

Part – 1: GPS Positional Error Correction

To correctly measure the GPS positional accuracy, the data bootstrapping method was used. The GPS module was left to run for 11 hours continuously, and the latitudes, longitudes, and distances were recorded while the GPS was stationary. To correct the GPS positioning error, the non-parametric method was used. Bootstrapping of data can be defined as the sampling with replacement from real data to estimate the variation in the statistic of interest which may be the mean, median, or standard deviation.

Data file attached and named “**GPS Positional Error Correction**” was used in positional error correction . The value was approximately *3.2 meters (10.5 feet)*.

[Data File Link](#)

NOTE: **** have been used for the privacy of my location.*

Part – 2: GPS Geolocation Data

After determining the GPS positional error, an experiment was carried out to determine the response/instance of the GPS sensor to the varied distance movements in different weather conditions. The recording was carried at the instants of *1m*, *2m*, and *3m* movements with the return of the device to the reference point after every instant recorded.

File titled “**GPS Geolocation-Cloudy data**” has been attached for the data collected in Cloudy day used for plotting geolocation variations.

[Data File Link](#)

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Part – 3: GPS Alerting Data

During alerting, another experiment was done to determine how the pulse is generated and communicated to the authorizing agents through emails.

File titled “**GPS Alerting Data-Clear Sunny**” has been attached for the data collected to show the distance movements in the instants of one meter and two meters and to show the corresponding alerting pulses during the experiment on a clear sunny day. The instants recorded were only two for one meter and another two for two meters hence two pulses per movement were expected after noise filtering.

[Data File Link](#)

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Part – 4: GPS Data Publication Summary

PubNub is a real-time communication platform for data streaming that is used to publish and subscribe to messaging API built on a global data stream network. With its extensive data network centers, it is widely used, and the streamer enables real-time geolocations to be published directly to the webpage hence improving communication safety. PubNub was used to generate publish and subscription keys which were locked to our application. Figure 1 below shows the PubNub publication summary of streamed data. No data have been attached for the publication summary because it is an online summary.

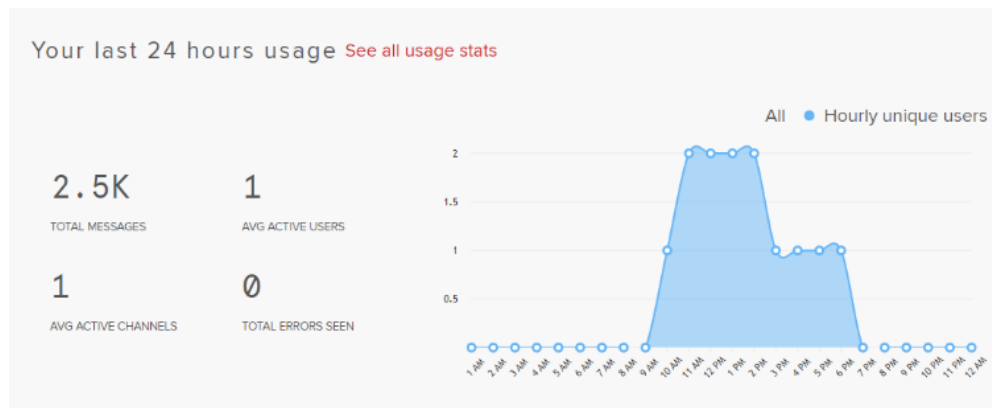


Figure 1: Data Publication Summary