ONLINE MAPS

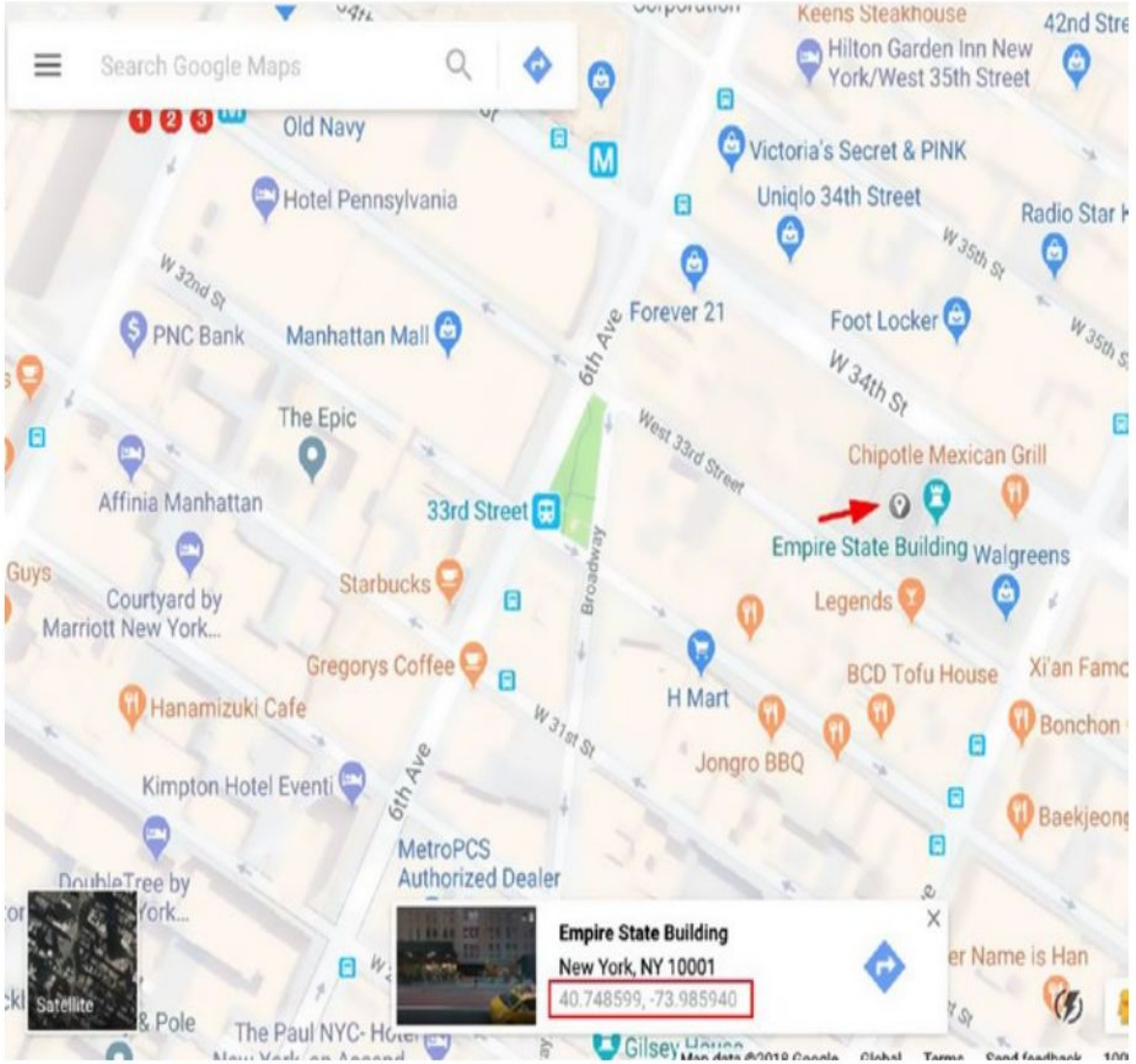
- ✔ Tracking users' geolocation information has become increasingly popular with the advance of computing devices, mobile communications, and social media platforms because these technologies make posting someone's current location online a matter of clicking one button.
- ✔ Nowadays, many types of electronic devices come equipped with satellite tracking sensors to determine their location on the map.
- ✔ Almost all handheld devices—such as smartphones and wearable devices—are now location aware.
- ✔ Many apps in major software stores such as Apple and Google Play have the ability to use the geolocation sensor of the smartphone/tablet to offer a customized experience or to offer certain functions to the device's user.
- ✔ In fact, most applications, online services, and social media platforms can track a user's location in one way or another.
- ✔ demonstrate how you can find out the geolocation information that comes with many users' online activities to determine their current and previous locations.
- ✔ We will also cover many useful online services that can help you to track everything online including vehicles, ships, shipments, airplanes, and people.
- ✔ You'll also learn how to research different online map repositories to gather intelligence.
- ✔ But before we begin, we will describe in simple terms how navigation systems— which are responsible for determining people's current locations—work.

The Basics of Geolocation Tracking

- ✔ Most people do not care about the underlying technology responsible for delivering location-based services to them.
- ✔ People enter the address of the location they need to look up on the map, or they use the built-in feature available in smartphones to geotag digital files (such as images and videos) so they record the current location of images/ videos as a meta tag automatically.
- ✔ In other instances, many social media platforms, especially Facebook and Twitter, allow their users to post their current location online (called a check-in on Facebook) with just a single click, and the rest is handled by the electronic device.
- ✔ To determine someone's current geographical spot, location-aware devices need to communicate with a satellite navigation system that is in turn is responsible for delivering the exact coordinates of the location on Earth.
- ✔ The Global Positioning System (GPS) is an American satellite navigation system developed and operated by the U.S. government; it is considered the most popular navigation system on Earth and is used by a large number of electronic devices worldwide.
- ✔ Of course, there are other navigation systems such as the Russian system named GLONASS, the BeiDou system owned by China, or the Galileo run by the European Union.
- ✔ For GPS to know your current location, it needs to determine the exact coordinate where you are currently standing.
- ✔ A geographic coordinate system is a system that locates points on Earth using two coordinate values: latitude and longitude. By knowing the two values, you can visualize any point on Earth on a map.

How to Find the GPS Coordinates of Any Location on a Map

- To find the GPS coordinates (latitude and longitude) of any geographical spot on Earth using Google Maps, follow these steps:-
  - 1. Go to Google Maps at https://maps.google.com.
  - 2. Click anywhere on the map where you want to see the GPS coordinates.
  - A small box appears in the bottom of the Google Maps page showing the current location GPS coordinates (see Figure on the right).
  - 3. To further investigate a selected location, click the coordinate numbers, and Google will take you to a closer view of the target location in addition to giving you its mailing address (if applicable).
  - The first GPS number represents the latitude, and the second represents the longitude.
  - You can also find the latitude and longitude of a point by going to http://itouchmap.com/latlong.html. Click the map and drag the marker to the desired location.
  - You can also enter the address (street, city, state, and country) in the search box to look up the GPS coordinates on map.
  - To convert latitude and longitude to decimal, go to https://andrew.hedges.name/experiments/convert_lat_long.



Finding the GPS coordinates of any location on Earth using Google Maps

HOW TO FIND THE GEOCODE COORDINATES FROM A MAILING ADDRESS

- If you have an address for a specific location on Earth but you do not know how to find its geocode coordinates on the map, go to the following free services:-
  - Batch Geocoding (https://www.doogal.co.uk/BatchGeocoding. php): This service converts multiple address at the same time into their equivalent geocode coordinates (latitude and longitude) using Google Maps.
  - GPS Visualizer’s Quick Geocoder (www.gpsvisualizer.com/geocode): This service converts an address into its equivalent geocode coordinates (and works for both Google and Bing).
  - Batch Reverse Geocoding (https://www.doogal.co.uk/ BatchReverseGeocoding.php): This service converts geocode coordinate numbers from various coordinate systems to their equivalent approximate mailing address.

General Geospatial Research Tools

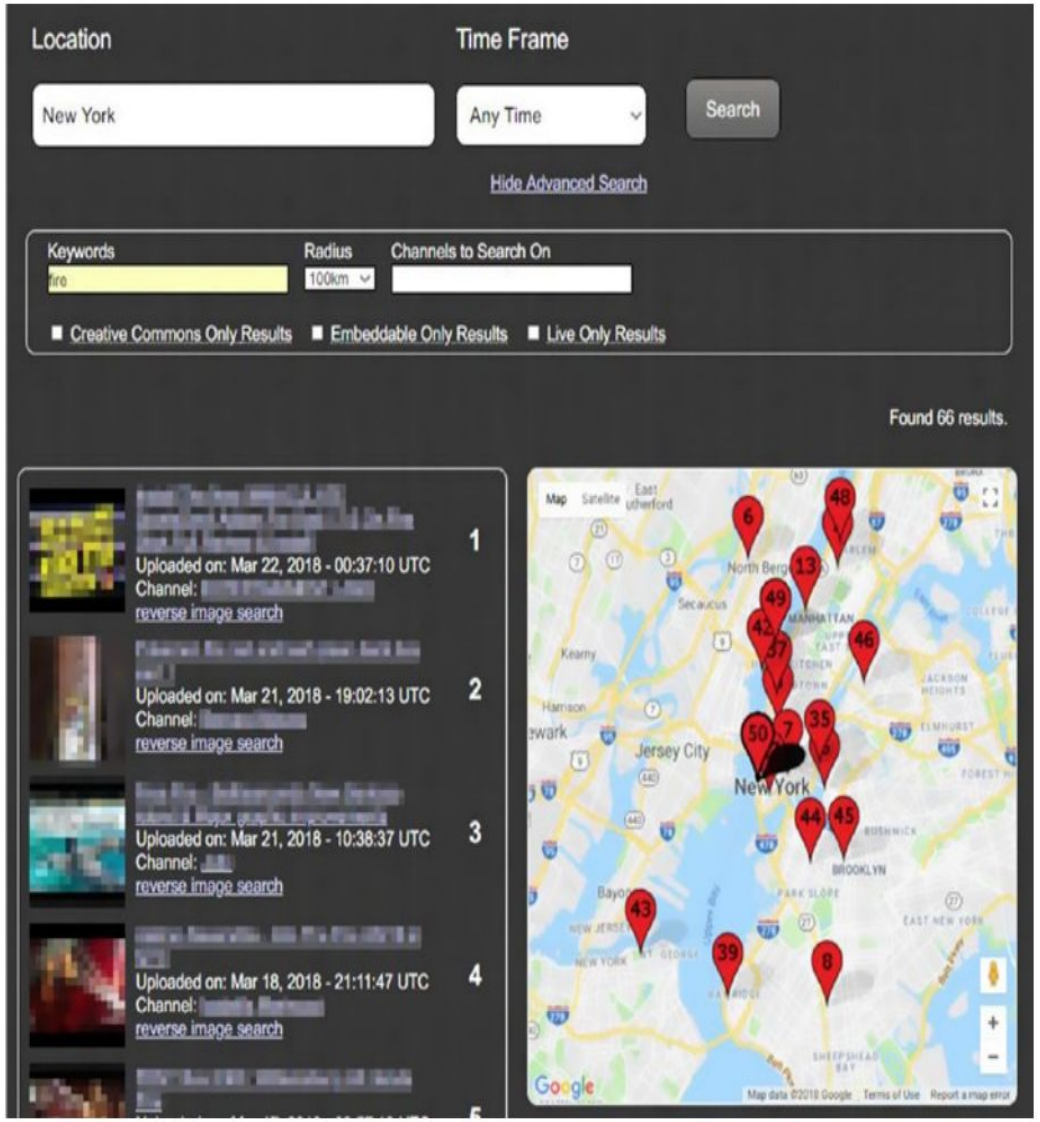
- There are many online services that can help you when researching online maps for different kinds of information. The following are the most popular services:-
  - Digital Globe (https://discover.digitalglobe.com): This is an easy-to-use global map imagery tool with advanced search filters.
  - Bing Maps (https://www.bing.com/maps): This is an alternative to Google Maps.
  - Yandex Maps (http://maps.yandex.com): This is a Russian alternative to Google.
  - Baidu Maps (http://map.baidu.com): This is a Chinese alternative to Google.
  - BB Bike (https://mc.bbbike.org/mc): Here you can compare two maps. For example, you can compare the same location on maps from Bing and Google Maps to see the differences in the target location.
  - Google Map Alert (https://followyourworld.appspot.com): You can receive an alert when new imagery is available in both Google Maps and Google Earth. Need to supply the latitude and longitude of a target location.
  - USGS (https://earthexplorer.usgs.gov): Here you can search a world map using different search criteria such as address, place name, or location coordinates. This map version is newer than Google Maps.
  - Google Street View (https://www.google.com/streetview): Here you can view a specific location (which must exist within the Google Street View database) as if you are there.
    - Google Maps Street View Player (www.brianfolts.com/driver): This shows a street view—where available—between two points on the map.
  - RouteView (http://routeview.org/): This is another Google map street viewer.
  - Street View Movie Maker (www.streetviewmovie.com): Here you can see the Google street view between two locations—where available— and download the movie to your PC for offline viewing.
  - Open Street Cam (http://openstreetcam.org/): Here you can view open street cameras in a specific location—where available.
  - GRASS GIS (https://grass.osgeo.org): This is open source Geographic Information System (GIS) software used for managing and analyzing geospatial data, spatial modeling, and visualization.

Location-Based Social Media

- ✔ Major social media platforms **allow their users to geotag some of their activities** when using them.
- ✔ how you can use the geolocation feature offered by major social media platforms to collect intelligence about a specific target or subject.

YouTube

- ✔ To search for videos tagged with geocoordinates on YouTube, you can use a dedicated tool called Geo Search Tool (https://youtube.github.io/geo-search-tool/search.html).
- ✔ You can search for videos at a given address and in a given timeframe.
- ✔ You can also specify a distance from the location entered; hence, the search can be as broad as 1,000 KM or as narrow at 1 KM.
- ✔ The returned results can be filtered according to each video upload time.
- ✔ Final results appear graphically on a map as a red marker (see Figure on right).



Geolocation YouTube movies search

Facebook Facebook

- Facebook is the number-one social networking site.
- It allows its users to geotag posts, photos, and videos, in addition to posting status updates with their current geolocation.
- We already covered how to search within Facebook thoroughly.
- focus on searching for locations within Facebook user-generated content.
- Using Facebook Graph in the Location Search We already covered how to find a specific user's (or page/group's) Facebook profile_id value.
- The following links will demonstrate how to use a Facebook Graph Search to fetch results based on geotagged content.
- To display the places visited by target profile, type the following in your browser address bar: https://www.facebook.com/search/100003886582037/places-visited/.
- To display the recent places that were "checked in" by the target profile, type the following in your browser address bar: https://www.facebook.com/search/100003886582037/places-checked-in/.

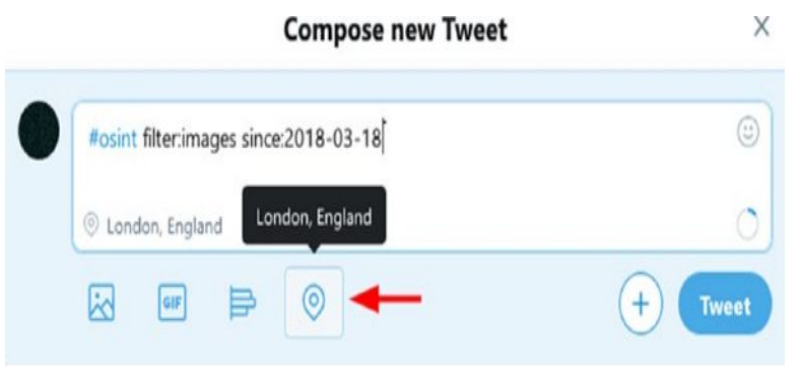
- To display common places where two targets have "checked in" previously, type the following in your browser address bar: https://www.facebook.com/search/Facebook_Profile_ID_1/ places-checked-in/ Facebook_Profile_ID_2/places-checked-in/ intersect/.
- To display common events where two targets have attended previously, type the following in your browser address bar: https://www.facebook.com/search/ Facebook_Profile_ID_1/ events/ Facebook_Profile_ID_2/events/intersect/.
- Go to Facebook Live (https://www.facebook.com/live) to see where there are live videos currently broadcasting. Live videos appear on a global map; a user can click any live video—represented as a blue dot—to view/save it.

Twitter

- ✔ Twitter allows users to post tweets combined with current location data (see Figure on the right).
- ✔ Such tweets can help investigators to determine the current/previous locations of a target at a specific point in time.
- ✔ How to locate tweets based on their geolocation information.

Search for Tweets in a Specific Geographical Location

- ✔ The Twitter search functionality allows you to search for tweets posted within a specific location using GPS coordinates.
- ✔ To locate all tweets posted from a specific location on Earth, follow these steps:-
  - ✔ 1. Open Google Maps, navigate to the target location, and click the exact point on the map to see its GPS coordinates (see figure on the right).
  - ✔ 2. Go to the Twitter search box and type near: followed by the target's latitude and longitude enclosed in quotation marks (see Figure on the right).



Posting a tweet with location information

Extracting the GPS coordinates of the target on Google Maps

Searching for all tweets that match the entered GPS coordinates

- ✔ 3. You can add more advanced Twitter search operators to the previous search to further filter its results (see Figure on the right).

✔ As shown in Figure on the right, note that three filters are applied on the previous location search.

- ✔ Within:3mil: This limits the results to three miles from the target GPS coordinates.
- ✔ Filter:images: This returns tweets that contain images within it.
- ✔ Since:2018-03-18: The tweet's date must be from the date specified and later.
- ✔ To see the exact time when any tweet was posted, hover your mouse over its timestamp (see Figure on the right).
- ✔ Please note that the date/time that appears is according to the time zone of your Twitter account settings, not the uploader's date/time.

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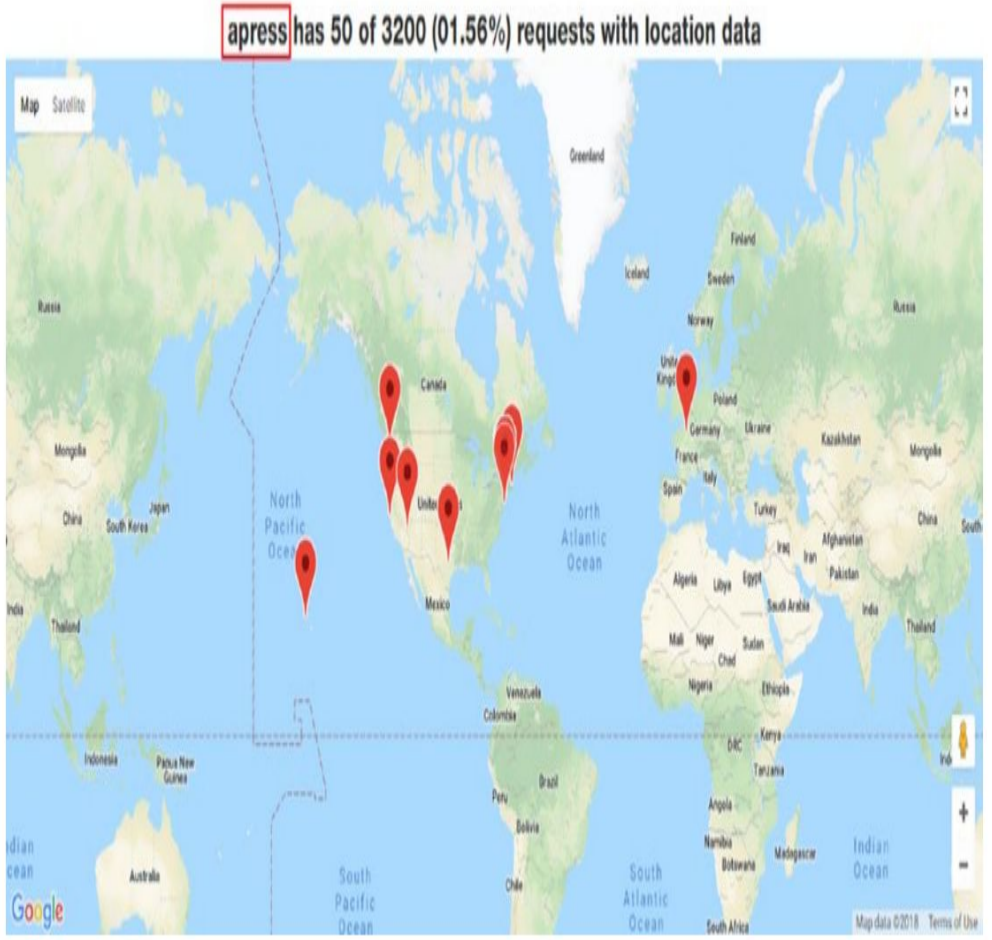
Adding advanced Twitter search filters to refine your search

Finding a tweet's date/time

- **Tweet Mapper** (https://keitharm.me/projects/tweet) is a free service that lists all geotagged tweets (all tweets posted while the location feature is ON).
  - All you need to do is to enter the target's Twitter handle and then press Enter.
  - A map will appear showing red markers (see Figure on the right) over all the geographical locations where this target posts their geotagged tweets.
  - Click any marker to see related tweets below the map.
- **One Million Tweet Map** View the world's last one million tweets on a map at https://onemilliontweetmap.com. This is an interesting map to see live tweets from around the globe in real time. Different filters can be applied to refine the results.
- **Qtr Tweets** (http://qtrtweets.com/twitter) allows you to find all tweets within a specific distance from the target location on map. You can also search for keywords and filter the results according to predefined criteria such as tweets with images and tweets with nonlocation data.
- **Periscope Map** (www.periscopemap.live) shows Twitter Periscope live videos on a world map.



Showing a tweets map for the user Apress

Conducting Location Searches on Social Media Using Automated Tools

- ✔ There are many tools that can prove useful when searching for data (both geotagged and nongeotagged) online.
- ✔ Some popular OSINT gathering tools for gathering different kinds of public information, including geolocation content, from both Internet and social media platforms.
  - ✔ Creepy (https://www.geocreepy.com): This is a geolocation OSINT tool to gather geolocation information from Twitter, Instagram, Google+, and Flickr.
  - ✔ Oryon OSINT Browser (https://sourceforge.net/projects/oryonosint-browser): This contains scores of OSINT links to different services for public information discovery; it also comes equipped with privacy-enhanced features to protect your identity while conducting your OSINT search.
  - ✔ Maltego (https://spreadsecurity.github.io/2016/09/03/opensource-intelligence-with-maltego.html): This is a data mining tool with GUI used to gather open source intelligence; it visualizes the results and finds interconnection between them.
  - ✔ Spider Foot (www.spiderfoot.net): This is an automated OSINT tool that queries more than 100 open data sources to find information about the target.

COUNTRY PROFILE INFORMATION

- ✔ These websites offer brief overviews and statistics about different countries throughout the world. Such overviews include information about a country's geography, history, politics, economy, international relations, culture, travel, military, health, education, and other topics.
- ✔ The following are the most popular suppliers of country profile information:-
  - ✔ The World Factbook (https://www.cia.gov/library/publications/the-world-factbook/index.html): This is a reference resource published by the Central Intelligence Agency (CIA); it provides information on the history, population, government, economy, energy, geography, communications, transportation, military, and transnational issues for 267 world entities.
  - ✔ BBC Country Profiles (http://news.bbc.co.uk/2/hi/country_profiles/default.stm): This is a guide to the history, politics, and economic backgrounds of countries and territories, as well as background on key institutions. It also includes archived contents of the BBC service.

- ✔ Webcams There are many sites offering free access to public webcams around the world.
- ✔ The following are the most popular ones:-
  - ✔ World Web Cam Search (http://world-webcams.nsspot.net): This displays available webcams from around the world using Google Maps.
  - ✔ Earth Cam (https://www.earthcam.com): This is a live streaming webcam from different places around the globe.
  - ✔ Fisgonia (www.fisgonia.com): This is a visual representation of a webcam—using Google Maps—from different locations around the globe.
  - ✔ You can filter the cameras according to different categories such as airports, train stations, animals, traffic, universities, and so on, and you can specify the country using Google Maps.
  - ✔ World Cam (https://worldcam.eu): This lists webcams in different places globally and offers information about the location such as their location on maps and weather information about the target area.
  - ✔ UM Weather (http://cirrus.sprl.umich.edu/wxnet/wxcam.php): This lists hundreds of weather cameras across North America.
  - ✔ Opentopia (www.opentopia.com/hiddencam.php): This lists publicly accessible webcams from different places around the world.
  - ✔ Mila (https://www.livefromiceland.is/webcams/geysir): This is a live webcam from Iceland.