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Location Identification of the Individual based on Image Metadata

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Abstract

Now-a-days an individual is directly or indirectly attached to many smart devices. One can find his or her whereabouts if we monitor the devices they are using by collecting the metadata of the photos posted by them in the social media. Some social media websites have a feature to post the place of their recent past. To provide a simple Android application, this will be using the feature of Geo tagging available with most of the smart phones. We can use this location based data to track the people based on longitude and latitude of Global positioning system(GPS). We can use this to collect the photos posted by individuals and to analyze them to know their present position. The proposed article verifies the metadata associated with image and track the individual country, city, route and street based on the GPS Altitude, GPS Latitude, GPS Longitude and GPS position.

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Keywords: Geo tagging, Photos, Metadata, tracking;

1. Introduction

In the modern digital world, ownership of the digital content plays a vital role in identifying the ownership or copyright. The data also provide forensic evidence for cyber crime investigation. The metadata of the owner can be inserted during the image acquisition of the data (image/video) through the device in building capabilities or after the data acquisition (computing based insertion). The modern digital camera's software is built in with metadata. The communication platforms are moving towards a paradigm, where an average individual is connected to six devices which are computer enabled. The modern social media tools also helping the individual to update the current

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status of uploading files (Text, Image, Audio and Video). Who is involved with this image? (Who took it, who owns it, who is in it?) What is interesting about this image? Where is this image from? When was this image created or modified? [3].

2. Metadata in video/ Image

Metadata is data about the data. The Metadata or the Meta content is the data, providing some important information about data which can be used to analyze the evidence, ownership and quality. The Metadata in a image or a video can be of two types.

a. Automatically generated metadata

b. Human inserted metadata

In the automatically generated metadata which provides information about device ID, software used, date and time of creation, image width and height, GPS features, etc. This information is more crucial for forensic examination but in Human inserted Metadata also plays an important role for copyright related and ownership claiming. Human inserted metadata can be a fingerprint of the click, algorithm generated hash code, key frames in video for inserting and pixel location of data insertion [1].

When storing location based information it's important to understand the difference between the two main concepts:

2.1. Location Created:

This information describes the location where the image was created, the location of the camera during shot creation. The typical case is when a GPS receiver injects the current location into an image at shooting time (camera location).

2.2. Location Shown:

This information describes the location of the main subject being shown in an image. For example, a picture of Mount Fuji would be tagged with the coordinates of where the mountain is located (subject location), although the picture may have been taken from downtown Tokyo [3].

```
Components Configuration        : Y, Cb, Cr, -
F Number                        : 2.4
Y Cb Cr Positioning             : Centered
Y Resolution                    : 72
Resolution Unit                 : inches
X Resolution                    : 72
Make                            : LGE
Compression                     : JPEG (old-style)
Thumbnail Offset                : 819
Thumbnail Length                : 8550
Image Width                     : 2448
Image Height                    : 3264
Encoding Process                : Baseline DCT, Huffman coding
Bits Per Sample                 : 8
Color Components                : 3
Y Cb Cr Sub Sampling            : YCbCr4:2:0 (2 2)
Aperture                        : 2.4
GPS Altitude                    : 0 m Above Sea Level
GPS Date/Time                   : 2015:08:12 12:56:37Z
GPS Latitude                    : 16 deg 29' 6.46" N
GPS Longitude                   : 80 deg 41' 30.19" E
GPS Position                    : 16 deg 29' 6.46" N, 80 deg 41' 30.19" E
Image Size                      : 2448x3264
Megapixels                      : 8.0
Shutter Speed                   : 1/50
Thumbnail Image                 : (Binary data 8550 bytes, use -b option to ext
act)
Focal Length                    : 4.0 mm
Light Value                     : 5.0
-- press RETURN --
```

Fig. 1. (a) Sample Image; (b) Corresponding EXIF Data [2].