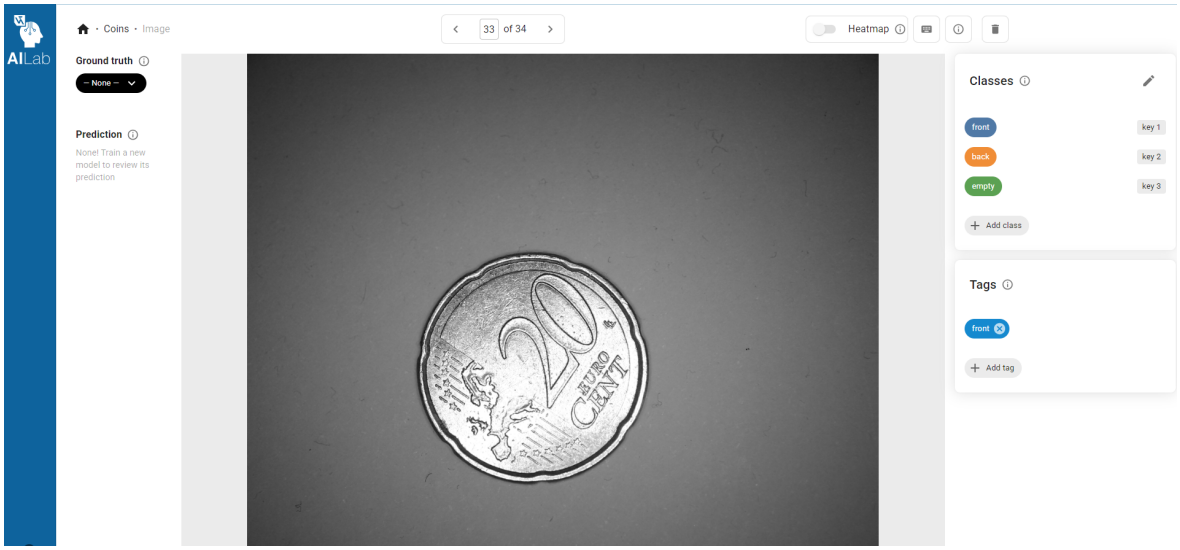
8 Labeling and Training in AI Lab

The uploaded data (images) appear in AI Lab at the corresponding dataset.



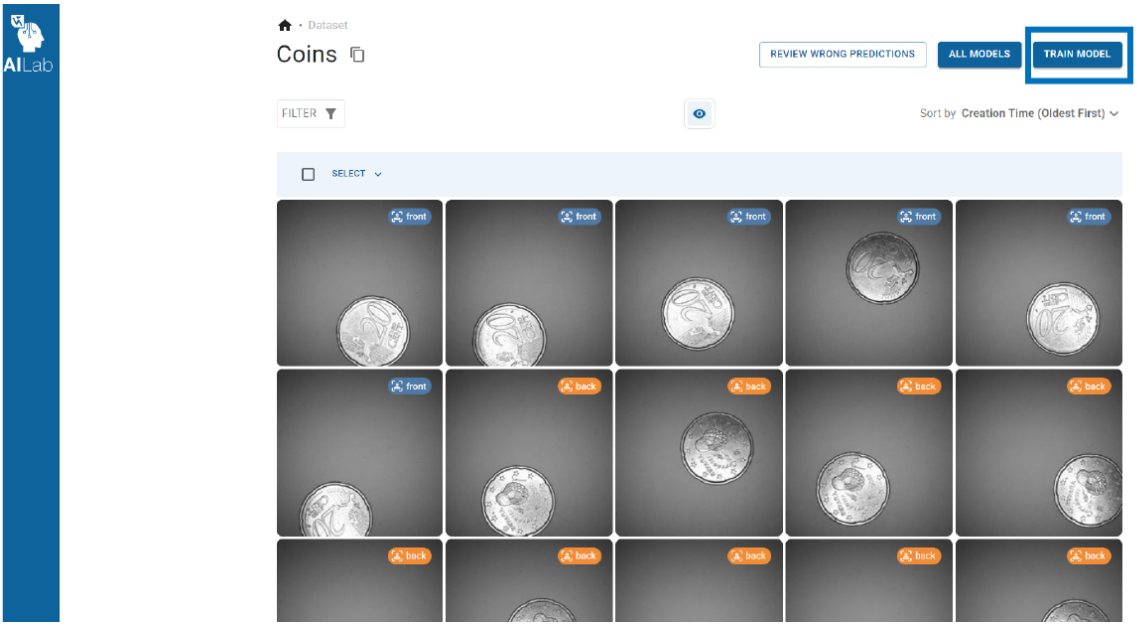
8.1 Annotate Data

For Multi Class Classifications create several classes and add exactly one of the classes to each image (via setting the “Ground truth”). For easier annotation, check or filter by tags. The tag can be added to the image in Module Image AI (see section Activate Upload to weHub [▶ 16]).

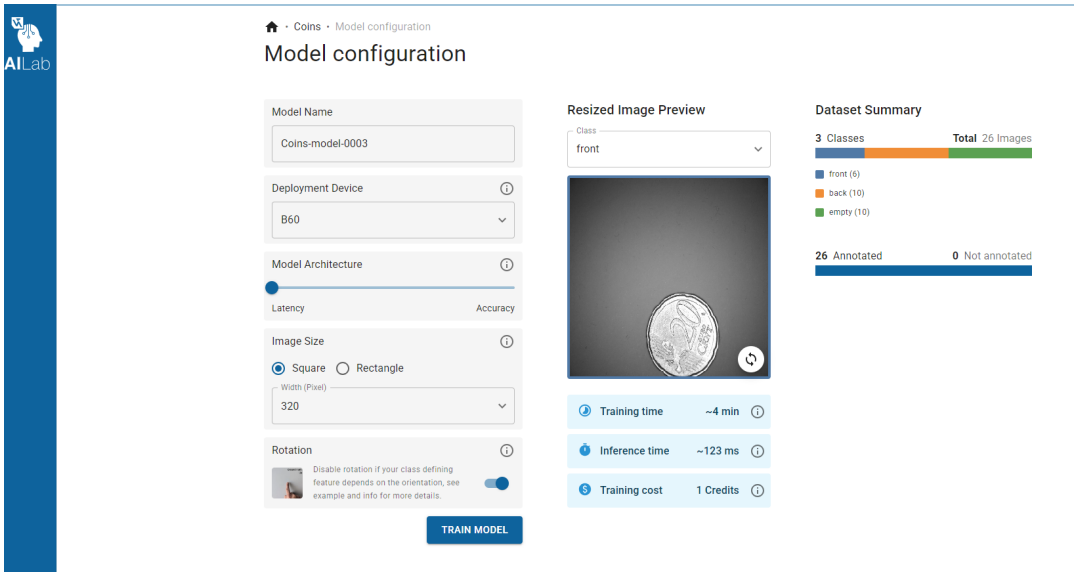


8.2 Train Model

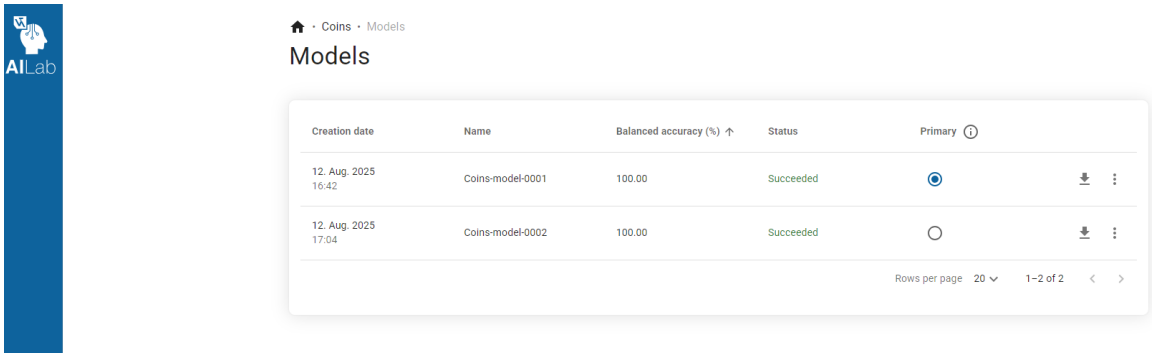
After annotating all images, click on the “Train Model” button (on top right side) to train the model.



Adjust the model settings and start training the model.



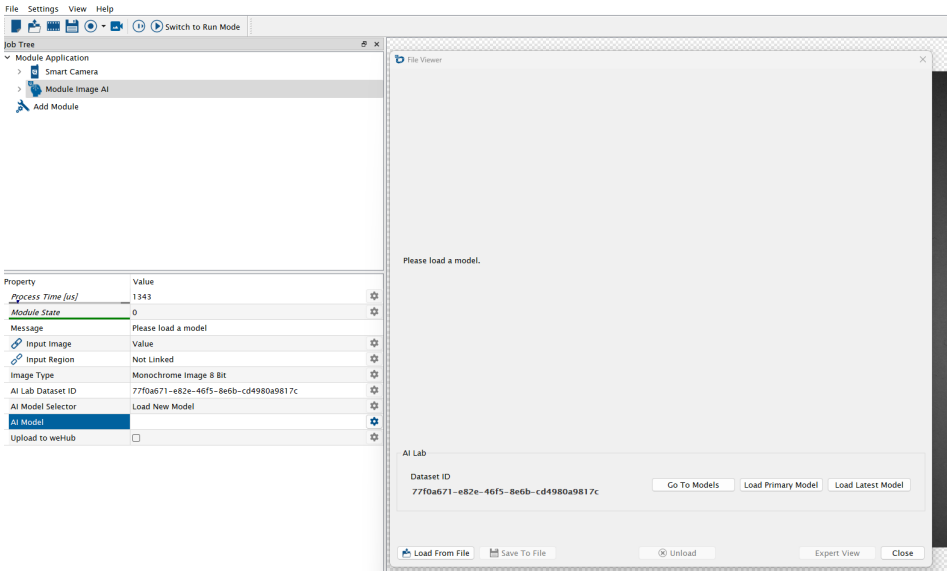
Check the trained models at “All Models”. Make sure to set the “Primary” flag for the model used when downloading the model to the Machine Vision Device via the weHub software (see section Model Download to Module Image AI via weHub [▶ 21]).



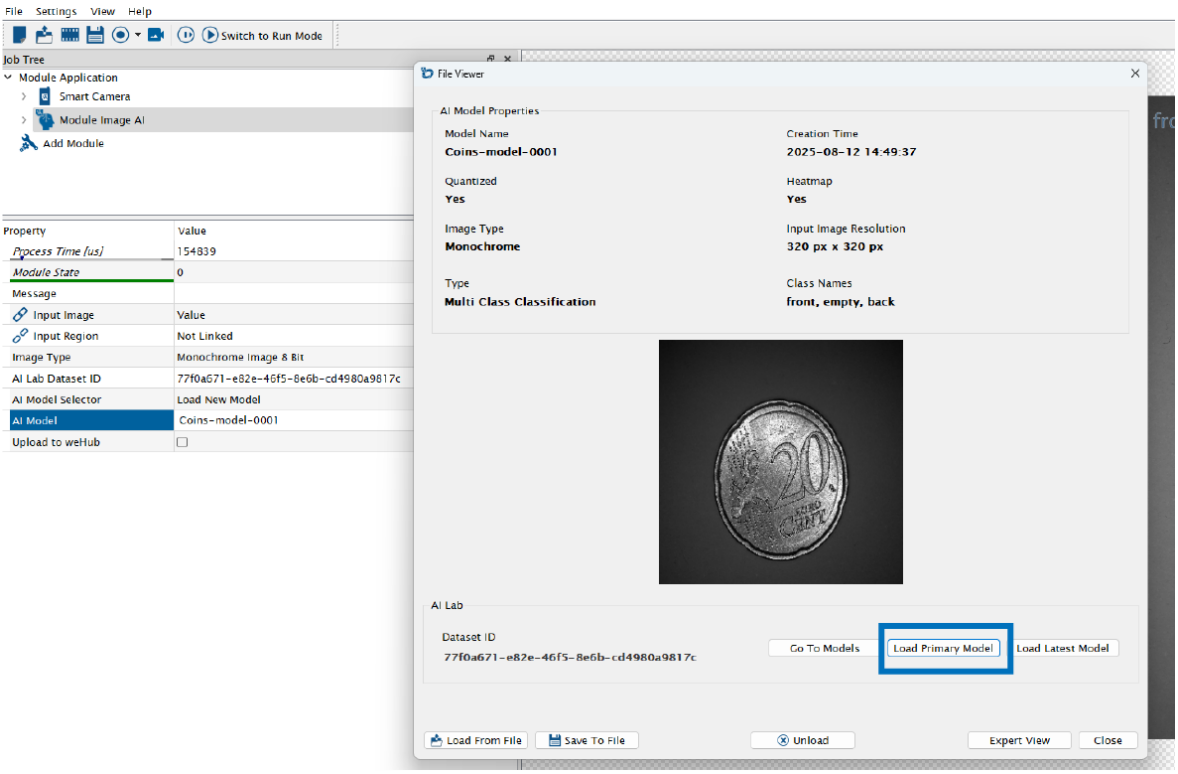
9 AI Model in Software wenglor uniVision 3

9.1 Model Download to Module Image AI via weHub

Open Module Image AI in the software wenglor uniVision 3. Add the “AI Lab Dataset ID” as it is the key for the Machine Vision Device to download the model of the corresponding dataset of AI Lab (see section Create Dataset [▶ 8]). Click on the settings icon at “AI Model” to open the File Viewer.



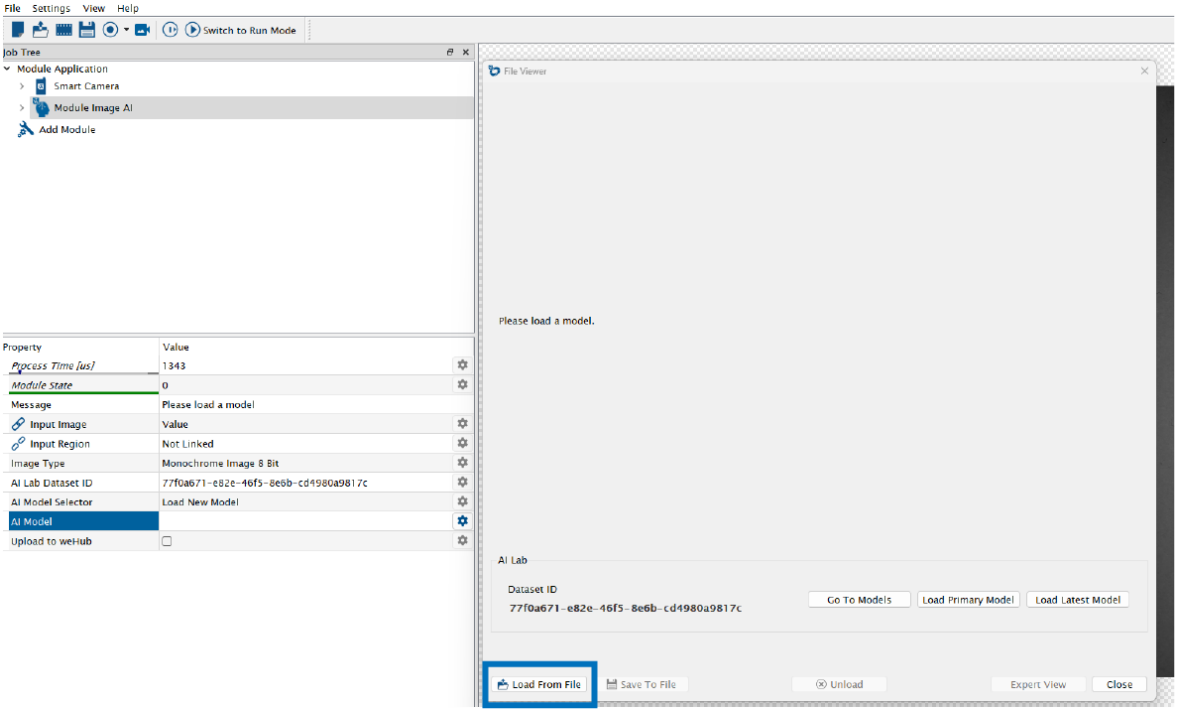
Click for example on the button “Load Primary Model” to download the model marked with “Primary” in AI Lab (see section Train Model [▶ 19]). After successful model download, the file viewer shows the AI model properties and the preview image.



Close the dialogue to run the model in Module Image AI.

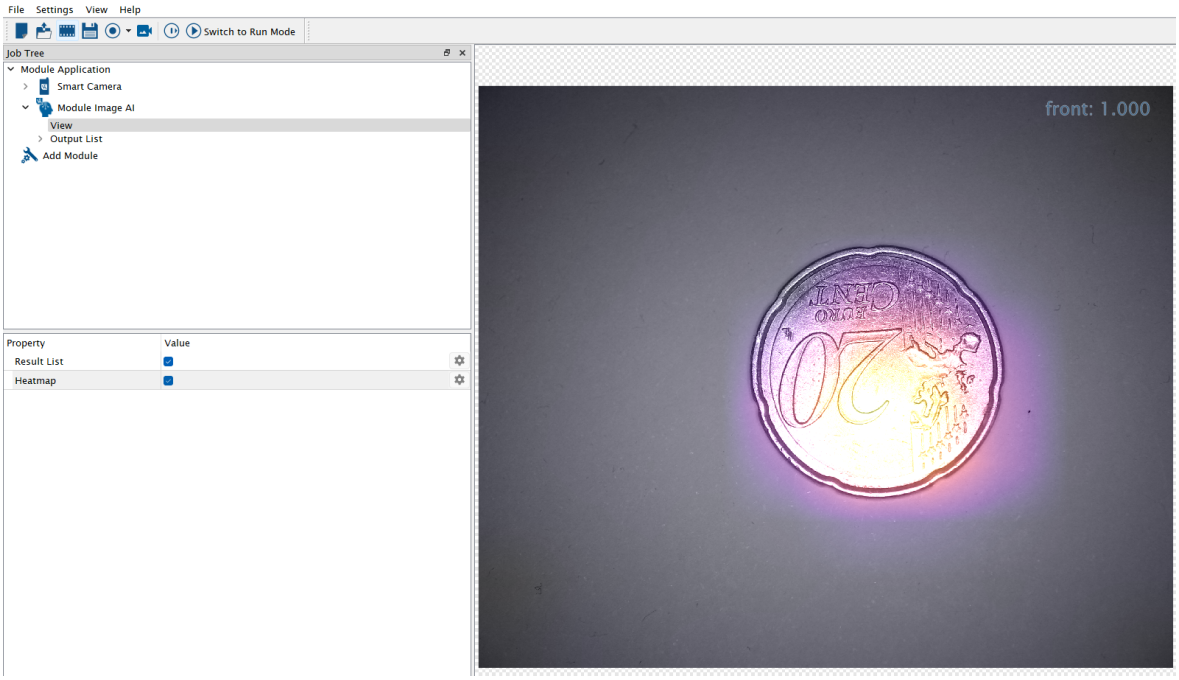
9.2 Load Model from File

In case if no simultaneous connection from weHub to the Machine Vision Device and to AI Lab, download the model directly in AI Lab and manually load it from file in Module Image AI within the uniVision job.



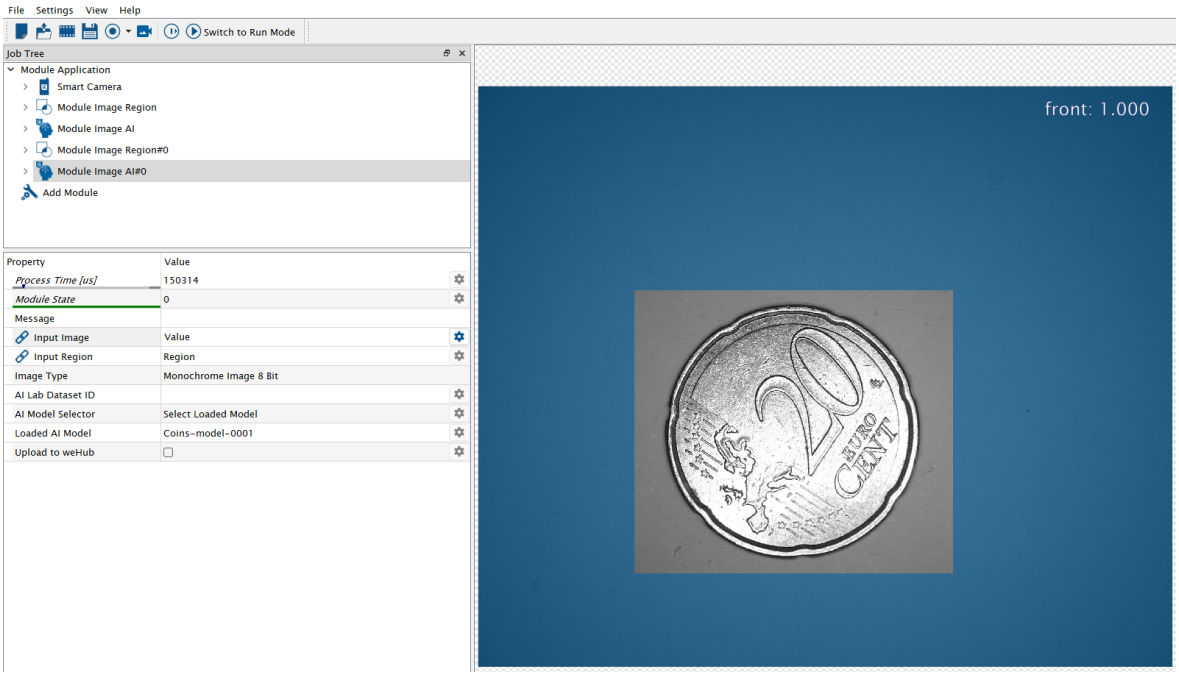
9.3 Heatmap

Open the sub-module “View” to activate the heatmap as overlay in the image in case of multi class classifications. Use it in order to validate the model and to understand if the model evaluates the correct part of the image. If a wrong part is used, check and improve your training data, collect more training data and retrain the model.



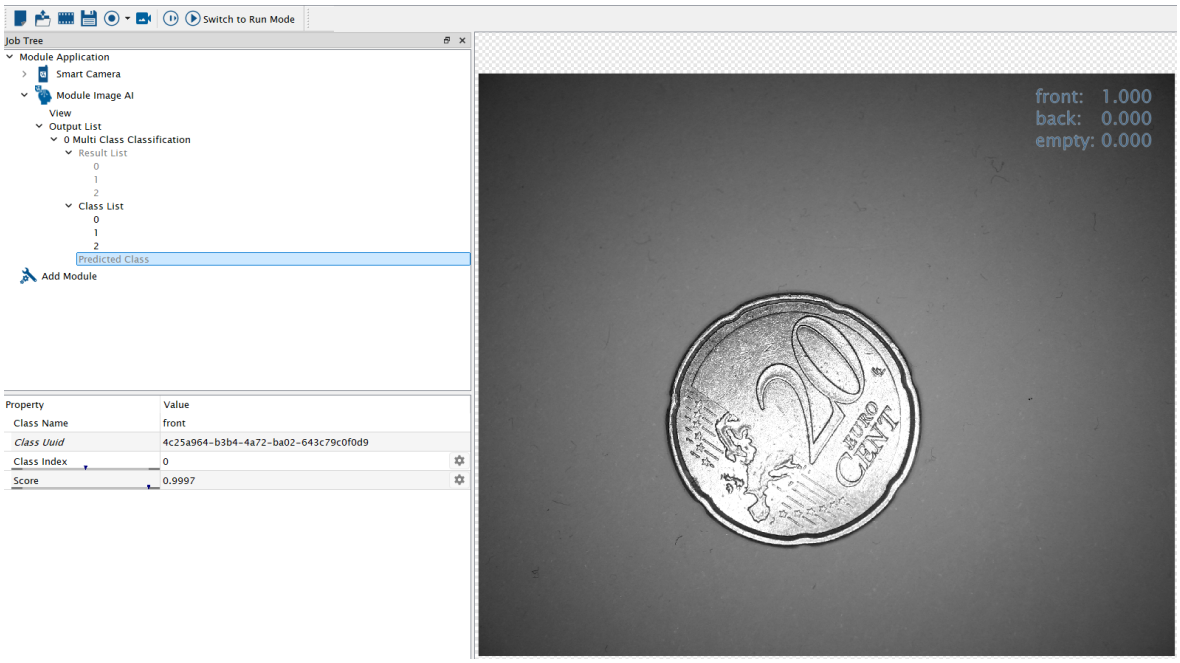
9.4 Link to AI Model of another Module Image AI

Module Image AI allows to link in a second Module Image AI to the model of the first Module Image AI. This is for example helpful in case of using the same model for several regions within the image. Set “AI Model Selector” to “Select Loaded Model” and link the AI model at “Loaded AI Model”. Not loading the same model in several modules reduces RAM on the Machine Vision Device (especially important on Smart Cameras).



9.5 Outputs of Module Image AI

At multi class classifications, the outputs of Module Image AI contain the Result List, the Class List and the Predicted Class with the class name and the score.



Link the outputs of Module Image AI to other modules or to output interfaces. Then, save the uniVision job on the Machine Vision Device.

NOTICE

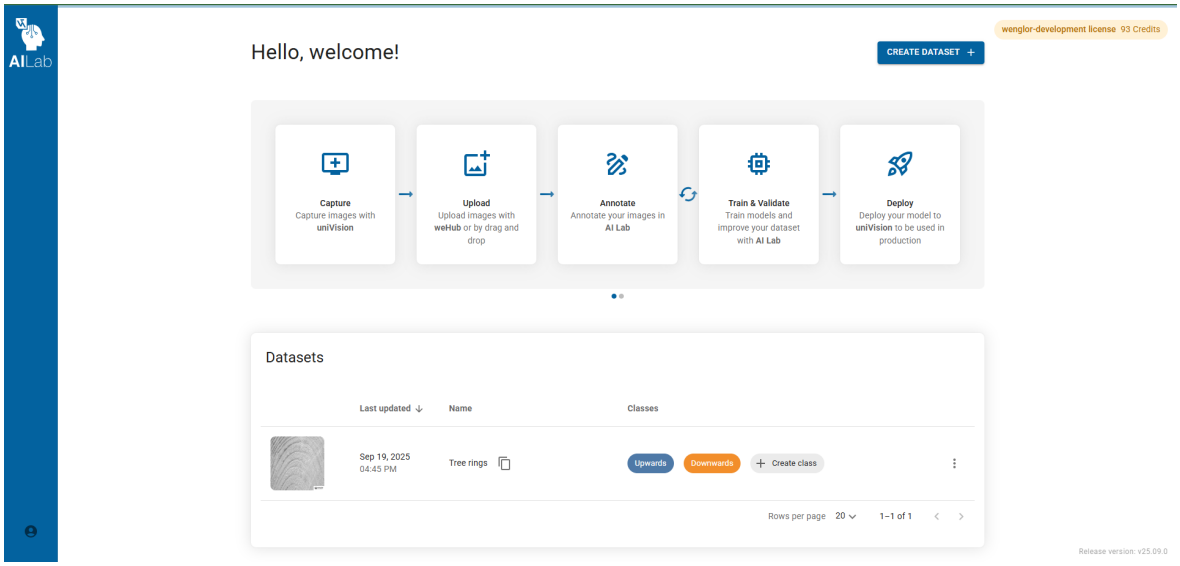
For details about the wenglor uniVision 3 software, check DNNF023.

10 Quick Tour of AI Lab

AI Lab enables to train deployment-ready AI models with a data-centric approach. It contains the following main pages.

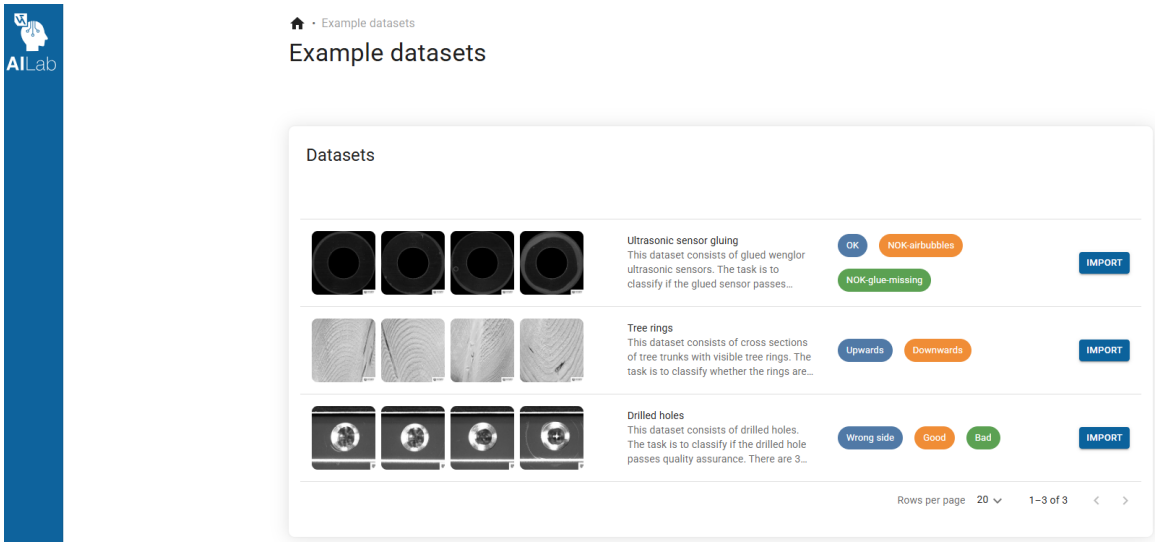
Datasets page

It contains all datasets that belong to the account. A dataset contains images, annotations and models. Click the dataset to go to the dataset page.



Example datasets page

It contains a set of example datasets to explore AI Lab. Click “Import” to add one of the examples to your account.



Dataset page

It contains the images of the dataset. Select several images in order to assign the ground truth, to add tags or to delete images.

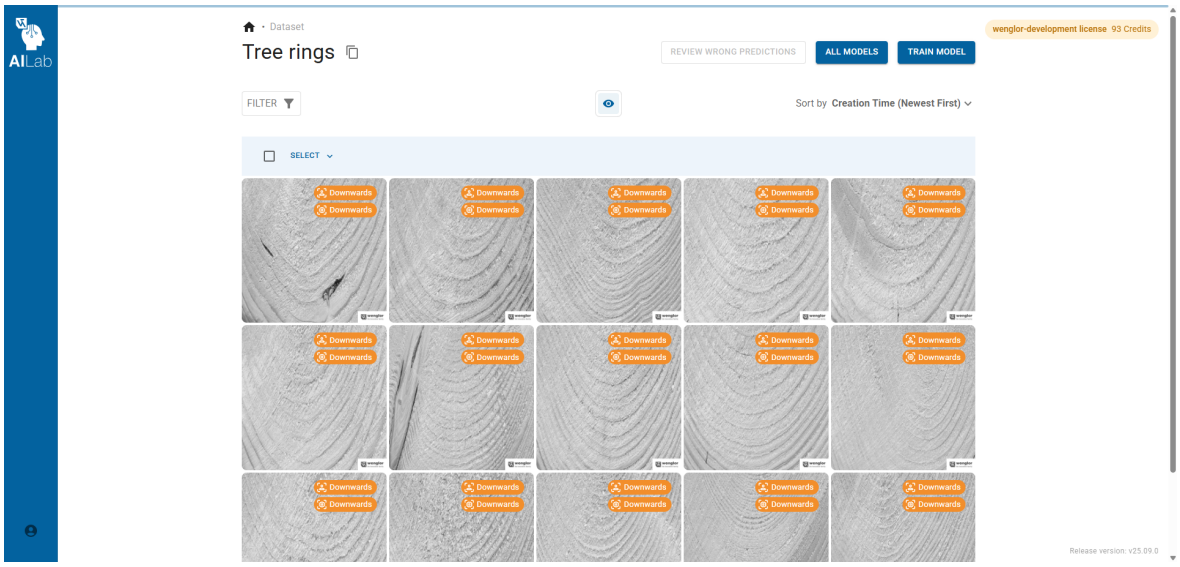
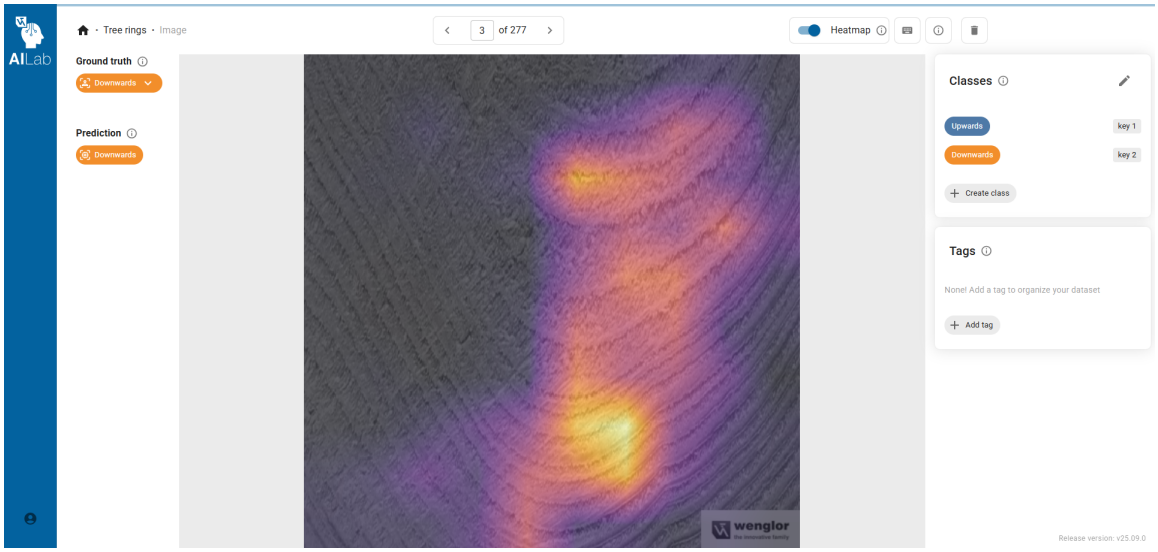


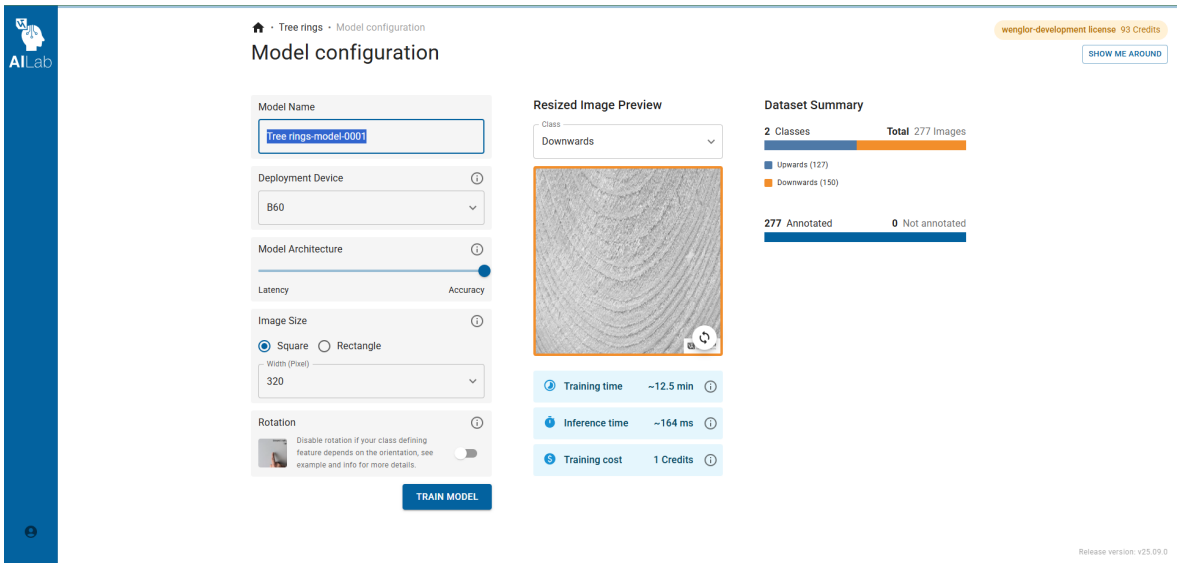
Image page

It contains the image and allows to annotate the image (to set the ground truth). Use the heatmap to show which parts of the image the model focuses on to make the prediction.



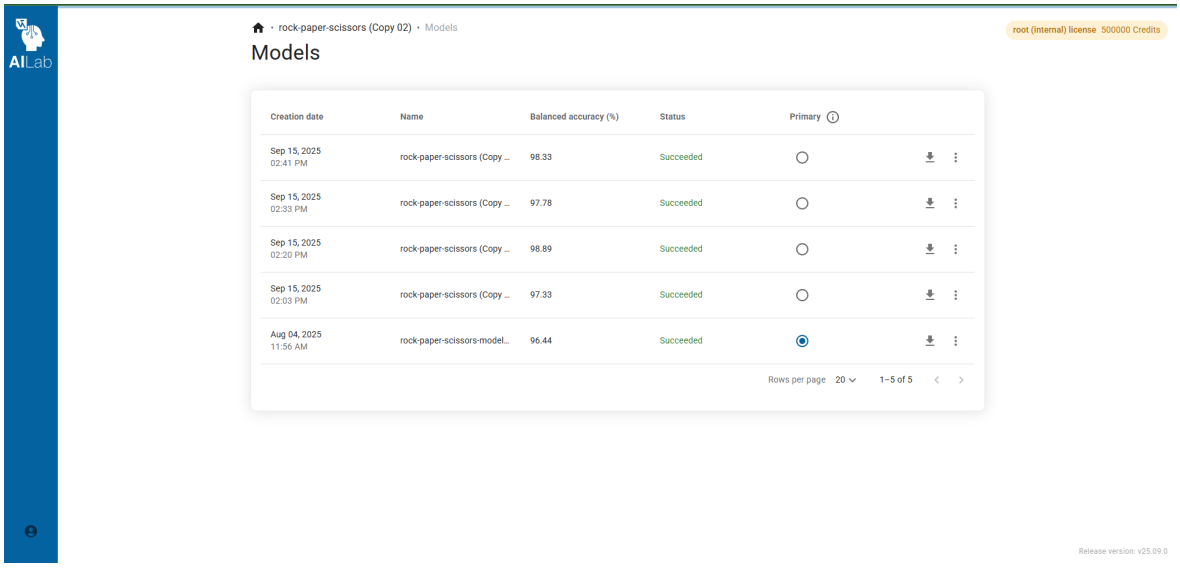
Model configuration page

It contains the parameters for training the model.



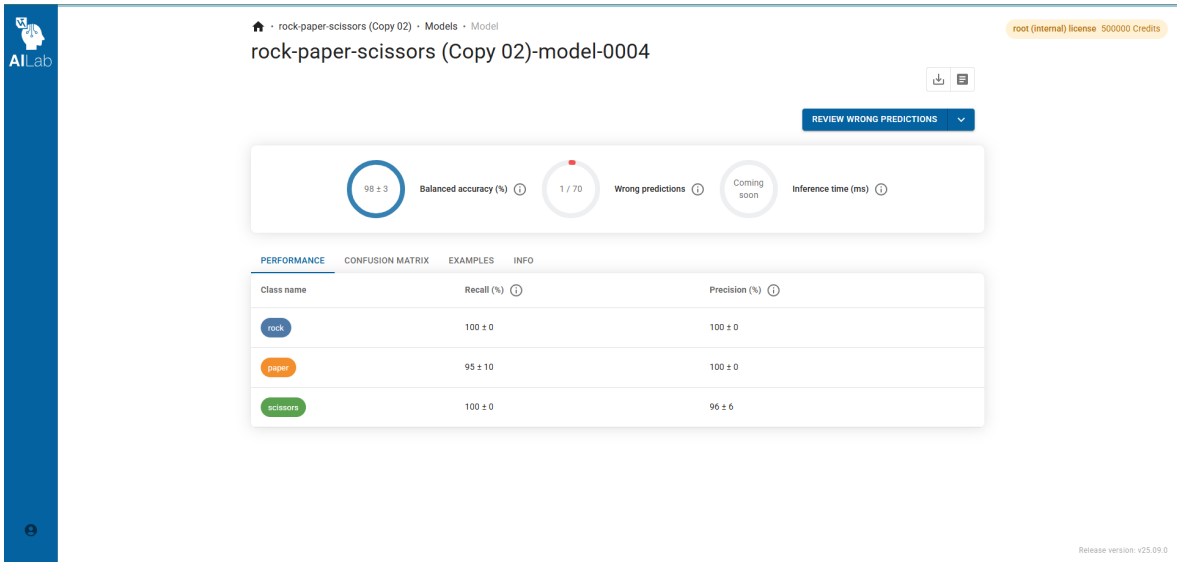
Models page

It contains all models of the dataset. Select the primary model, which can be seamlessly deployed to the uniVision device via uniVision and weHub. Click the model to go to the model page.



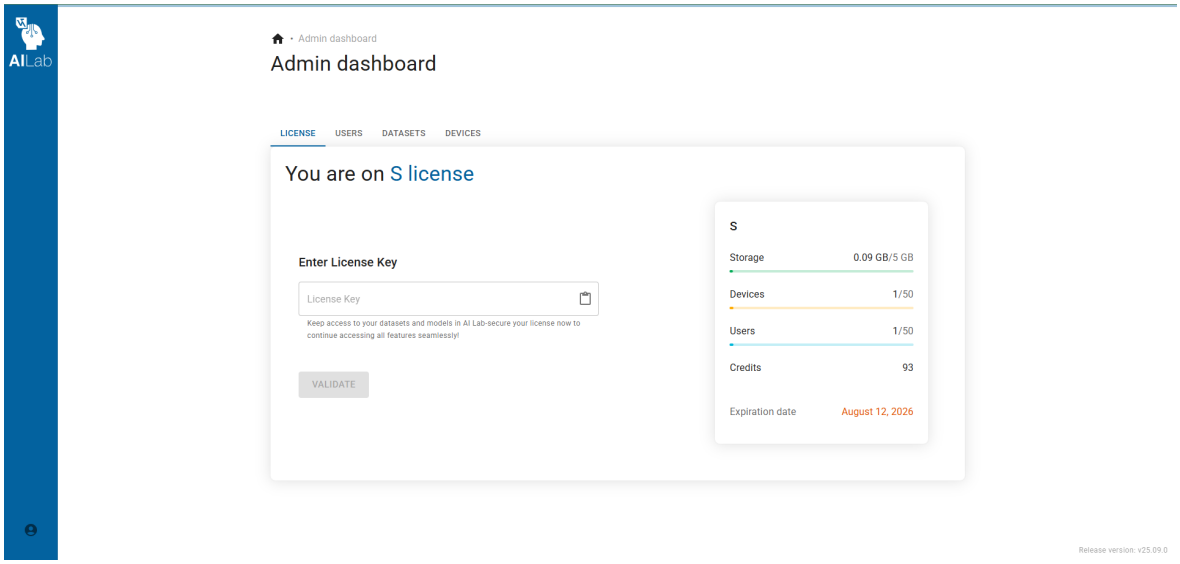
Model page

It contains the detailed evaluation of the model.



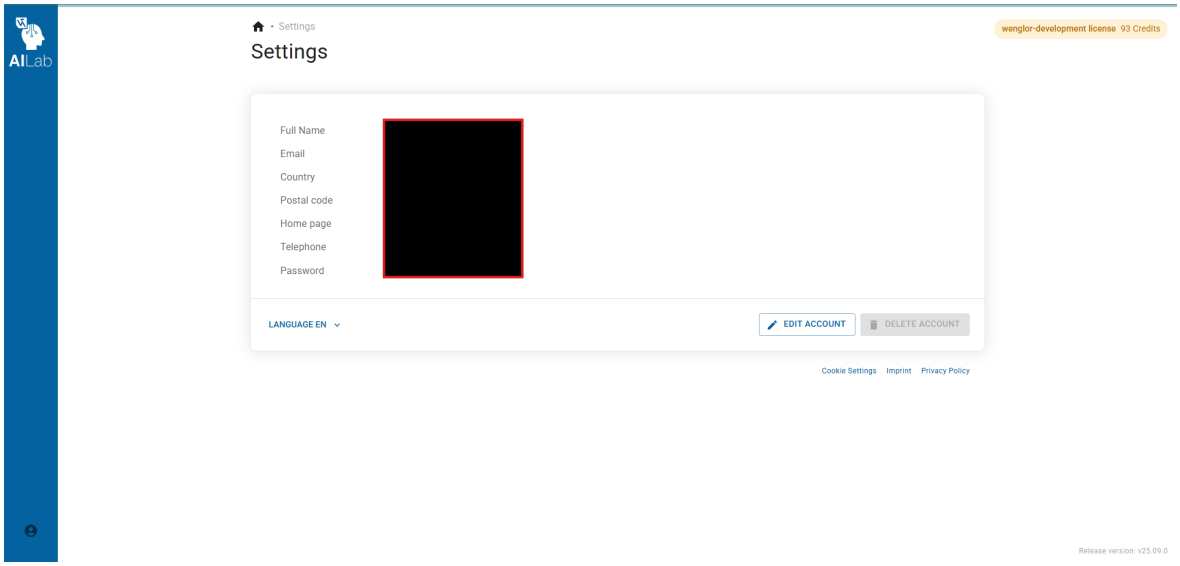
Admin dashboard page

It contains the relevant info for only administrators to activate licenses, to manage users, datasets and devices.



User settings page

It contains all settings in order to change for example the language.



11 Change Index for Getting Started

Version	Release Date	Description	Compatibility
1.0.0	27.08.2025	Initial version	Software wenglor weHub 1.0.0 Software wenglor uniVision 3.6.0 Firmware B60 1.6.0 Firmware MVC 1.3.0
1.1.0	18.02.2026	Updated description for the new software and firmware versions	Software wenglor weHub 1.1.0 Software wenglor uniVision 3.7.0 Firmware B60 1.7.0 Firmware MVC 1.4.0