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GEO Tagging: An Overview (A Analytical Study Of Recent Status)

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Introduction

Photo Supreme is "Digital Asset Management" software. Photo Supreme makes it possible to manage your image files by categorizing them. It will categorize the files based on the available details of the file, this includes technical photo details, but also the location of the file on disk, etc. Apart from those properties you can add tags to the images, enrich the files with descriptions, or add custom information. This may sound like a very time-consuming task, but once you have worked through that yourself, you will benefit from the many advantages. With Photo Supreme at hand, you will be able to quickly retrieve your images using all kinds of criteria or combinations.

GEO Tagging is the process of adding geographical metadata to your images. This includes the coordinates like latitude and longitude, but also altitude, and location details like City, Country etc. (geocoding). This manual will describe the GEO Tagging features of Photo Supreme. In Photo Supreme there is a dedicated panel devoted to GEO tagging individual images or groups of images. But there are also high-level GEO tagging options. For example, there are options to add GEO Tag information to a catalog label and then, simply by assigning the catalog label to your images, the corresponding GEO Tag information is pushed to these images. Some photographers do not use cameras with a GPS chip and don't use a GPS recorder. These photographers will add GEO details from scratch by either entering coordinates manually or selecting the coordinates from the map.

A second group of photographers use a camera that has a built-in GPS recording chip. These cameras can write GPS coordinates directly to the metadata of the recorded image file. Other cameras take this a step further and will even add (some) location details like city or country. Cameras with a GPS chip are very convenient for those who prefer GEO Tag information for their images. At most you will have to make slight adjustments to coordinates or other location details that the camera recorded for you.

A third group of photographers use cameras that do not record GPS coordinates and use a separate GPS recording device. Such a device offers features to record track-logs. A track-log is a series of recorded coordinates, written at a specific interval. For instance, you can let a GPS recording device record the coordinates every 30 seconds. Then every 30 seconds a new point is added to the track-log. Such a track-log can then be used afterwards to map the photos to the track-log. This is done by matching the photo's time stamp with the track-log times. Photo Supreme offers features to facilitate all three groups of photographers.

Preparing the use of Google Maps

Since July 2018, Google requires the use of an API key to work with Google Maps. To get your own API key, sign up with Google Cloud. This is described in the Quick Start Manual for Setup Google API. Enter your Google API key in the Photo Supreme Preferences in the Other Settings section.

1. GEO Tagging individual images

This section describes how you can GEO Tag individual or groups of images. To create GEO Tagging information for your images, there is the GEO Tag panel. Open this panel by selecting the corresponding button from the Command Bar below the thumbnails.

As explained, there are three groups of photographers with GEO tagging needs:

1. The photographer that does not use any GPS recording

2. The photographer that uses a camera with embedded GPS chip

3. The photographer who uses a GPS recorder device

Each of these groups have different demands and Photo Supreme facilitates each of them. The first group can use Photo Supreme to manually add GEO coordinates, lookup locations fine tune coordinates. The second group has images with pre-existing coordinates and with Photo Supreme they can fine tune the coordinates, lookup location details, altitudes, etc. The last group can use Photo Supreme to read GPX track-logs, fine tune the coordinates, lookup location details, altitudes.

The GEO Tag Panel has three main areas:

a. The upper area is the Map.
b. The middle area has the Location Details.
c. The lower area has the GEO Details.

1- Map- The upper part shows the Map. Photo Supreme uses Google Maps for its GEO tagging.
2- Location Details- The middle part shows the Location Details. This is "real world" information such as the physical location, the city, state, and country where the image was taken. There are two ways to enter this information.
    a. Enter the location information by hand.

b. Get the details based on coordinates (reverse lookup).
c. Get the details from one of your stored favorites.

3- GEO Details- The lower part shows the GEO Details. There are several ways to enter this information:
    a. Enter the coordinates by hand.
    b. Get the coordinates based on the Location Information (forward lookup)
    c. Load coordinates from another image file
    d. Copy/paste the coordinates from either another image or from Maps software like Google Maps.
    e. Get the coordinates directly from the map.
    f. Read the coordinates from a GPX track- log.
    g. Get the coordinates from a favorite.

The GEO Tag Panel works for the selected files. This can be one single image but also a series of images. Keep in mind that the GEO Tag Panel is intended to represent one single coordinate. When you select multiple images and then enter either Location and/or GEO details then that information is applied to every selected image.

Enter the Location Information by hand

This is the most straightforward way of entering Location Information. The Location Details of the GEO Tag Panel is intended to enter information about where the image was taken. At a conceptual level one could make a difference between the location where an image was shot vs. the location that is represented by the image. The location information in the GEO Tag Panel is for the first location. In general, this is also representative for what the image represents (unless you own a wonderful lens like a 1200mm, or when you take a picture from a subject from a far distance).

It is not recommended to enter the information directly but use a reverse lookup. This is described in the next chapter of this manual. With a reverse lookup, the Location Details are populated automatically, based on the existing coordinate (latitude/longitude pair). If you think that the retrieved information is incorrect or needs minor adjustment, then you can always change the details afterwards.

Get the details based on coordinates (reverse lookup)

You can get the Location Details based on existing coordinates. This is called a "reverse lookup". With a reverse lookup, the entered GPS coordinates are queried online, and the matching details are returned. Photo Supreme uses the Google GEO coding Service to retrieve location details. Their service is accurate. Doing a reverse lookup is a matter of pushing a button. Once you've entered GPS coordinates for latitude and longitude, you click the "Reverse" button.

That populates the Location Detail fields by querying the online services. Enter the coordinates by hand

Some photographers do not use a GPS recording device and have no GPS chip in their camera, or there just wasn't a GPS fix available. In that case you can enter coordinates by hand. Of course, there are much easier ways to enter coordinates than entering these long number strings manually. You can enter coordinates by typing them in the Latitude or Longitude fields. Then select if it's North/South (for latitude) and East/West (for longitude) Once entered you can click the "Reverse" button to look up the matching details. Entering coordinates manually can be a tedious task. There are better ways to do it. You can use location information and then query the coordinates (forward lookup), or you can copy and paste coordinates from your favorite maps software or website.

Get the coordinates based on the Location Information (lookup)

When you remember some basic information about an image, you can use that information to lookup the matching coordinates. Click the "Lookup" button and enter the partial information that have. That will run the location details against the Google GEO Services and return the matching coordinates This also fetches the missing Location Details that go with the information that you have entered.

Load coordinates from another image file

In some cases, it is convenient to load the coordinates from another image which has coordinates in the metadata. Click the "load button and point to the image file from which you would like to load the coordinates.

Copy/paste the coordinates from either another image or from Maps software like Google Maps

Another way of getting coordinates is by copying them from another image

a. Select an image.
b. Open the GEO Tag Panel.
c. Click the Copy button.
d. Select another image.
e. Click the Paste button.

You can also copy/paste coordinates from other software. The requirement is that the coordinates that are copied to the clipboard use the latitude, longitude format (note the comma separator) and that the numbers for latitude and longitude each use the international "period" decimal separator.

Get the coordinates directly from the map

When your computer is connected to the internet, then at the top of the GEO tag Panel, there is a map area. You can shift the map to any location by dragging the map around. TIP: right click on the map and select Search to find a specific location on the map Right click on the map background and select "Set the Marker here". That will copy the coordinates from the exact location where you right clicked on the map. Another way to

get updated coordinates is by simply dragging the pin marker around on the map. Then as soon as you drop the marker, the matching coordinates will be entered in the GEO Details.

Read the coordinates from a GPX track-log

A GPX track-log is typically recorded with a separate GPS recording device. This can be a device that was dedicated for this purpose, but there are also particularly good GPS track recording Apps for smartphones, Either which type or recorder you use, the device creates a file containing a series of coordinates at a specific recording interval. This file is usually formatted in the popular GPX format. Photo Supreme can read such a GPX files and map your photos to the track log to retrieve the applicable coordinates for that photo. In the GEO Tagging panel, you can load one or more GPX files by clicking the "GPX track" button below the Location Details.

That open a file selection dialog and select one or more of your GPX track logs there. Since the track log will be used to map photos onto the track log, it is important that the recorded time of the track log matches the recorded time of the camera. If you are not sure about that then you can synchronize the times. Click the time frame of the GPX track to alter the times. Again, this is only needed when the time of your camera does not match the time of your track-log. In the dialog that opens you can synchronize the time of your camera. Make sure that the time is synced to the location of where you are now. You are now done and ready to assign coordinates from the track-log to the selected photos The GPX track log remains loaded, even when you select other photos. Now select a photo thumbnail for which you would like to assign coordinates from the track-1og. Now click the button "GPX Point" that is located below the coordinates. That will match the photo date with the track date and extract the best possible GPS coordinates from the log.

Get the coordinates from a Favorite

The GEO Tagging Panel allows you to create Favorites. A Favorite is a set of information in the Panel that you store for future re-use. A favorite does not only contain coordinates but also the location details of the point when the favorite was stored. To store a Favorite, click the Favorite button and then select "Store as new Favorite". To read the details of the favorites (the coordinates and the location details) then click the Favorites button and select the previously stored favorite from the drop down.

GEO information on thumbnails

Now that you have images which are GEO tagged, it is easy to make this visible on your thumbnails. You can do that with Custom Thumbnail Information.

1. Click the Thumb Button in the Settings Bar below the thumbnails
2. Tick the option to "Show custom thumb info".
3. In one of the lines, click the right drop down arrow.
4. Select "Image"

5. Select "Image Has GPS"

That will show a "Yes" or a "No" on the thumbnails to indicate if there are GEO coordinates for that image or not. TIP: The Info Panel also shows a GPS Indicator which will light up if the selected image has GEO coordinates.

Working with GEO Fences

From Wikipedia: A geofence is a virtual perimeter for a real-world geographic area. A geo-fence could be dynamically generated (as in a radius around a point location) or match a predefined set of boundaries (such as school zones or neighborhood boundaries).

In simple words: a GEO Fence is a range around a point/GEO location. It's comparable to putting a fence around your garden with the house in the center. The GEO Fence distance is the distance from the house to the fence. After you have GEO tagged your images in Photo Supreme (or with a camera, a GPS Recorder, a phone app or otherwise) then each of these images have a point location defined for them. Since GEO coordinates are not very "convenient" to remember or work with, it becomes harder to find GEO tagged images. That is where GEO Fences come to help.

In Photo Supreme you can start from a point location and then define a fence around that location. You typically do this by starting with one image having coordinates. Select the thumbnail and right click on it. This is where you define where you'd like to place the fence around this image's GEO location. Enter the distance radius where you'd like so search in. In this case a 2 miles distance radius. Note that the unit being used (miles or kilometers) depends on the preference setting for "Measurement System".

Click OK to start the search for this GEO Fence. The Collection title shows the GEO-Fence as the center point and its distance radius. This is the simplest way of using GEO-Fences. From here you can keep this GEO-Fence stored as a Favorite or use it as a part in a Dynamic search. Or even use it as a Catalog Filter to evaluate your catalog based on the GEO Fence.

You can also define GEO Fences for multiple selected images. For instance, you could define a GEO fence as a radius around your home joined with a radius around your favorite hangout spot. You can now define the distance and how the GEO fences should be joined. Options are:

Overlap	Only the overlapping (intersecting) region will be used. In other words: if the GEO fences overlap then the shared/overlapping region will be used in the search.
Individual	Despite the regions overlapping or not, results from each GEO Fence will be returned.

Finding all images with or without GEO Tagging

You can get direct access to all images that have GEO tag information and those that do not There are two ways to achieve this.

❖ **Filter on GEO Tag**

Every collection can be filtered. This can be done with the Filter Bar. One of the options in the Filter Bar is to filter the current collection on GEO tags.

When selecting the state while holding down the Alt key on the keyboard, the inversed will be selected. In this case "Not GEO Tagged".

❖ **All GEO Tagged images**

The quickest way to access all images that have GEO tags is by using the Catalog States. One of the catalog states is to see GEO Tagged or Not GEO Tagged images. To open the Catalog States:

1. Click the States section in the Catalog Sections.
2. Select the entry for GEO Tagged.

❖ **Catalog Labels and GEO information**

Catalog Labels are "tags" that you add to your images. Such a Catalog Label is typically something that identifies the content of an image, like a person, a place, an event, etc. Some Catalog Labels represent a physical location. This could be a place, city, neighborhood (e.g., "Staten Island"), or a special point of interest:

- a building (e.g., "Space Needle"),

- a specific object (e.g., "Statue of Liberty"),

- a tourist attraction (e.g., "Forbidden City" or "Times Square")

With Photo Supreme you can add GEO details to a Catalog Label and then, when that label is assigned to an image, the GEO coordinates will be written to the file when the image is synchronized. Using GEO details with Catalog Labels is especially convenient when you do not have recorded GPS coordinates but still want some degree of GEO tagging. To add GEO Details to your Catalog Label, then either create a new label or open the details for an existing label (right click on the label -> Details).

The easiest way to retrieve coordinates for a point of interest is by using the "lookup" button. This will use the details as already entered to find the coordinates. In my case, I am creating a Catalog Label for the Atomium structure (building?) in Brussels. I have entered the name of the label. Then click the lookup button to do a reverse lookup for Atomium. This gives an instant hit, and the coordinates are filled in. Of course, you can also enter the coordinates either by hand, copy/paste the coordinates from the GEO Panel, or copy/paste the coordinates from the Google Maps website.

Please pay attention to the checked field "Overwrite pre-existing GEO location info". When you assign this catalog label to an image that already has coordinates, then this checkmark will overwrite those coordinates when the metadata for that image is written. In general, you would keep this switched off to safeguard your recorded coordinates. Then click Apply. This Catalog Label is now GEO tagged and ready to be

assigned to your images. Remember, when you assign this catalog label to an image then the GEO tags will be written to the metadata of the file when the file is synchronized. If you enter coordinates for a Catalog Label that already has images assigned to them and you would like the coordinates to be written to all these files, then select all images for that Catalog Label, and sync the with a right click on a thumb -> Metadata -> Save Metadata to File.

❖ Working with the Map

With the GEO Tag Panel, it is possible to add GEO Details to one or more selected image. The panel works with a single set of coordinates, and so it's not possible in the GEO Tag Panel to see multiple images on the map. To facilitate this, you can also display an image on the Map. Photo Supreme uses Google Maps for this. To open the Maps, select one or more images and then right click on a selected thumbnail and select "Display on Map". This will open a map panel with the selected images all marked on the map. Each selected thumbnail is visualized on the Map as a Marker. When selecting one or more thumbnails, the map will be zoomed to display all selected thumbnails that have coordinates. Inside the map, a Marker can be dragged around to a new location. Keep in mind that by dragging a Marker on the map will instantly update the coordinates for that image. This makes it a great way to fine-tune the coordinates.

The Map displays up to 50 "picture" markers that can be dragged around. If you select more than 50 thumbnails, then each image will be presented as drop-markers and those can't be dragged around. When you drag a marker on the Map to a new location then that updates the coordinates for the photo that you're dragging the marker around. If you want to delete the GEO coordinates for a photo, then you can right click on the marker and select "Delete".

❖ GEO Batch processing

Batch Processing is the handling of multiple images in a single run. With Photo Supreme you have a very advanced Batch Processor at hand that allows you to batch process about anything and in many possible combinations. This section describes the available Batch Processing command that relate to GEO Tagging. Those are:

a. GEO Tag Image
b. GEO Remove
c. GEO Reverse Lookup
d. GEO Tag from GPX File

Working with the Batches is done in the Batch Panel and you can open it by clicking the Batch button in the Control Bar below the thumbnails.

GEO Tag Image

When you add this batch command then the editor for this command will pop up. This one is like the GEO Tagging panel as described earlier in the manual. In short, this will

give you the batch feature of working with the GEO Tag Panel. For a description of the content, please read through the earlier chapters.

GEO Remove

This batch command is very convenient when you would like to remove GPS coordinates from one or more images. By removing the information, only the coordinates are removed not the location information. If you want to remove location information, then you can batch update these fields with the "GEO Tag Images" batch command. Optionally add both commands in one batch to have them processed together. The GEO Remove batch command does not have additional settings

GEO Reverse Lookup

This batch command can be used to perform a reversed lookup for the existing GEO coordinates in the metadata of the selected images. The GEO Reverse Lookup batch command does not have additional settings

❖ **GEO Tag from GPX file**

With this batch command you can apply a GPX track-log to a selection of images. When applied to a series of selected images, the batch command will load the GPX file, optionally make a time correction, and then locate the appropriate GEO coordinates in the GPX track: log for each of the selected images. When you add this batch command then the editor for this command will pop up. Click the folder icon to load a GPX file from disk. Then optionally click the Time Offset button to sync the camera time and GPX time. And click Apply to confirm the settings of the Batch effect.

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