User Manual
AI4Pheno

Version 1.0.0

Seth Software sp. z o.o
Poznań University of Life Sciences
September 15, 2023

Contents

1 Introduction **4**
- 1.1 Web Application Access . . . 4
- 1.2 Problem Definition . . . 4
- 1.3 User Benefits . . . 4
- 1.4 Objectives . . . 5

2 License(s) **5**

3 User Roles and Types **9**
- 3.1 Administrators . . . 9
- 3.2 Power Users - Users of Cameras and Analysis Tools . . . 9
- 3.3 Regular Users - Analytical Tools User . . . 10
- 3.4 Default login and password . . . 10
- 3.5 Regular User Access . . . 10
- 3.6 Admin and Power User Access . . . 10
- 3.7 Sign In . . . 10
- 3.8 Sign Up . . . 11
- 3.9 Dashboard . . . 15

4 Data acquisition and storage (DAS) **16**
- 4.1 Camera Type 1 Camera Type 1 . . . 16
  - 4.1.1 Basic Configuration . . . 16
- 4.2 Camera Type 2 . . . 27
  - 4.2.1 Basic Configuration . . . 28
- 4.3 API definition – Swagger . . . 38
  - 4.3.1 Connect Controller . . . 38
  - 4.3.2 Alarm Controller . . . 38
  - 4.3.3 Snapshot Controller . . . 39
  - 4.3.4 File Controller . . . 39
  - 4.3.5 Time Controller . . . 39
  - 4.3.6 Device Controller . . . 39
  - 4.3.7 Media Controller . . . 39
  - 4.3.8 Time Controller . . . 40
  - 4.3.9 Device controller . . . 41
- 4.4 FTP Storage Data . . . 41
  - 4.4.1 Camera Type 1 . . . 41
  - 4.4.2 Camera Type 2 . . . 42

5 Image data sources **43**

5.1 Defining a new image data source 45
5.2 Upload new images from Google drive 46

6 Analysis **48**
6.1 Define analysis 48
6.2 Order AI analysis 51
6.3 Preview of the completed AI analysis 52

7 ROI **53**

8 Data visualization **55**

9 Contact **56**

List of Figures

1 Sign in screen 11
2 Sign up screen 12
3 Activation link screen 12
4 Create password screen 13
5 Filling profile screen 14
6 After filling profile screen 15
7 Dashboard screen 15
8 Image sources screen 44
9 Image sources (all) screen 44
10 New image sources screen 45
11 New image sources created screen 45
12 Import from Google drive screen 46
13 Import from Google drive screen 47
14 Thumbnails screen 48
15 Go to analysis screen 49
16 Defining analysis screen 50
17 Defined analysis screen 50
18 Order AI analysis screen 51
19 Ordered AI analysis screen 51
20 Ordered AI analysis in progress screen 52
21 Preview AI analysis screen 52
22 Result AI analysis screen 53
23 Preview ROI screen 54
24 Create new ROI screen 54
25 Visualization data screen 55

26 Example of visualization data screen 56

List of Tables

1 Introduction

This User Manual is designed to provide users with a comprehensive understanding of the functionalities and features of the **EOSC Digital Innovation Hub Web Application** which can be accessed at the following URL: https://ai4pheno.seth.software. The document aims to guide users step-by-step through the application, ensuring they can efficiently utilize its features and address any challenges encountered. Additionally, this manual serves as a go-to reference for troubleshooting, best practices, and frequently asked questions about the platform.

1.1 Web Application Access

The web application is available and can be accessed at the following URL: https://ai4pheno.seth.software.

1.2 Problem Definition

The heart of the problem lies in the domain of *Phenology* - a discipline studying vegetation's temporal changes. Traditionally, it targets seasonal events such as budding, fruiting, flowering, and ageing. Due to the influence of both environmental factors and human activities on plant developmental stages, this science yields invaluable insights into the state of our landscape's vegetation cover. Such data proves pivotal especially in the context of climate change, where progressive shifts challenge the health and occurrence of plant species.

While various methods exist to detect phenological stages, there remains a void in the market for open tools aiding in the collection and analysis of digital phenological imagery using machine learning (ML) techniques. The proposed tool intends to fill this gap by offering an automated, efficient means to apply ML in time series image analyses of vegetation impacted by climate changes.

1.3 User Benefits

Upon the provision of this service, users will be endowed with a comprehensive IT solution. This integrated platform will not only streamline the processes of image acquisition, storage, and analysis but also offer scalability to accommodate further research areas like landscape analysis or crop yield forecasting.

1.4 Objectives

The overarching aim is to co-develop this solution with the EOSC DIH and the Research Community, ensuring its accessibility via the EOSC Marketplace. By procuring these solutions from the private sector, EOSC DIH aims to meet the research community's needs while also enriching the EOSC with novel offerings.

Specific objectives encompass:

1. Acquisition of a digital platform for phenological imagery.
2. Provision of digital tools for manual and automatic image analysis.
3. Introduction of digital tools to utilize hand crafted AI models for phenological imagery analysis.
4. Development of AI models for automatic ROI detection.
5. Facilitation of management tools for the platform concerning data and users.

2 License(s)

Keycloak and Fedora subsystems as well as AI4Pheno itself obey Apache 2.0 license. The text of the license is cited below:

Apache License

Version 2.0, January 2004

http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by

contract or otherwise, or (ii) ownership of fifty percent (50outstanding shares, or (iii) beneficial ownership of such entity.
"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.
"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.
"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.
"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).
"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.
"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."
"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.
2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to

reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may

provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree

to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.
END OF TERMS AND CONDITIONS
APPENDIX: How to apply the Apache License to your work.
To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don’t include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.
Copyright [yyyy] [name of copyright owner]
Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at
http://www.apache.org/licenses/LICENSE-2.0
Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

3 User Roles and Types

In the AI4Pheno system, roles are predefined sets of permissions that determine what actions users can and cannot perform. On the basis of these roles, three primary user types are defined:

3.1 Administrators

Administrators have the highest level of control in the AI4Pheno system. They can manage other user accounts, oversee system settings, and perform any function that other user types can.

3.2 Power Users - Users of Cameras and Analysis Tools

Power users have permissions that allow them to access and use cameras and analysis tools provided by AI4Pheno. This role is ideal for those who need to capture and analyze data directly within the application.

3.3 Regular Users - Analytical Tools User

Users with this role have access to the analysis tools in AI4Pheno. They may not have permissions to access cameras or certain data but can utilize tools to analyze existing datasets.

3.4 Default login and password

AI4Pheno has three primary user roles: admin, power user, and regular user.

3.5 Regular User Access

These default credentials are provided for demonstration purposes and initial system exploration. It's advised to change the default password upon the first login to ensure the security of your account.

3.6 Admin and Power User Access

The roles of admin and power user are reserved for system management and administrative tasks. As such, their default login credentials are not publicly disclosed to maintain system security. Only the system administrators or those responsible for system management have access to these credentials.
If you believe you require admin or power user access, please contact the system management team for further assistance.

3.7 Sign In

Logging in is possible after providing an email and password following prior account registration.

Figure 1: Sign in screen

3.8 Sign Up

Account registration is possible by initially providing an email address and accepting the Terms of Use and Privacy Policy. After clicking, check your email and click the activation link. Next, you should set a password according to the presented password complexity policy.

Figure 2: Sign up screen

Figure 3: Activation link screen

Figure 4: Create password screen

Next, you need to fill out the profile form, providing more information about the account.

Figure 5: Filling profile screen

After completing the profile and saving, the account will be manually reviewed. After manual review, the account will be activated and an activation notification will be sent via email.

Figure 6: After filling profile screen

3.9 Dashboard

After logging into the system, the user is redirected to the dashboard.

Figure 7: Dashboard screen

4 Data acquisition and storage (DAS)

4.1 Camera Type 1 Camera Type 1

5MP IPC-HFW2531S-S-S2
IPC-HFW2531S-S-S2 (dahuasecurity.com)
Dahua-Network-Camera-Web-3.0_OperationManual_V2.1.5.pdf (dahuasecurity.com)

4.1.1 Basic Configuration

The chapter introduces the basic configuration, camera configuration, storage configuration and system configuration.

Login This subsection introduces how to log in to and log out of the web interface.

- You need to initialize the camera before logging in to the web interface.
- When initializing the camera, keep the PC IP and device IP in the same network.
- Follow the instruction to download and install the plug-in for the first login.

Procedure
Step 1: Open IE browser, enter the IP address of the camera (192.168.1.108 by default) in the address bar and press Enter.

Step 2: Enter the username and password.
Step 3: Click Login.

General You can configure device name, language and video standard.

Procedure

Step 1 Select Setting > System > General > General.

Step 2: Configure general parameters

Description of general parameters

Parameter	Description	Settings
Name	The name of the device.	Each device has its own name. Set own name e.g. SLOWIN_1
Language	Select system language.	Select system language from list. Set e.g. English
Video Standard	Select video standard from PAL and NTSC	Set PAL

Step 3: Click Save.

Date & Time You can configure date and time format, time zone, current time, DST (Daylight Saving Time) or NTP server.

Procedure

Step 1: Select Setting > System > General > Date & Time.

Step 2: Configure date and time parameters

Description of date and time parameters

Parameter	Description	Preferences
Date Format	Configure the date format	YYYY-MM-DD
Time Format	Configure the time format. You can select from 12-Hour or 24-Hour.	24-Hour
Time Zone	Configure the time zone that the camera is at.	(UTC) Coordinated Universal Time
Current Time	Configure system time. Click Sync PC, and the system time changes to the PC time.	
DST	Enable DST as needed.	Not enable

Parameter	Description	Preferences
NTP	Select the check box, and then NTP (network time protocol) is enabled, the system then syncs time with the internet server in real time. You can also enter the IP address, time zone, port, and interval of a PC which installed NTP server to use NTP.	Serwer: clock.isc.org Port: 123 Interval: 30 Min.

Step 3: Click Save.

Snapshot (Quality&Interval) You can configure snapshot parameters, including snapshot type, image size, quality and interval.

Procedure

Step 1: Select Setting > Camera > Video > Snapshot.

Step 2: Configure snapshot parameters.

Description of snapshot parameter

Parameter	Description	Preferences
Snapshot Type	You can select General and Event. General: The system takes snapshot as scheduled. Event: The system takes snapshot when the video detection, audio detection, event, or alarm is triggered. This function requires the corresponding snapshot being enabled.	General
Image Size	The same resolution with main stream.	
Quality	Configures the snapshot quality. There are six levels of Image quality, and the sixth is the best.	
Interval	Configures the snapshot frequency. Select Customized, and then you can configure snapshot frequency manually.	

Step 3: Click Save.

Setting Schedule Snapshot Plan You can configure record schedule, snapshot schedule and holiday schedule. Set certain days as holiday, and when the Record or Snapshot is selected in the holiday schedule.
The system takes snapshot or records video as holiday schedule defined.
Procedure
Step 1 Select Setting > Storage > Schedule > Snapshot

Step 2: Select Snapshot.

Step 3: Select snapshot type and set time period.

- green represents normal snapshot plan (such as timing snapshot);
- yellow represents motion snapshot plan (such as snapshot triggered by
- red represents alarm snapshot plan (such as snapshot triggered by alarm-in) intelligent events);

Step 4: Select Setting.

Step 5: Select Period and type (General, Event, Alarm) -> preferences General. You can set 6 time periods per day.

Step 6. Select Save.

Setting Destination FTP This subsection introduces the configuration of the storage method for the recorded videos and snapshots.

Path You can select different storage paths for the recorded videos and snapshots according to event type. You can select from SD card, FTP and NAS.

Local is displayed only on models that support SD card.

Procedure

Step 1 Select Setting > Storage > Destination > Path

Step 2: Select the storage method that you need for the snapshots of different types.

Description of path parameters

Parameter	Description	Preferences
Event Type	Select from **Scheduled, Motion Detection** and **Alarm**	Snapshot > Scheduled
Local	Save in the internal SD card.	
FTP	Save in the FTP server.	Enable
NAS	Save in the NAS (network attached storage).	

Step 3: Click Save.

Step 4: Configure other path parameters on FTP interface.

FTP FTP can be enabled only when it was selected as a destination path. When the network does not work, you can save all the files to the internal SD card for emergency.

Step 1: Select Setting > Storage > Destination > FTP.
Step 2: Select the Enable check box, and select the FTP type

Description of path parameters

Parameter	Description	Preferences
Server Address	The IP address of the FTP server.	Set FTP IP address
Port	The port number of the FTP server.	Set FTP port number
Username	The user name to log in to the FTP server.	Set user name
Password	The password to log in to the FTP server.	Set password

Parameter	Description	Preferences
Remote Directory	The destination path in the FTP server, and it is shared by default.	The default directory structure in destination path: • Remote Directory • Date • “001” – channel no. • “jpg“– file ext. • e.g. “01” – hourly period with image • image file name

Step 4: Click Save.
Step 5: Click test to test whether FTP function works normally.

Local Display the information of the local SD card. You can set it as read only or read & write; you can also hot swap and format SD card

Setting Alarm Preferences to set: Disk Full, Disk Error

About Alarm Types

Description of alarm types

Parameter	Description	Preparation
Disk Full	The alarm is triggered when the free space of SD card is less than the configured value.	The SD card no space function is enabled.
Disk Error	The alarm is triggered when there is failure or malfunction in the SD card.	SD card failure detection is enabled.

Setting SD Card

In case of SD card abnormality, the system performs alarm linkage. The event types include No SD Card, Capacity Warning, and SD Card Error. The introduction is for reference only, and may differ from the actual interface.

Step 1 Select Setting > Event > Abnormality > SD Card

Step 2: Select the event type from the Event Type drop-down list, and then select the Enable check box to enable the SD card detection function. When setting **Capacity Warning** as **Event Type**, set **Capacity Limit**. When the remaining space of SD card is less than this value, the alarm is triggered.

Step 3: Set alarm linkage actions.

Step 4: Click Save

4.2 Camera Type 2

12MP IPC-HFW71242H-Z

IPC-HFW71242H-Z (dahuasecurity.com)

Dahua-Network-Camera-Web-5.0_Operation-Manual_V1.0.6.pdf (dahuasecurity.com)

4.2.1 Basic Configuration

The chapter introduces the basic configuration, including login, camera configuration, storage configuration and system configuration.

Login This subsection introduces how to log in to and log out of the web interface.

- You need to initialize the camera before logging in to the web interface.
- When initializing the camera, keep the PC IP and device IP in the same network.
- Follow the instruction to download and install the plug-in for the first login.
- Follow the instruction to download and install the plug-in for the first login.

Procedure

Step 1: Open IE browser, enter the IP address of the camera (192.168.1.108 by default) in the address bar and press Enter.

Step 2: Enter the username and password.

Step 3: Click Login.

General You can configure device name, language and video standard.

Procedure

Step 1 Select Setting > Camera > System > General > Basic.

Step 2: Configure general parameters

Description of general parameters

Parameter	Description	Settings
Device Name	The name of the device.	Each device has its own name. Set own name e.g. 8H0BFDAPAG21270
Video Standard	Select video standard from PAL and NTSC	Set PAL

Step 3: Click Save.

Date & Time You can configure date and time format, time zone, current time, DST (Daylight Saving Time) or NTP server.

Procedure

Step 1: Select Setting > System > General > Date & Time.

Step 2: Configure date and time parameters

Description of date and time parameters

Parameter	Description	Preferences
Date Format	Configure the date format	YYYY-MM-DD
Time Format	Manually Setting: Configure the parameters manually. NTP: When selecting NTP, the system then syncs time with the internet server in real time. You can also enter the IP address, time zone, port, and interval of a PC which installed NTP server to use NTP.	24-Hour Serwer: clock.isc.org Port: 123 Interval: 30 Min.
Time Zone	Configure the time zone that the camera is at.	(UTC) Coordinated Universal Time

Parameter	Description	Preferences
Current Time	Configure system time. Click Sync PC, and the system time changes to the PC time.	
DST	Enable DST as needed.	Not enable

Snapshot (Quality&Interval) You can configure snapshot parameters, including snapshot type, image size, quality and interval.

Procedure

Step 1: Select Picture > Snapshot.

Step 2: Configure snapshot parameters.

Description of snapshot parameter

Parameter	Description	Preferences
Snapshot Type	You can select from Scheduled and Event. Scheduled: Capture images in configured period. Event: Capture images when configured event is triggered, such as Motion Detection, Video Tamper and Scene Changing.	General
Size	It is same with the resolution of the main stream.	

Parameter	Description	Preferences
Quality	Set the quality of the snapshot. The higher the value, the better the quality.	
Interval	Set the frequency of snapshot. You can select Custom to set the frequency as needed.	

Step 3: Click Apply.

Setting Schedule Snapshot Plan You can configure record schedule, snapshot schedule and holiday schedule. Set certain days as holiday, and when the Record or Snapshot is selected in the holiday schedule. The system takes snapshot or records video as holiday schedule defined.

Procedure

Step 1 Select Picture > Time Plan

Step 2: Set record plan.

- Green represents normal record plan (such as timing recording);
- yellow represents motion record plan (such as recording triggered by intelligent events);

- red represents alarm record plan (such as recording triggered by alarm-in).

Select a record type, such as Normal, and directly press and drag the left mouse button to set the period for normal record on the timeline.

Step 3: Click Apply.

Setting Destination FTP This subsection introduces the configuration of the storage method for the snapshots.

Procedure

Step 1 Select Picture > Storage

Step 2: Select the storage method that you need for the snapshots of different types.

Description of path parameters

Parameter	Description	Preferences
Event Type	Select from **Scheduled, Motion Detection** and **Alarm**	Scheduled

Parameter	Description	Preferences
Disk Full	Recording strategy when the disk is full. Overwrite: Cyclically overwrite the earliest video when the disk is full. Stop: Stop recording when the disk is full	Overwrite
Storage Method	Select from Local storage and Network storage Local storage: Save the recorded videos in the internal SD card. Network storage: Save the recorded videos in the FTP server or NAS.	Network storage > FTP

Step 3: Click Apply.

Step 4: Configure FTP parameters.

Description of path parameters

Parameter	Description	Preferences
Server IP	The IP address of the FTP server.	Set FTP IP address
Port	The port number of the FTP server.	Set FTP port number
Username	The user name to log in to the FTP server.	Set user name
Password	The password to log in to the FTP server.	Set password
Storage Path	The destination path in the FTP server.	
Directory Structure	Set the directory structure, and you can select **Use Level 1 Directory, Use Level 2 Directory**, and **Use Level 3 Directory**	

Parameter	Description	Preferences
Level 1 Directory	Set the Level 1 directory name, and you can select from **Device name, Device IP,** and **Custom**. When you select **Custom**, please enter the custom directory	
Level 2 Directory Level 3 Directory	Set the Level 2 directory name, and you can select from **File Type, Date, Fil**	
Urgently store to local	Cick , and when the FTP server does not work, all the files are saved to the internal SD card.	

Step 4: Click Apply.
Step 5: Click test to test whether FTP function works normally.

Local Display the information of the local SD card. You can set it as read only or read & write; you can also hot swap and format SD card

Setting Exception In case of SD card exception, the system performs alarm linkage. The event types include No SD Card, Low SD Card Space, and SD Card Error. Functions might vary with different models.
Preferences set: Low SD card space, SD card error
Procedure
Step 1: Select > Event > Exception > SD Card Exception.

Step 2: Click to enable the SD card detection functions. When enabling Low SD Card Space, set Capacity Limit. When the remaining space of SD card is less than this value, the alarm is triggered. Step 3: Set alarm linkage actions.

Step 4: Click Apply

About Alarm Types

Description of alarm types

Parameter	Description	Preparation
Low SD card space	The alarm is triggered when the free space of SD card is less than the config-ured value.	

Parameter	Description	Preparation
SD card Error	The alarm is triggered when there is failure or malfunction in the SD card.	

4.3 API definition – Swagger

4.3.1 Connect Controller

4.3.2 Alarm Controller

4.3.3 Snapshot Controller

Dahua Snapshot Controller Endpoints to get current snapshot and get/set snap config

- GET `/api/dahua/snapshot/snap` Get SNAP config
- PUT `/api/dahua/snapshot/snap` Set SNAP config
- GET `/api/dahua/snapshot/snap/get` Get Current snapshot

4.3.4 File Controller

Dahua File Controller Endpoints to get files list and download picture

- POST `/api/dahua/files/download` Download file from Dahua
- GET `/api/dahua/files` Get list of files from Dahua

4.3.5 Time Controller

Dahua Time Controller Endpoints to actual time and timezone

- GET `/api/dahua/time/timezone` Get current timezone
- POST `/api/dahua/time/timezone` Set timezone in Dahua
- GET `/api/dahua/time/get` Get current Datetime from Dahua

4.3.6 Device Controller

Dahua Device Controller Endpoints to get config of device

- GET `/api/dahua/device/info` Get basic info about device

4.3.7 Media Controller

Dahua Media Controller Endpoints to configure FTP and media encode

- GET `/api/dahua/media/nas` Get FTP data
- PUT `/api/dahua/media/nas` Set FTP data
- GET `/api/dahua/media/media-encode` Get media config
- PUT `/api/dahua/media/media-encode` Set media config

4.3.8 Time Controller

Dahua Time Controller Endpoints to actual time and timezone

GET `/api/dahua/time/timezone` Get current timezone

POST `/api/dahua/time/timezone` Set timezone in Dahua

GET `/api/dahua/time/get` Get current Datetime from Dahua

Date as a String, in format yyyy-mm-dd hh:mm

Parameters Cancel

No parameters

Execute Clear

Responses

Curl

```
curl -X 'GET' \
  'http://10.0.2.69:5202/api/dahua/time/get' \
  -H 'accept: */*'
```

Request URL

```
http://10.0.2.69:5202/api/dahua/time/get
```

Server response

Code	Details

200	Response body
	`2023-05-29 10:11:44`
	Download
	Response headers
	`connection: keep-alive`
	`content-length: 19`
	`content-type: text/plain;charset=UTF-8`
	`date: Mon,29 May 2023 10:11:43 GMT`
	`keep-alive: timeout=60`

Responses

Code	Description	Links
200	OK	*No links*

4.3.9 Device controller

Dahua Device Controller Endpoints to get config of device

GET `/api/dahua/device/info` Get basic info about device

Parameters Try it out

No parameters

Responses

Curl

```
curl -X 'GET' \
  'http://10.0.2.69:5202/api/dahua/device/info' \
  -H 'accept: */*'
```

Request URL

```
http://10.0.2.69:5202/api/dahua/device/info
```

Server response

Code	Details
200	Response body


```
{
  "items": [
    {
      "name": "/dev/mmc0",
      "state": "Success",
      "details": [
        {
          "path": "/mnt/sd",
          "totalBytes": "31998345216.000000",
          "type": "ReadWrite",
          "usedBytes": "3670999040.000000"
        }
      ]
    }
  ]
}
```


Download

Response headers

```
connection: keep-alive
content-type: application/json
date: Mon,29 May 2023 10:10:30 GMT
keep-alive: timeout=60
transfer-encoding: chunked
```

Responses

Code	Description	Links
200	OK	No links

4.4 FTP Storage Data

4.4.1 Camera Type 1

Interval = 600s (10 min)

0:/Photo2/SLOWIN_1/*.*

Nazwa	Roz.	Wielkość	Czas	Atryb
[..]		<DIR>		
[2023-05-19]		<DIR>	19.05.2023 07:00	-775
[2023-05-20]		<DIR>	20.05.2023 00:00	-775
[2023-05-21]		<DIR>	21.05.2023 00:00	-775
[2023-05-22]		<DIR>	22.05.2023 00:00	-775
[2023-05-23]		<DIR>	23.05.2023 00:06	-775
[2023-05-24]		<DIR>	24.05.2023 00:01	-775
[2023-05-25]		<DIR>	25.05.2023 00:03	-775
[2023-05-26]		<DIR>	26.05.2023 00:07	-775
[2023-05-27]		<DIR>	27.05.2023 00:01	-775
[2023-05-28]		<DIR>	28.05.2023 00:01	-775
[2023-05-29]		<DIR>	29.05.2023 00:01	-775
[2023-05-30]		<DIR>	30.05.2023 00:01	-775
[2023-05-31]		<DIR>	31.05.2023 00:01	-775
[2023-06-01]		<DIR>	01.06.2023 00:02	-775
[2023-06-02]		<DIR>	02.06.2023 00:01	-775
[2023-06-03]		<DIR>	03.06.2023 00:00	-775
[2023-06-04]		<DIR>	04.06.2023 00:00	-775
[2023-06-05]		<DIR>	05.06.2023 00:01	-775
[2023-06-07]		<DIR>	07.06.2023 08:00	-775
[2023-06-08]		<DIR>	08.06.2023 00:00	-775
[2023-06-09]		<DIR>	09.06.2023 00:00	-775
[2023-06-10]		<DIR>	10.06.2023 00:01	-775
[2023-06-11]		<DIR>	11.06.2023 00:00	-775
[2023-06-12]		<DIR>	12.06.2023 00:00	-775
[2023-06-13]		<DIR>	13.06.2023 00:00	-775
DVRWorkDirectory		4 016	13.06.2023 02:00	-764

0:/Photo2/SLOWIN_1/2023-06-12/001/jpg/11/*.*

Nazwa	Roz.	Wielkość	Czas	Atryb
[..]		<DIR>		
50.57[R][0@0][0]	jpg	675 635	12.06.2023 11:50	-764
40.57[R][0@0][0]	jpg	638 192	12.06.2023 11:40	-764
30.57[R][0@0][0]	jpg	636 760	12.06.2023 11:30	-764
20.57[R][0@0][0]	jpg	662 147	12.06.2023 11:20	-764
10.57[R][0@0][0]	jpg	675 078	12.06.2023 11:10	-764
00.57[R][0@0][0]	jpg	619 868	12.06.2023 11:00	-764

4.4.2 Camera Type 2

Interval = 600s (10 min)

0:/Photo3/8H0BFDAPAG21270/*.*

Nazwa	Roz.	Wielkość	Czas
[..]		<DIR>	
[$8H0BFDAPAG21270_1.entries]		<DIR>	14.06.2023 09:42 -
[2023-06-05]		<DIR>	05.06.2023 10:21 -
[2023-06-06]		<DIR>	06.06.2023 09:12 -
[2023-06-07]		<DIR>	07.06.2023 23:53 -
[2023-06-08]		<DIR>	08.06.2023 23:54 -
[2023-06-09]		<DIR>	09.06.2023 23:56 -
[2023-06-10]		<DIR>	10.06.2023 23:57 -
[2023-06-11]		<DIR>	11.06.2023 23:58 -
[2023-06-12]		<DIR>	12.06.2023 23:50 -
[2023-06-13]		<DIR>	13.06.2023 23:51 -
[2023-06-14]		<DIR>	14.06.2023 09:41 -
DVRWorkDirectory		4 016	14.06.2023 08:33 -
$8H0BFDAPAG21270_1	node	20	05.06.2023 10:22 -

0:/Photo3/8H0BFDAPAG21270/2023-06-13/*.*

Nazwa	Roz.	Wielkość	Czas
[..]		<DIR>	
001_20230613235130_[R][0@0][0]	jpg	1 058 777	13.06.2023 23:51
001_20230613234129_[R][0@0][0]	jpg	1 076 855	13.06.2023 23:41
001_20230613233129_[R][0@0][0]	jpg	1 045 260	13.06.2023 23:31
001_20230613232128_[R][0@0][0]	jpg	1 038 397	13.06.2023 23:21
001_20230613231128_[R][0@0][0]	jpg	1 043 072	13.06.2023 23:11
001_20230613225126_[R][0@0][0]	jpg	1 035 849	13.06.2023 22:51
001_20230613224126_[R][0@0][0]	jpg	1 029 706	13.06.2023 22:41
001_20230613223125_[R][0@0][0]	jpg	1 045 507	13.06.2023 22:31
001_20230613222125_[R][0@0][0]	jpg	1 032 469	13.06.2023 22:21
001_20230613221124_[R][0@0][0]	jpg	1 026 669	13.06.2023 22:11
001_20230613220124_[R][0@0][0]	jpg	961 061	13.06.2023 22:01
001_20230613214123_[R][0@0][0]	jpg	1 055 744	13.06.2023 21:41
001_20230613213122_[R][0@0][0]	jpg	1 040 996	13.06.2023 21:31
001_20230613212121_[R][0@0][0]	jpg	1 021 749	13.06.2023 21:21
001_20230613211121_[R][0@0][0]	jpg	1 010 726	13.06.2023 21:11
001_20230613210120_[R][0@0][0]	jpg	1 000 847	13.06.2023 21:01
001_20230613205120_[R][0@0][0]	jpg	999 519	13.06.2023 20:51
001_20230613204119_[R][0@0][0]	jpg	981 619	13.06.2023 20:41

5 Image data sources

After logging in, the user can navigate to image sources, where they will see image sources defined by the logged-in user. By clicking on "Show all image sources," one can view public image sources.

Figure 8: Image sources screen

Figure 9: Image sources (all) screen

5.1 Defining a new image data source

After filling out the fields in the form regarding the new data source, click "Save."

Figure 10: New image sources screen

Figure 11: New image sources created screen

After defining the source, you can connect to the camera by providing the necessary connection parameters.

5.2 Upload new images from Google drive

After creating a new source, you can upload new photos from e.g. Google drive

Figure 12: Import from Google drive screen

Figure 13: Import from Google drive screen

After importing data from Google Drive, thumbnail images appear.

Figure 14: Thumbnails screen

6 Analysis

6.1 Define analysis

With the added photo of Linden or Apples, we can perform an analysis.

Figure 15: Go to analysis screen

After defining the analysis parameters, click the Save button.

Figure 16: Defining analysis screen

Figure 17: Defined analysis screen

After defining the source, you can initiate the analysis by clicking the "Order AI analysis" button

6.2 Order AI analysis

Figure 18: Order AI analysis screen

Figure 19: Ordered AI analysis screen

Figure 20: Ordered AI analysis in progress screen

6.3 Preview of the completed AI analysis

Figure 21: Preview AI analysis screen

Figure 22: Result AI analysis screen

7 ROI

For a given analysis, one can define their own ROI or approach those already defined.

Figure 23: Preview ROI screen

Figure 24: Create new ROI screen

8 Data visualization

After conducting the AI analysis, you can visualize the data by clicking the "Visualize data" button.

PHOTO	NUMBER_OF_APPLES	AVG_AREA	AVG_HEIGHT	AVG_WIDTH	B_AV	B_SD	BI_AV	BI_SD
	37	3706.59459	65.64865	67	50.66552	48.27703	0.40592	0.18066
	39	3629.92308	65	66.46154	48.1127	49.3124	0.35081	0.17582
	39	3475.61538	62.94872	64.30769	55.67593	51.30837	0.42702	0.18609
	39	3659.4359	65.23077	67.20513	47.60142	46.10458	0.34642	0.16367
	42	3513.19048	64.07143	65.95238	59.33373	54.86243	0.40462	0.16814
	37	3443.81081	62.97297	65.24324	64.58498	55.66668	0.45954	0.17244
	51	4641.13725	73.94118	75.31373	46.46447	34.50885	0.37718	0.17565
	40	4227	70.4	72.2	75.43679	46.3881	0.49971	0.1736

Figure 25: Visualization data screen

One can perform the following analyses in the form of graphs:

- RGB indices averaged for ROI
- Daily RGB chromatic coordinates (median)
- Green chromatic coordinate
- Meteorological data

Figure 26: Example of visualization data screen

9 Contact

If you need to get in touch with our team, please use the appropriate email address below based on the nature of your inquiry:

- **Administrative Inquiries:** For questions related to licensing, partnerships, and other administrative matters, please contact ai4pheno-admin@seth.software.
- **General Information:** For general questions or information about our software and its features, reach out to ai4pheno-info@seth.software.
- **Security Issues:** If you have identified a security vulnerability or have concerns about the security of our software, please alert our security team immediately at ai4pheno-security@seth.software.
- **Support:** For technical support, troubleshooting, or reporting bugs, get in touch with our support team at ai4pheno-support@seth.software.

We aim to respond to all inquiries in a timely manner. Thank you for your interest in AI4Pheno.