

# Photo Aggregator - User Guide

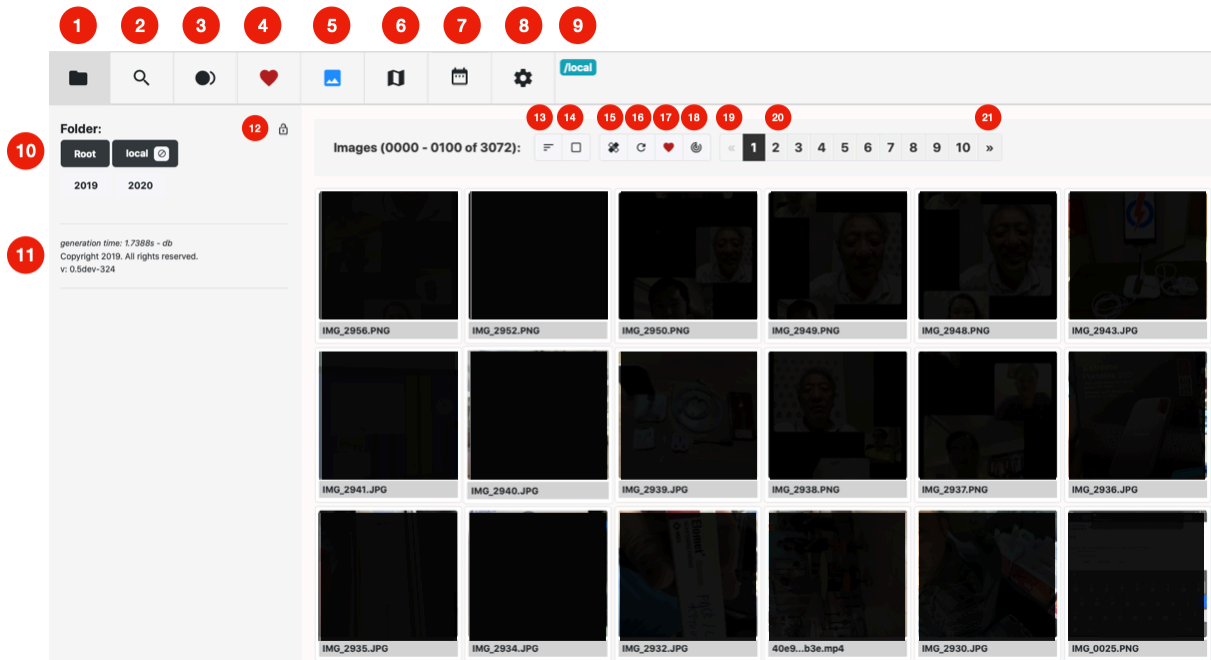
## Overview

The concept of Photo Aggregator came about when members of the team came together and started to discuss the pains of finding a particular photo that we knew was taken but could not recall when and where. Apple's Photo app was great but it needed all the photos either on device or on iCloud. How about the photos that is taken from the DSLRs and other cameras? As an amateur photographer, one of us had taken hundreds of thousands of photos but locating a specific photo also has proven to be a challenge even with proper folder filing on a NAS. Quite a few existing solutions are available which the team has explored, but most fell short as it lacks many of the features that we want. This has lead to the team in putting their capabilities together and wrote this software to aggregate all the sources of photos that we have so that we can locate that photo that we knew it existed somewhere in our own library. We called it Photo Aggregator.

Photo Aggregator builds its own database which consist of thumbnails generation, favourite tags, Object detection etc. It is non-destructive to your source of photos and does not require you to import the photos into the application at all. Multiple sources can be defined and you simply define the location of your photos such as a NAS Destination or a local folder. The metadata of the images are picked up from the source locations during the scanning phase of each photo and once completed, you will be able to query these metadata information. Photo Aggregator provides many ways of searching your photos. It is a companion app to your favourite editing tool as the main purpose of this solution is to search and locate your images. You can search for all the photos you took from a specific location, search for all photos taken with a particular lens using EXIF, or for a photo that is from a particular time period. Find similar photos taken from the same location, or similar photos taken with similar looking background based on the colour tone. These are all possible because of today's technologies such as object detection based off Machine Learning. There is no right or wrong way of storing your photos. It is how we can use Photo Aggregator to bring all in a single interface that helps to to locate it fast.

Enjoy this product and the team accepts any feedback on how we can further improve. If it fulfils your needs, we hope you will recommend it to your friends and encourage them to purchase the product. We have decided to not base this software on a subscription but we hope to provide updates and bug fixes as long as we can. Small developers like us appreciates words of mouth from users like yourself to help make our product and efforts successful. We hope that you will contribute to our journey in trying to keep this software alive. Thank You!

# The Interface



**Browse Photo Folders** - This works in conjunction with 5 for Media View, 6 for Map View and 7 for Timeline View.

**Filter Search** - Search your media based on filters. Check section on Search for more details.

**Smart Search** - Provides an advanced method of searching. Check section on Advanced Search for more details.

**Favourites** - A consolidated view of all your tagged favourite images. Tags can also be shared. Check Tag sharing section for more details.

**Image Display** - Displays photos and videos based on thumbnail generated.

**Map Display** - Displays your photos and videos based on GPS information available

**Timeline Display** - Displays your photos and videos based on date and time information available

- 8 **Settings** - For defining your photos and videos sources, adding blacklist items, checking on system progress such as scanning, indexing , thumbnail generation. Also provides links to system logs and state.
- 9 **Status Bar** - Displays system progress such as Processing, Shows Filters applied etc. Status are highlighted in colour with Errors in Red being the most severe. Yellow is for longer running processes, such as image scanning or database cleaning activities. Teal or Blue status are for regular information.
- 10 **Folder Selection** - Selection of Browsing based on sources, Folders Views etc.
- 11 **Version and Build information** and Open Source Projects used.
- 12 **Scroll Lock** - Locks the scrolling for side bar.
- 13 **Sort Direction** for displays of photos and videos.
- 14 **Select Images** - Allows multiple selection of images to create a favourite tag for future quick access to selection.
- 15 **Update Thumbnails** - Updates the thumbnails for selected photos.
- 16 **Refresh** the images in the currently displayed selection.
- 17 **Add to Favourites** - Bulk favourites addition.
- 18 **Rescan Directory** - Rescans the current directory for any new photos.
- 19 **Last 10 Page View** - Displays the last 10 Pages.
- 20 **Page Navigator**. It is set to display ~100 thumbnails per page or more if the display permits. For resource management, it limits the maximum images to load to about the first 4000+ images though it can be more.
- 21 **Next 10 Page View** - Displays the next 10 Pages.

## Filter Search

Photo Aggregator is designed to help search through your massive archive of photos. The emphasis is on search and therefore there are several search options to help you locate your photo quickly.

1 Select filter from current folder or all indexed photos. Define Search Conditions of None, AND, OR.

2 Search by Directory , Filename or the MD5 Checksum of the file. The default Drag and Drop behaviour searches for the directory.

3 Search by Date Range, Presets of Today, Last 7 Days, Last Month, Last 6 Months, Last 1 Year or Custom Dates.

4 Search by Location. Selection availability is based off your GPS Data from your images. Country, State, County, Suburb. Upon Search by location, you can also select to Show the location on the Map View

5 Search by EXIF Metadata such as Make, Model, ImageSize, ISO, FOV, Flash, LensInfo, Orientation. The default search mode during drag and drop is for the Model of the camera used.

\* Hint : On a desktop browser, you can drag and drop an image over any of the search fields titles to begin the default search parameter. Do not drag into the fields but over the search bars which are in black titles.

The screenshot displays the 'Filter Search' interface of the Photo Aggregator application. It features a sidebar on the left with five numbered red circles (1-5) corresponding to the numbered text blocks. The main content area is divided into several sections, each with a dark header bar and a light body. Section 1: 'Filter from:' with a lock icon and two buttons: 'All Indexed Photos' and 'Current Folder'. Section 2: 'Apply Filter Rules:' with three radio buttons: 'None' (selected), 'AND', and 'OR', and a 'Clear All Filters' link. Section 3: 'Directory, Filename or MD5 -' with a search input field containing 'Filename or MD5' and a close button. Section 4: 'Selected Date Range -' with a date range input field showing '01/01/1970 - 07/06/2020', and links for 'Show on Timeline' and 'Reset Date Range'. Section 5: 'Scoped Locations -' with three dropdown menus for 'No country selected', 'Select a country', 'Select a state', and 'Select a county', and links for 'Show on Map' and 'Reset Locations Scope'. Section 6: 'EXIF Metadata -' with a 'Search for:' input field, a 'Metadata Labels:' dropdown showing 'No EXIF labels found', and an 'Available Values:' dropdown showing 'No EXIF values found'.

# Smart Search

The Smart search provides a way to search your images based on Image Similarity or the objects detected.

- 1 Select filter from current folder or all indexed photos. Define Search Conditions of None, AND, OR.
- 2 Find similar image. You can only drag an image onto the title bar. This would find the images with similar colours. So if you are trying to identify an image which consist mainly of the colour red, all similar images with predominant red will be found.
- 3 Object detection uses machine learning to detect the contents of the image and tells you what it detects and searches similar images to it. You can determine the level of confidence to the results. The lower the percentage confidence, the lower the system is sure of what it has detected.

For example. If you set it to 50% and a noodle soup photo is dragged to this section, it will show only photos where the detecting is at least 50% confident that it is right.

Changing the threshold to 5% might reveal more photos with the same object, as it would include images with a lower confidence.

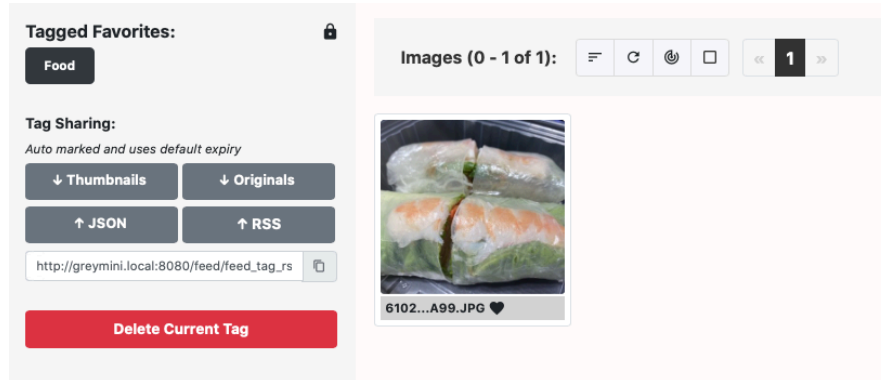
Increasing the percentage to 80% or more shows the same result with a much higher confidence of detection.

You can manually specify search object by typing the first or any character and let the options appear itself. Eg, hot will show **hot**dog, **hot**\_spring, hotel . fri will show **f**risbee and **r**efrigerator.

The screenshot shows the 'Smart Search' interface. At the top, under 'Filter from:', there are two buttons: 'All Indexed Photos' and 'Current Folder'. Below this is the 'Smart Search Rules:' section, which includes three radio buttons: 'None' (selected), 'AND', and 'OR', along with a 'Clear Smart Rules' link. This section is highlighted with a red box and a red circle containing the number '1'. Below the rules is the 'Find Similar Images -' section, which contains a large grey box with the text 'No Image'. This section is also highlighted with a red box and a red circle containing the number '2'. At the bottom is the 'Search Objects -' section, which has a 'Search for:' label, a text input field containing 'Object Name', and three radio buttons for confidence thresholds: '>5%', '>50%' (selected), and '>80%'. This section is highlighted with a red box and a red circle containing the number '3'. At the very bottom, there is a small copyright notice: 'Copyright 2019. All rights reserved. Leverages YOLO, Places365-CNN and many other great tools available.'

# Favorites

Whenever you add a tag to photo or a group of photos, they would appear in this view. Along with the view, it would allow you to share your tags in various ways :



In this example here, we are using a favourite tag named Food. We could share out the tag so that when new photos are added with the same tag, an RSS feed or JSON Feed is available for you to share and publish to your favourite web pages / RSS Reader.

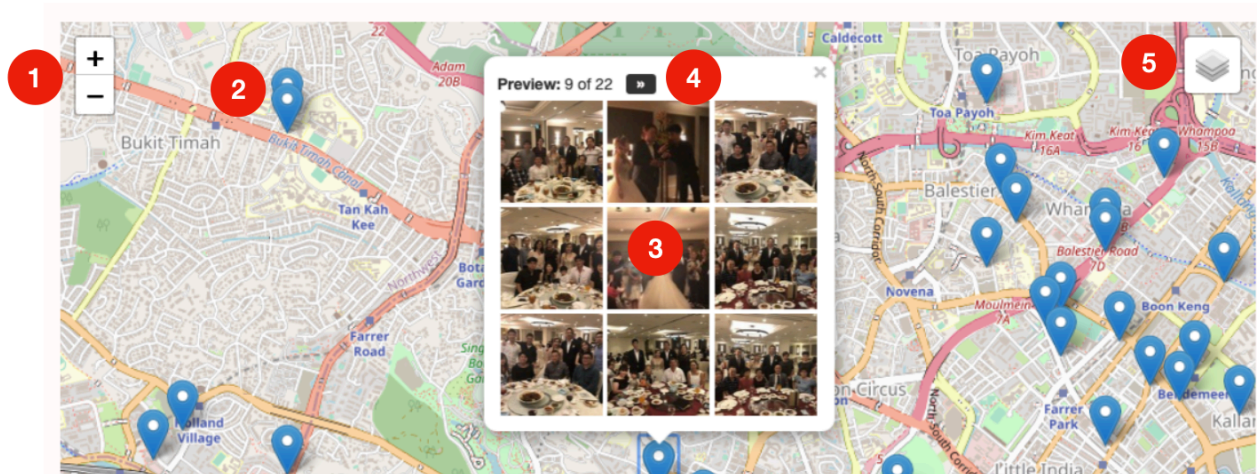
Tag sharing also allow you to dynamically watermark the photos when you try to download as Thumbnails. No Watermarks are added when you download the Original photos.



To modify the watermark, go to your home directory, aphoto, config folder. In the config folder, there is a settings file that you can modify using your favourite editor.

## Map Display

The Map Display presents your photos that has GPS data within the EXIF information in an interactive manner. It also helps you to visually locate photos that you might have recollection of but do not know where to start.



- 1 Zoom In and Zoom Out of the Map Display.
- 2 Photo Marker Pins indicating photos with specific location. Zoom in further to expose granular details.
- 3 When you select any of the pins, the Preview window shows up to 9 photos.
- 4 To see all photos in the same GPS location, select the >> to reveal all photos as a Filtered Image Display.
- 5 Photo Aggregator uses OSM to compute and display maps and venue information. This requires an internet connection (most of our other features do not!). On top of the regular map view, we have included some other freely available base maps such as the Topo Map, Cycle and Stamen Watercolour Layers. Use this to switch between different layers and toggle to show/hide the Photo Marker Pins.



## Timeline Display

The Timeline Display displays your images in a timeline manner for searching of images based on a date range. The default timeline view is 90 days and you can narrow down to a shorter range by scrolling. As you narrow down to the days and even hours, you will noticed that the stacked tiles of images slowly collapsed from **Merged Preview** to **Preview**.

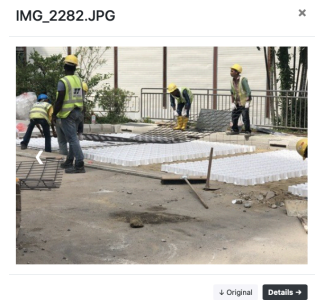


- 1 The selected tile in yellow will display thumbnail images. Previews displays up to 6 images.
- 2 To view the other non displayed images in the same tile, simply select the >> to reveal into image display.
- 3 The selected tile will also have the timeline highlighted from the centre of the tile to the timeline display.
- 4 A Merged Preview tile indicates that there are several preview tiles combined in this same tile. As you narrow down your timeline view, these managed preview tiles may expand further into the individual tiles. However, there would be instances where it will always stay in Merged Preview because we do not allow timeline to go beyond the hour mark.
- 5 The timeline view starts from 90 days and you can expand and narrow to the hour mark. We do not support going into minutes or seconds view.



# Working on the images

When you select an image, a preview will show with 2 options. You can either download the **Original** and use it with your favourite application for editing or find out more **Details** about this photo.



## Photo Details

Image details such as filename and the MD5 checksum. The icon next to the filename is the blacklist trigger. Clicking that adds this photo to the list of blacklisted photos not to be shown when searched. See more in Blacklist section.

Displays the main EXIF information such as DateTime Original ,Directory, FileName, FileType, GPSPosition, ImageSize, Make and Model.

Comment Field - Any comments added here are added to the database as part of your EXIF information. It does not modify your original EXIF on the photos and is only stored in Photo Aggregator's internal database. You can search for 'Comment' in EXIF search to look for your photos with comments.

Thumbnail Resolution - Provides a quick way to download the low, medium, high resolution of the thumbnails generated. You can also download the original file from here.

Adds tag to this photo. All tagged photos are automatically to the favourites list with sorting via various tags.

Perform a search based on the image information such as the same directory, same make or model of camera, GPSPosition or the same date. When the information is not available, the selection will be disabled. For example, if it is a screenshot taken from your phone, there is only directory information and date information. You can simply click the quick search links and will will search similar directory, make, model, GPSPPhoto or Date based on the same image information.

IMG\_2282.JPG

07f92a89010183d9e364d7af40ddb6be

EXIF Details:

DateTimeOriginal: 2018:04:11 15:04:45

Directory: /local/2018/04/11

FileName: IMG\_2282.JPG

FileType: JPEG

GPSPosition: +1.27400556, +103.82793333

ImageSize: 4032x3024

Make: Apple

Model: iPhone X

Comment:

Thumbnail Resolutions:

Low

Medium

High

↓ Original

Tags:

None

Quick Search Links:

Directory

Make

Model

GPSPosition

Date

+

-

Leaflet | © OpenStreetMap contributors

Smart Search Links:

[Find similar looking images](#)

Objects Detected:

person (~80%)

excavation (~31.16%)

construction\_site (~24.75%)

driveway (~6.7%)

kennel/outdoor (~5.91%)

All Exif Information

Re-process EXIF

AccelerationVector: -0.9961620571 -0.01925027556 -0.1802869141

Aperture: 2.4

ApertureValue: 2.4

BitsPerSample: 8

BlueMatrixColumn: 0.1571 0.06657 0.78407

BrightnessValue: 10.865625

CMMFlags: Not Embedded, Independent

ChromaticAdaptation: 1.04788 0.02292 -0.0502 0.02959 0.99048 -0.01706 -0.00923 0.01508 0.75168

CircleOfConfusion: 0.003 mm

ColorComponents: 3

ColorSpaceData: RGB

ComponentsConfiguration: Y, Cb, Cr, -

Compression: JPEG (old-style)

ConnectionSpaceIlluminant: 0.9642 1 0.82491

CreateDate: 2018:04:11 15:04:45

7

A Map view of where the photo is taken. This section is only available if GPS Information is available. You can zoom in and out of the map where applicable.

8

Smart Search groups the capabilities of the other search capabilities such as allowing you to find similar images based on the same colour.

9

Object detection information. You can click any of the detected attributes to search for the same objects detected in your database.

10

Shows ALL EXIF information from photo. You can click any of the EXIF value in the photo to filter a search based on that same value. For example, you may want to search for all photos taken using the same 'Model' of camera, or 'LensModel' of your favourite lens or if 'Flash' was on.

# Settings

## Data Sources Configuration

The sequence of the data source configuration will determine which folders / mount point gets scanned.

We will be showing some examples here for your consideration on your mount points.

### Window/Samba/Network File Servers: cifs

**local:** a pre-defined docker folder. This is located in the home directory, aphoto/photo directory. You can copy your SD Card contents here if you do not have a NAS.

For most of the popular consumer NAS like Synology and QNAP, samba/cifs is the default file sharing protocol used. Here's an example when we need to connect to our test NAS mount point with a specific folder called Photos:

#	Type	Name	Device	Directory	Options	Actions
1	cifs	folderName	//192.3.4/shared/folder	/	user=name,password=pw	Add

Usage Instructions: Configure your data source

- 1 Select the Protocol - cifs
- 2 Name this mount point. This is the same name that will appear on the side bar of mounts. Alphanumeric field with no spaces in between.
- 3 Device - We specify the IP address of the NAS and the MountPoint such as *//192.168.1.5/Photos* .
- 4 Directory - If you plan to scan the entire mount point, Add / into Directory which means everything inside this mount location. If you have many folders in this location, you should

include all by specifying / first. Then after the scanning is done, use the blacklist function to exclude those few unwanted folders.

5

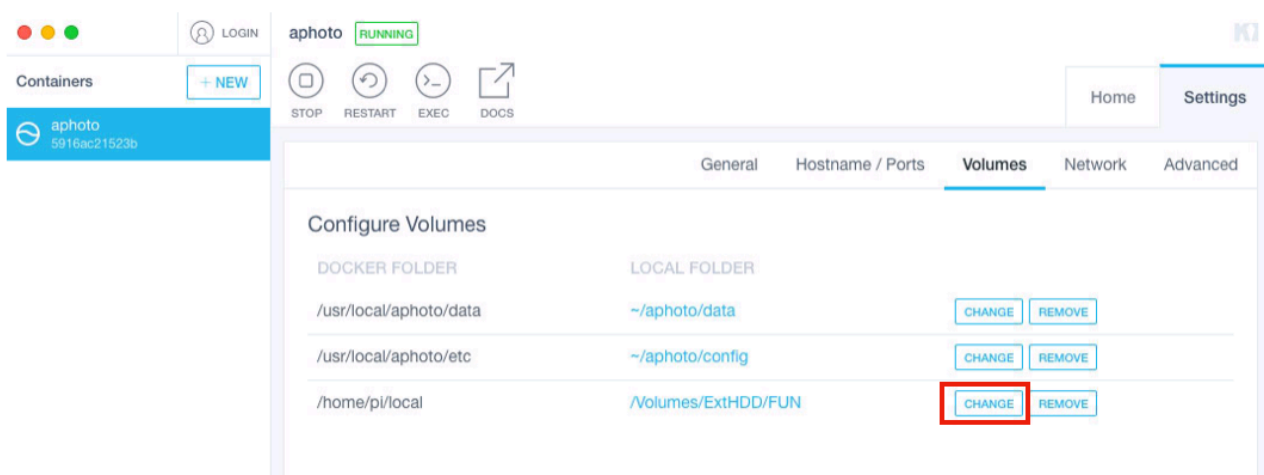
Options will be required for network mount points for your user ID and password used to access this mount. The machine where Photo Aggregator is installed must be able to connect to these mount points.

6

Detailed instructions on how to configure your data source can also be found [here](#).

## Local USB Drive Mount.

Because Photo aggregator is deployed via a Docker Image, it will not see your USB Drives natively. In order to be able to see your USB Drives, you will need to route the local folder to your USB Drive folder. This can be done using GUI tools for Docker such as Kitematic to mount the necessary drive mapped as local. Do note that you can only mount 1 external local drive.



## Blacklisted Items

You can exclude any folders from Photo Aggregator from appearing when you search.

## System Progress

Provides an overview of the current photo indexing progress. [Update Progress](#)

Queue State: 1

QUEUE	JOBS REMAINING
Thumbnail/Exif Queue:	0
Worker Queue:	0

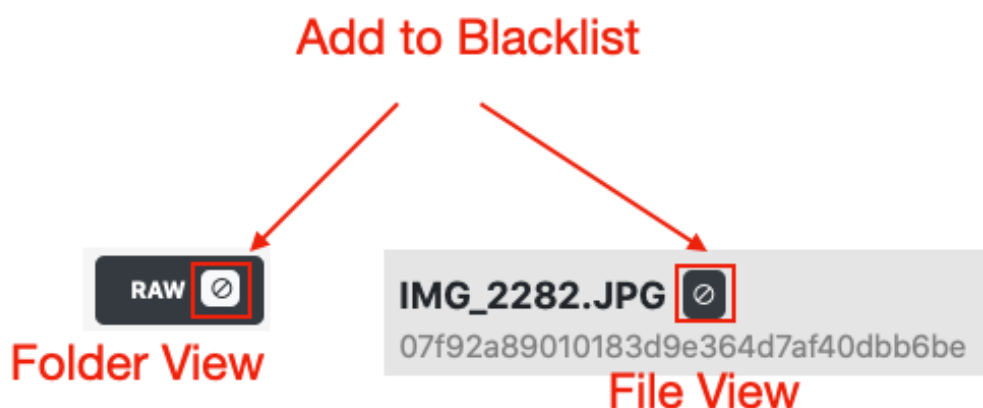
Previous Scans: 2

TYPE	LAST COMPLETED
Last Directory Scan:	Unknown
Last Thumbnail Indexed:	Unknown
Last DB Clean:	Unknown

File States: 3

TITLE	COUNTS	PERCENTAGE
Filecount	195348	100.0%
Thumbnails	195339	100.0%
GPS Indexes	24193	12.4%
Detection Indexes	185868	95.2%

When scanning is completed, you will be able to navigate to the appropriate folders to blacklist the specific folder. See usage instructions on the settings page under Blacklisted items. You cannot manually define your blacklist. You will need to add a file or a folder to blacklist before you can modify the blacklist rule. When you browse photos, you can also blacklist that individual photo, Simply look out for the Add to blacklist icon :



When you attempt to add a blacklist photo or an album, the system will prompt you if you would like to clean it from the photo indexes immediately :

Do you want to clean (/PhotoSync/2020/05/03/  
IMG\_3173.MOV) from the photo indexes now?

Cancel OK

If this is your only photo or folder that you are blacklisting, you can proceed to do so. However, if you are blacklisting multiple items, it would be better not to re-index every time you add it. This is because blacklisting a photo or folder is a system intensive process and it will need to scan your

database. Complete all of your intended blacklist selections and rescan at the end of it all. This is highly recommended. Detailed instructions on Blacklist is found on the Settings Page under Blacklisted Items section.

**CAUTION** : You should NOT start the blacklist process if you are still scanning your photo sources. Both process are very processor intensive and leverages the same database. Therefore it should not be carried out at the same time. You can start to add to black list and not clean up the database if you are able to find the specific photo / folder to do so. You can trigger a re-scan manually by either rescanning a directory or do a full re-index manually upon completion.

## Progress and Advanced Control

### System Progress

The Queue State will show the current queue status including the Thumbnail generation status.

- 2
- Previous Scans shows when was the last scan was completed, when the last thumbnail was indexed as well as when as the last Database Cleanup when you apply blacklist.
- 3
- File States shows the number of files scanned, the number of thumbnail created, GPS indexes would be photos typically taken with GPS information in the EXIF. Smartphones and GPS enabled cameras etc. The detection indexes essential shows the number of
- 1
- photos it has processed for image detection. When you initially add photos into the photo sources, the system will scan and the total number will be indicated. As you apply blacklist photos and albums, the list will be reduced. The two most system intensive tasks are scanning of the database which results in thumbnail generation, as well as blacklist database cleanup. In our test of 250,000 photos, the scanning took 2 days on a i7 6 core 3.2GHz Processor with 32GB of memory. For smaller number of images, e.g. 5000 photos, the scan & thumbnail generation process is reasonably fast, perhaps within 15 minutes. (Your mileage may vary).

### Advanced Control

### Advanced Control

System control for advanced users.

FUNCTION	DESCRIPTION	ACTION
Re-Index Files	Scans through all configured folders and re-indexes all files where not found or outdated. <b>This is a time consuming process! Use with caution!</b>	<a href="#">Index Files</a>
Clean File Indexes	Removes blacklisted files from file list database and cleans up items that are no longer in the data sources	<a href="#">Clean Indexes</a>
Data Source Configuration	Add network drives and folders containing photos for indexing	<a href="#">Data Source</a>
Evaluate System State	Provides an overview of the current system health.	<a href="#">Evaluate System</a>
Display System Logs	Displays system log information	<a href="#">System Logs</a>

[BROWSE PHOTOS](#)

# System Logs

Displays system log information

FUNCTION	DESCRIPTION	ACTION
Check System Progress	Provides an overview of the current photo indexing progress.	<a href="#">System Progress</a>
Evaluate System State	Provides an overview of the current system health.	<a href="#">Evaluate System</a>

File Indexing

File Worker

Search Indexing

Clean Indexes

file\_index: No recent output found.

The advanced control provides a set of controls that you are able to further check on the health status of Photo Aggregator.

Re-Index Files or Clean File indexes (Blacklist) are system intensive tasks. You can proceed to do so if some of your new photo sources or new blacklist items are not properly showing. Data Source allows you to configure your available network mounts for scanning purposes. System Evaluation State lets you check on the system health on the various modules being used. If you are brought to this screen while performing a search, it would mean some modules might have encounter an error. This could happen when database is busy and an error has occured communicating with the databases. Ideally, allow any indexing or cleaning process to complete before performing any additional actions.

# System Evaluation

Provides an overview of the current system health.

TEST TYPE	TEST RESULTS	ACTION LINK	
Data sources	4 data source(s) configured	<a href="#">Data Source Init</a>	
Blacklisted items	API successful. 13 items blacklisted.	<a href="#">Data Sources</a>	
JS Events Support	Supported	<a href="#">Get Chrome</a>	
Scan Process	Files are not being added to the database at this point. <b>Scan Files</b> if you wish to trigger the indexing of files.	<a href="#">System Progress</a>	
Processing Queue State	Processing queue is running. 0 jobs in queue.	<a href="#">System Progress</a>	
Check Browsing API	API successful. 6956 results retrieved in querying the base directory.	<a href="#">Browse Photos</a>	<a href="#">System Progress</a>
Check EXIF Filter API	API successful. 1987 EXIF keys retrieved.	<a href="#">EXIF Filter</a>	<a href="#">System Progress</a>
Check Object Detection API	API successful. 442 object classes detected.	<a href="#">Object Search</a>	<a href="#">System Progress</a>
Check Date Filter API	API successful. 16 years retrieved.	<a href="#">Date Filter</a>	<a href="#">System Progress</a>
Check Location Filter API	API successful. 12 countries retrieved.	<a href="#">Location Filter</a>	<a href="#">System Progress</a>
Check Map Display API	API successful. 37 pins retrieved.	<a href="#">Map Browser</a>	<a href="#">System Progress</a>
Check Favorite Labels API	API successful, but no favorite labels found.	<a href="#">Favorite Labels</a>	



System Logs shows in detailed the four main log files. File indexing, File worker, Search Indexing and Clean Indexes. If you have triggered an action and it does not seem to have progress, you may want to check the logs and see what it reports.

## Support & Updates

For feature request and support, please drop us an email to [photoaggregate@gmail.com](mailto:photoaggregate@gmail.com)

We will provide updates to the product which contains bug fixes reported and new features requested. We seek your understanding that not all feature request would be implemented. The team would need to study its viability before implementation.