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ISC 110

1. Question:

If you take a picture with the same phone but you are on different carriers, is the GPS metadata the same or different between the carriers?

2. Background Research:

EXIF stands for **Exchangeable Image File Format**. This is comprised of information such as the aperture that was used, the date and time that it was taken along with the shutter speed. EXIF data can include GPS data which can be extremely risky. This GPS data will give the coordinates to the location you were in when the photo was taken and maybe give a general range of where you were. EXIF information can be wiped away, so no one can take it and look for your whereabouts. EXIF data can only handle JPEG information and many don't know when EXIF data is being stored.

3. Hypothesis:

If series of pictures are taken outside with the GPS on and the mobile data being turned on and off. Which phone carrier will have the sharper GPS location data if they are on the same carrier?

4. Tests:

Two people with the same will be standing outside and in the same spot. They both will be taking pictures of the object in the same location. They will follow a series of directions that I will be giving them. The Results are displayed in the chart that will be provided below.

1. What is kept the same:
  - i. Same picture of the same object
  - ii. Type of Phone
  - iii. Zoomed all the way out
  - iv. Outside
  - v. GPS is always on
  
2. What is different:
  - i. Mobile Data
  - ii. Wifi
  - iii. Phone Carrier

**Device & Results:** iPhone 6s Carrier: Verizon

Test 1:  Latitude:  <b>43.44964722222222</b>  Longitude:  <b>-76.54966666666667</b>	Wi-Fi: On	Mobile Data: On	GPS: On
Test 2:  Latitude:  <b>43.44966944444444</b>  Longitude:  <b>-76.549675</b>	Wi-Fi: On	Mobile Data: Off	GPS: On
Test 3:  Latitude:  <b>43.44974166666666</b>  Longitude:  <b>-76.54939166666666</b>	Wi-Fi: Off	Mobile Data: On	GPS: On
Test 4:  Latitude:  <b>43.449863888888885</b>  Longitude:  <b>-76.54936111111111</b>	Wi-Fi: Off	Mobile Data: Off	GPS: On

**Device & Results:** iPhone 6s Carrier: Sprint

Test 5:  Longitude: <b>43.44970277777777</b>  Latitude: <b>-76.54974444444444</b>	Wi-Fi: On	Mobile Data: On	GPS: On
Test 6:  Longitude: <b>43.44961111111111</b>  Longitude: <b>-76.54973611111112</b>	Wi-Fi: On	Mobile Data: Off	GPS: On
Test 7:  Longitude: <b>43.44963055555555</b>  Latitude: <b>-76.54974444444444</b>	Wi-Fi: Off	Mobile Data: On	GPS: On
Test 8:  Longitude: <b>43.44963333333333</b>  Latitude: <b>-76.54972777777778</b>	Wi-Fi: Off	Mobile Data: Off	GPS: On

## 5. Conclusion:

The location that the experiment was taken was right outside of Oneida Hall at SUNY Oswego. The coordinates of this location are  $43^{\circ}26'58.9''\text{N}$  Longitude and  $76^{\circ}32'59.0''\text{W}$  Latitude. I ran eight pictures through the exiftool to get an accurate reading of the location information and in the chart that is displayed above, I provided the metadata that was within the picture. From the metadata, it proves that the GPS data from Verizon is more accurate than the GPS data from Sprint. The GPS location are approximations, sometimes the phone was held higher or lower and more to the left or right. The location data was never the same between the devices.