

The Internet as a Geographic Data Source

Dr Alex Singleton
Department of Geography and Planning



UNIVERSITY OF
LIVERPOOL

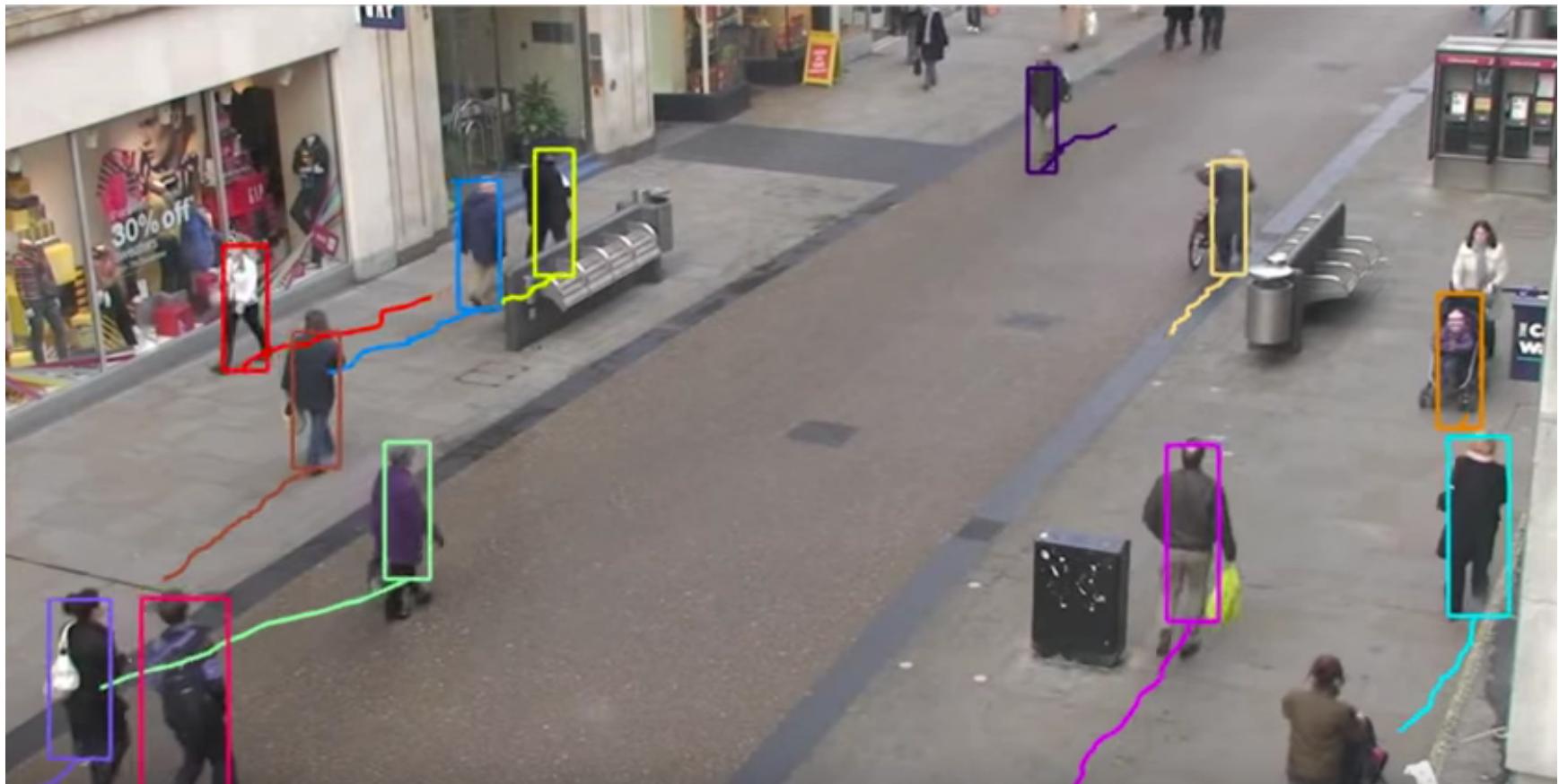
Overview and Structure

- Passive V Active Data Collection
 - Sensors
 - People
 - Environment
 - Volunteered Geographic Information (VGI)
 - OpenStreetMap
- Bias and Use
- Data formats and Access
 - CSV
 - XML / JSON etc
- Web API

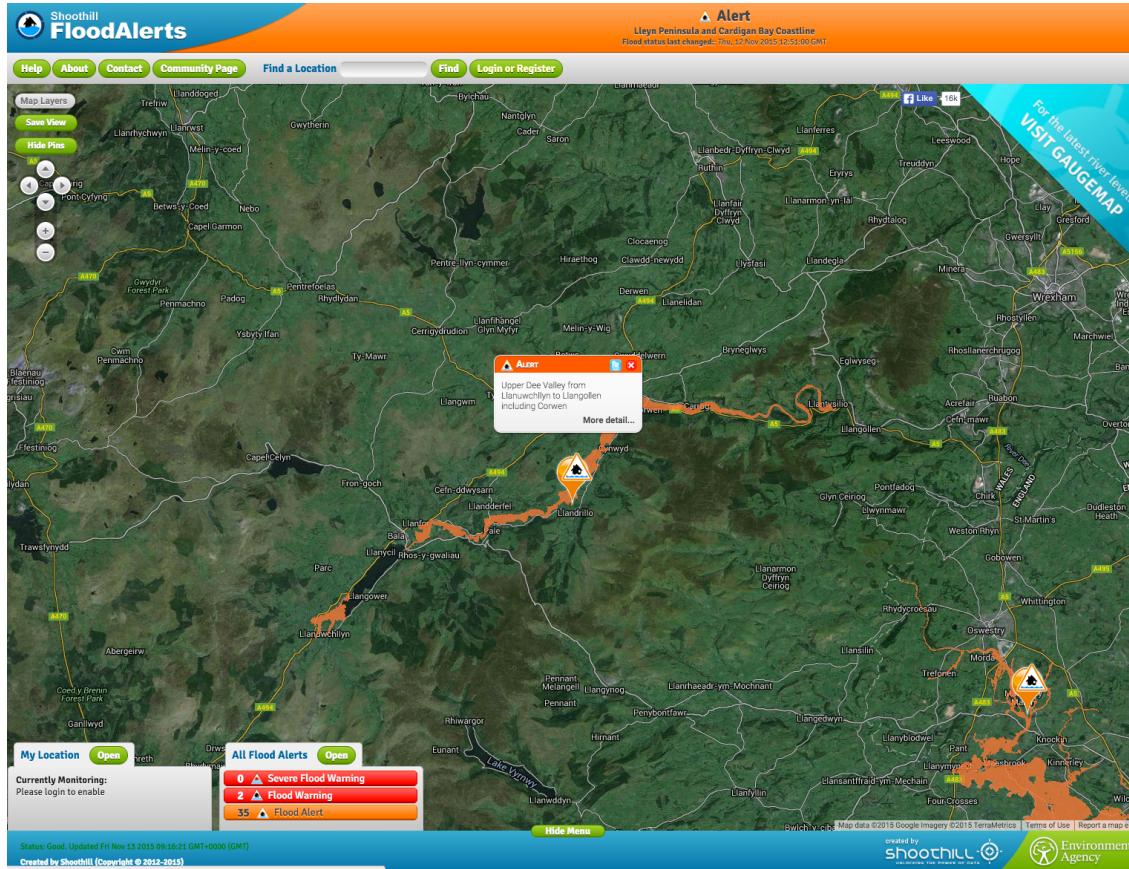
Examples of Passive Data Collection



Examples of Passive Data Collection



Examples of Passive Data Collection



Examples of Passive Data Collection

 Department for Environment Food & Rural Affairs

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Air Quality Search...

You are here: Home > Latest measurement summary >Latest measured levels

UK-AIR

Latest measurement summary

- ▶ Latest measured levels
- ▶ 24 Hour Summary
- ▶ European Pollution Levels
- ▶ View with Google Earth
- ▶ UK Pollution Forecast Summary
- ▶ Pollution alerts & notifications

Latest measured levels

Here you can view the detailed data behind the latest measurement summary displayed on UK-AIR, and also a summary of information that has been displayed over the previous 24 hours. The detailed data tabulated below are from monitoring sites within the AURN. Graphs of hourly monitoring data are also available to view as weekly time series. You can also subscribe to this information as an email alert.

Index Bands

1	2	3	4	5	6	7	8	9	10
Low	Moderate		High		Very High				

Read associated health advice »

- PM₁₀ data is from a FDMS PM₁₀ instrument type unless specified
- View the legend
- Pollutant levels recorded for the hour up to **8am Fri 13th Nov 2015**

A B C D E F G H I L M N O P R S T Y

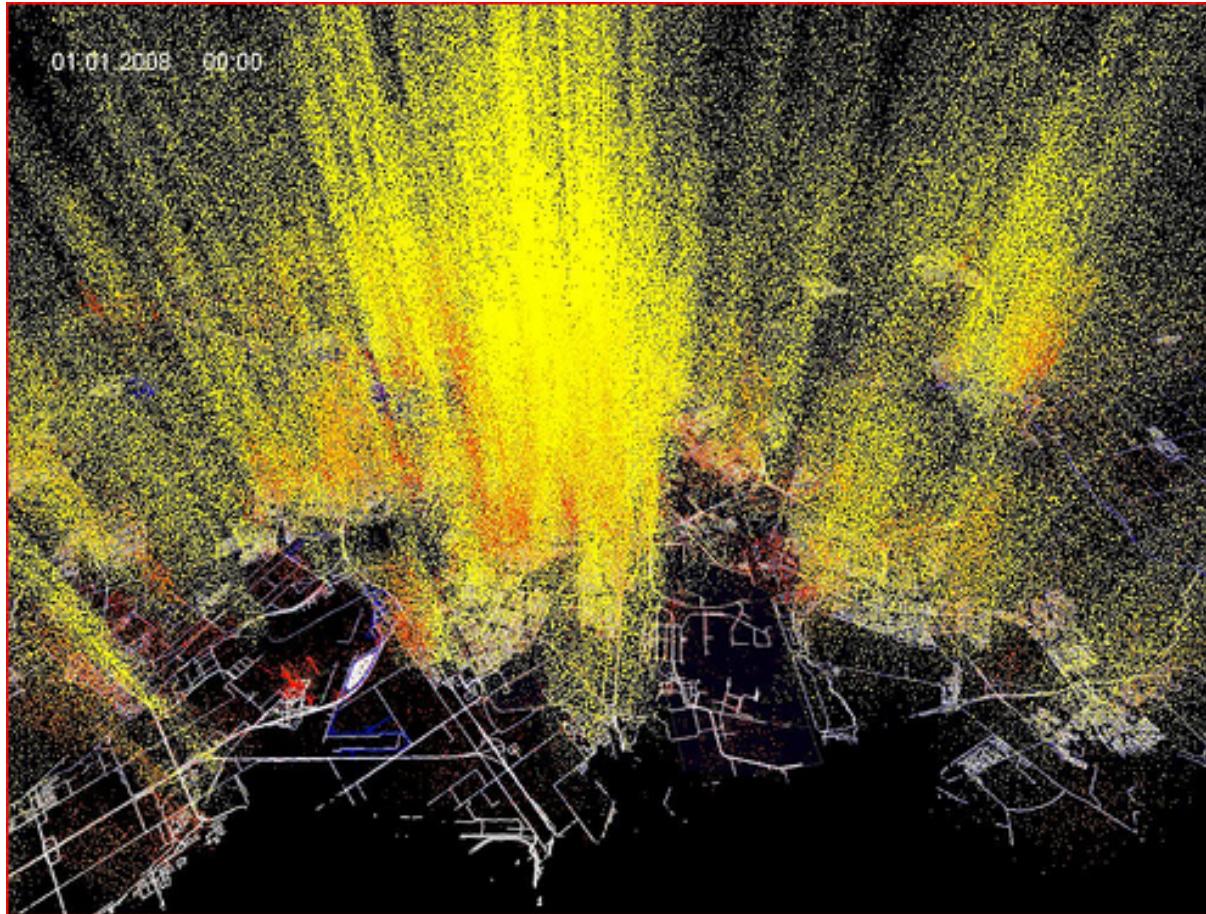
A

Latest measured levels

Monitoring site	Running 8 Hour mean Ozone (μgm^{-3})	Hourly mean Nitrogen dioxide (μgm^{-3})	Max 15 min mean Sulphur dioxide (μgm^{-3})	Running 24 Hour mean PM _{2.5} Particles (μgm^{-3})	Running 24 Hour mean PM ₁₀ Particles (μgm^{-3})	Last updated
Aberdeen Timeseries Graph	65 (2 Low)	16 (1 Low)	n/m	5 (1 Low)	16 (1 Low)	13/11/2015 08:00
Aberdeen Union Street Roadside Timeseries Graph	n/m	72 (2 Low)	n/m	n/m	n/m	13/11/2015 07:00
Armagh Roadside Timeseries Graph	n/m	28 (1 Low)	n/m	n/m	n/a	13/11/2015 08:00
Aston Hill Timeseries Graph	83 (3 Low)	2 (1 Low)	n/m	n/m	n/m	13/11/2015 08:00
Auchencorth Moss Timeseries Graph	61 (2 Low)	n/m	n/m	3 (1 Low)	8 (1 Low)	13/11/2015 08:00

[Back to top](#)

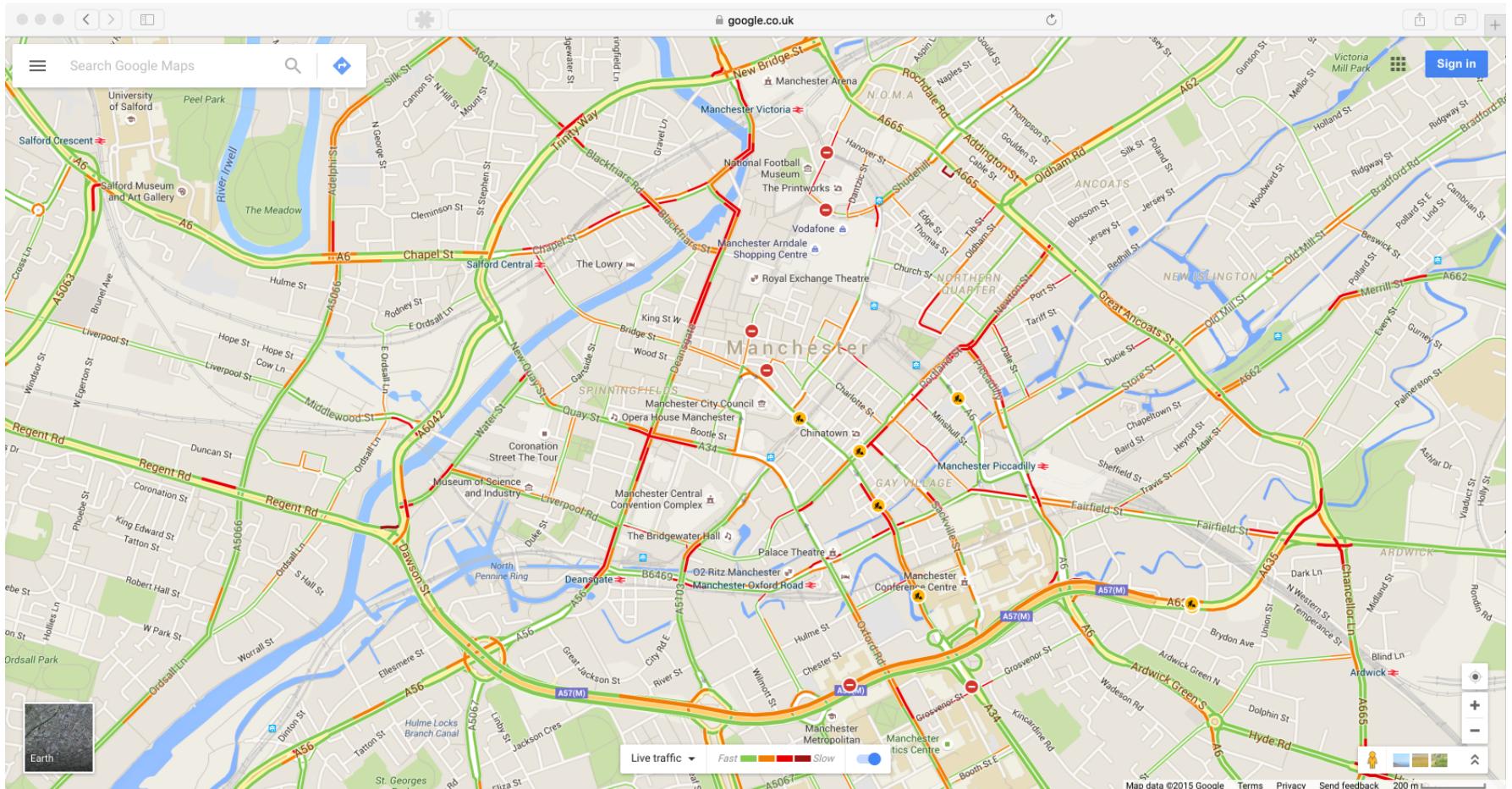
Examples of Passive Data Collection



Examples of Passive Data Collection



Examples of Passive Data Collection



Volunteered Geographic Information (VGI)

- Use of the Web to create, assemble, and disseminate geographic information provided voluntarily by individuals

Goodchild, 2007

Volunteered Geographic Information (VGI)



WIKIPEDIA
The Free Encyclopedia

Main page
Contents
Featured content
Current events
Random article
Donate to Wikipedia
Wikipedia store

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About Wikipedia
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Contact page

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What links here
Related changes
Upload file
Special pages
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Languages
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Català
Čeština
Dansk
Deutsch

Main Page Talk

Read View source View history

Search



Create account Not logged in Talk Contributions Log in



European Science Photo Competition 2015 – participate now!

Welcome to Wikipedia,

the free encyclopedia that anyone can edit.
5,009,846 articles in English

From today's featured article

Elias Abraham Rosenberg (c. 1810 – 1887) was an adviser to King Kalākaua of Hawaii. He had lived in San Francisco in the 1880s, working as a peddler and selling illegal lottery tickets. In 1886, he traveled to Hawaii and performed as a fortune-teller. Endearing himself to the king with favorable predictions, he received lavish gifts and was appointed as a *kahuna-kilokilo* (royal soothsayer), customs appraiser, and guard. Rosenberg and the king enjoyed talking and drinking together, but he was distrusted by other royal advisers and satirized in the Hawaiian press. He encouraged the king to revive the traditional Hawaiian religion, an idea that fascinated Kalākaua but angered political rivals. In 1887 Rosenberg returned to California; a month later, he was admitted to a hospital in San Francisco, where he died. In Hawaii, the 1887 Constitution—which curtailed royal power—was forced on Kalākaua. A Torah scroll presented to the king by Rosenberg was later exhibited with other royal treasures and eventually donated to Temple Emanu-El in Honolulu. ([Full article...](#))

Recently featured: Typhoon Gay (1992) · Harris's List of Covent Garden Ladies · Rhodesia's Unilateral Declaration of Independence
[Archive](#) · [By email](#) · [More featured articles...](#)

Did you know...

- ... that Canadian professional basketball player **Papa Opong** was traded to the *Windsor Express* so he could attend teacher's college in that city?
- ... that **Rihanna** debuted *Anti*'s official artwork and title at a private viewing for fans and press at Los Angeles' *MAMA* Gallery?
- ... that chef **André Chiang** is known for his "Octo-philosophy" of preparing dishes?
- ... that the **U.S. Supreme Court** ruled in a **2014 decision** that police officers may conduct traffic stops even if they have not personally observed a traffic violation?
- ... that the **frigid bumblebee** is one of only two species of bumblebee to have natural-born cues to prevent inbreeding?
- ... that the **University of Hong Kong** council's **decision to reject** Johannes Chan's appointment to pro-vice-chancellor is said to be "very sad news for Hong Kong's autonomy and freedom"?
- ... that **Gravity Falls: Legend of the Gnome Gemulets** is powered by the UbiArt Framework engine?



Opong with the Oshawa Power in 2012

- Arts
- Biography
- Geography
- History
- Mathematics
- Science
- Society
- Technology
- All portals

In the news

- At least 120 people are killed amid **shootings and explosions** (*Bataclan theatre* pictured) in Paris, France.
- Russia** is suspended from all international **athletic** competition by the **IAAF** following a **World Anti-Doping Agency** report into doping in athletics.
- The **National League for Democracy**, led by **Aung San Suu Kyi**, wins a majority in **Myanmar's general election**.
- At least 37 people are killed and more than 200 others are injured by **double suicide bombings** in Beirut, Lebanon.
- In motorsport, Jorge Lorenzo wins the **MotoGP World Championship**.



Bataclan theatre

Ongoing events: Metrojet Flight 9268 · European migrant crisis

Recent deaths: Pat Eddery · Helmut Schmidt

On this day...

November 14: World Diabetes Day; Children's Day in India

- 1910 – Aviator **Eugene Burton Ely** performed the first **takeoff** from a ship (pictured), flying from a makeshift deck on the **USS Birmingham** in Hampton Roads, Virginia, US.
- 1940 – Second World War: **Coventry Cathedral** and much of the city centre of **Coventry**, England, were destroyed by the **German Luftwaffe** during the **Coventry Blitz**.
- 1975 – With the signing of the **Madrid Accords**, Spain agreed to withdraw its presence from the territory of **Spanish Sahara**.
- 1995 – As a result of budget conflicts between President **Bill Clinton** and the United States Congress led by **Newt Gingrich**, the **federal government** was **forced to shut down** non-essential services.

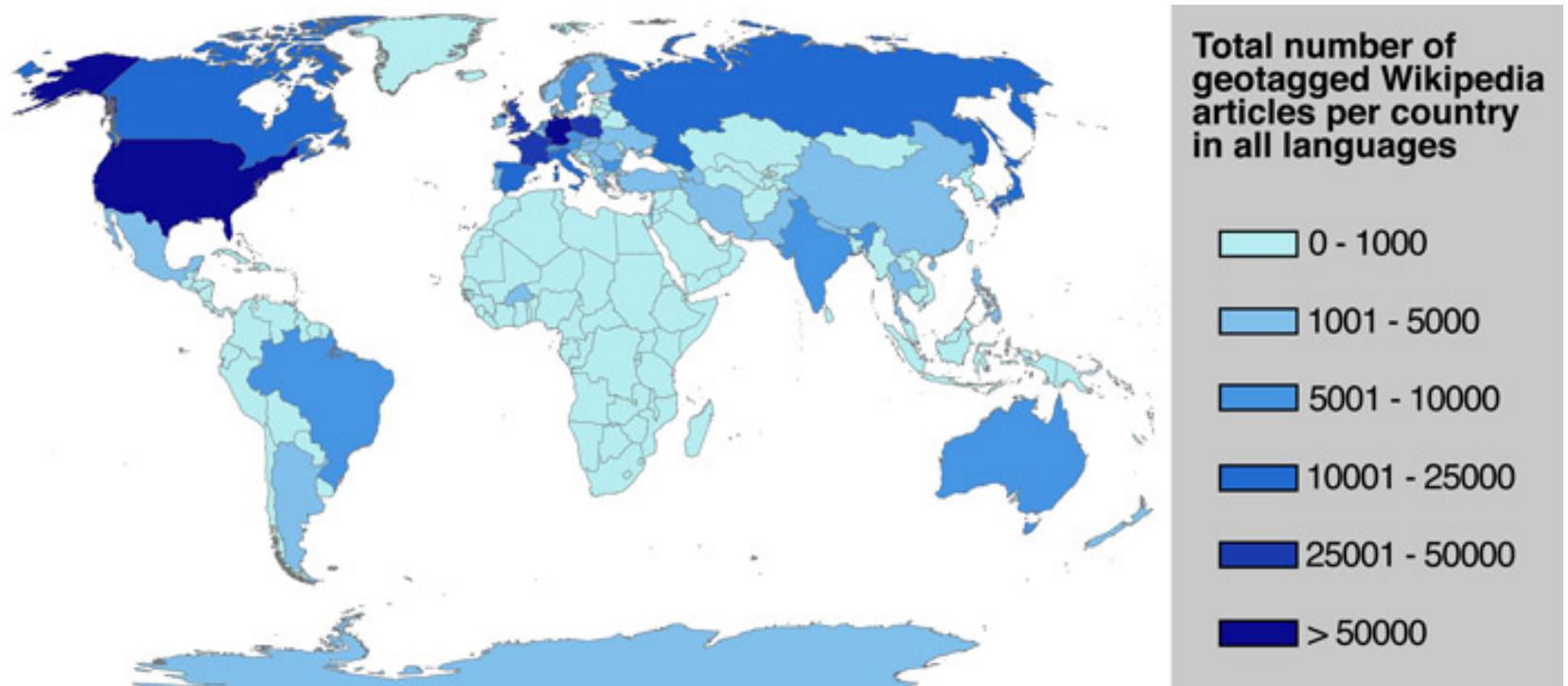


Eugene Burton Ely taking off from a warship

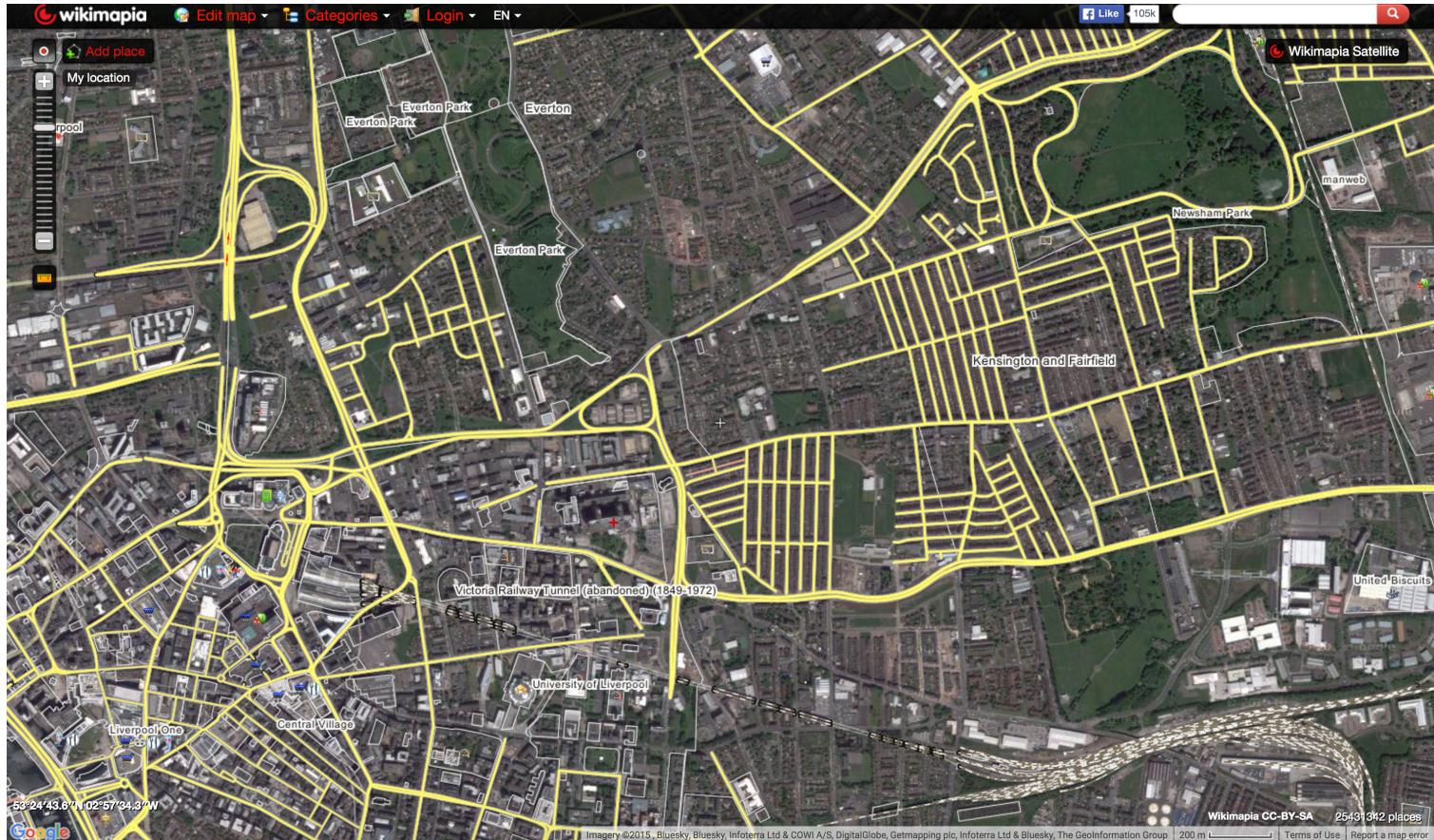


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Volunteered Geographic Information (VGI)



Volunteered Geographic Information (VGI)



Volunteered Geographic Information (VGI)

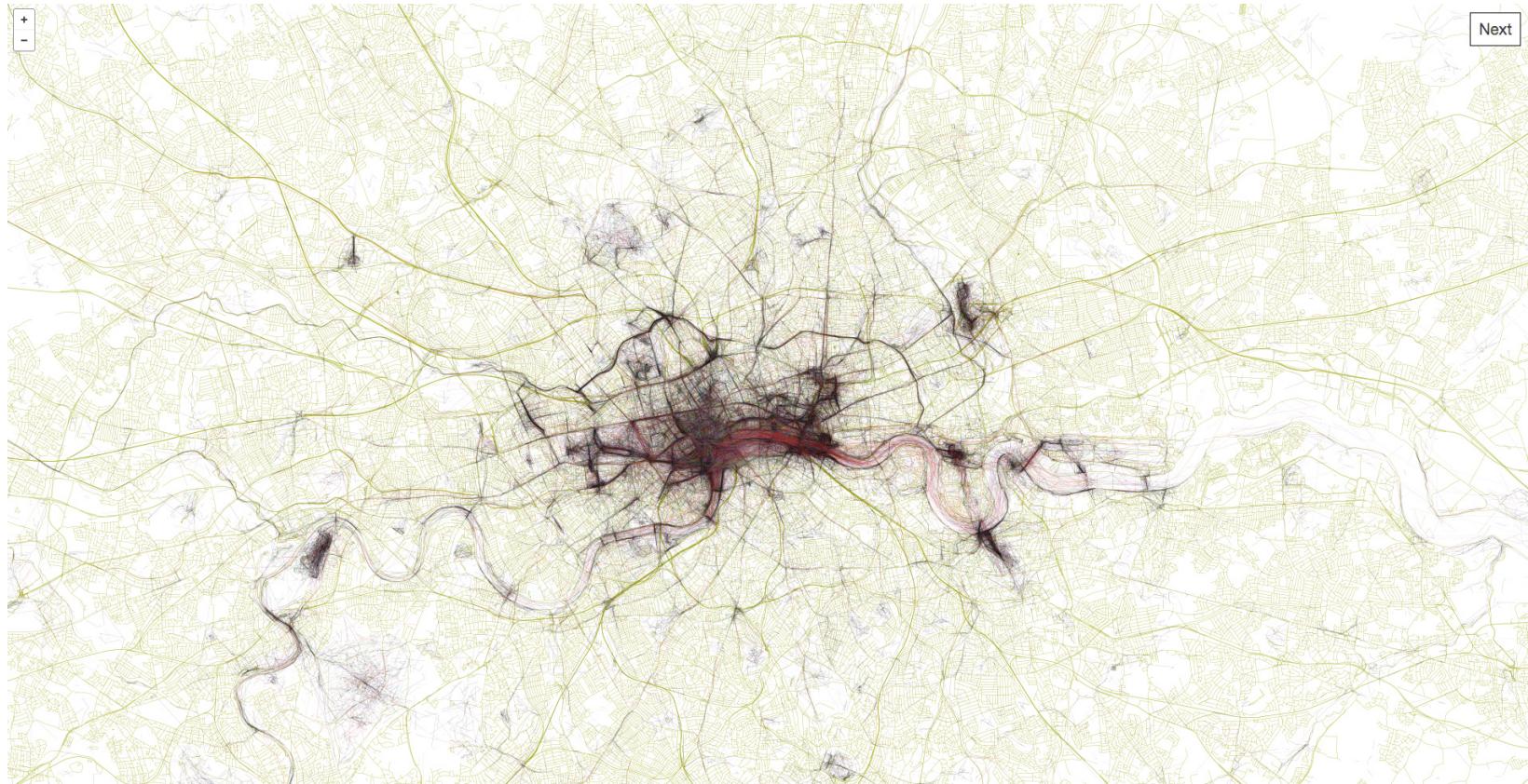
The home for all your photos.

Upload, access, organize, edit, and share your photos from any device, from anywhere in the world.

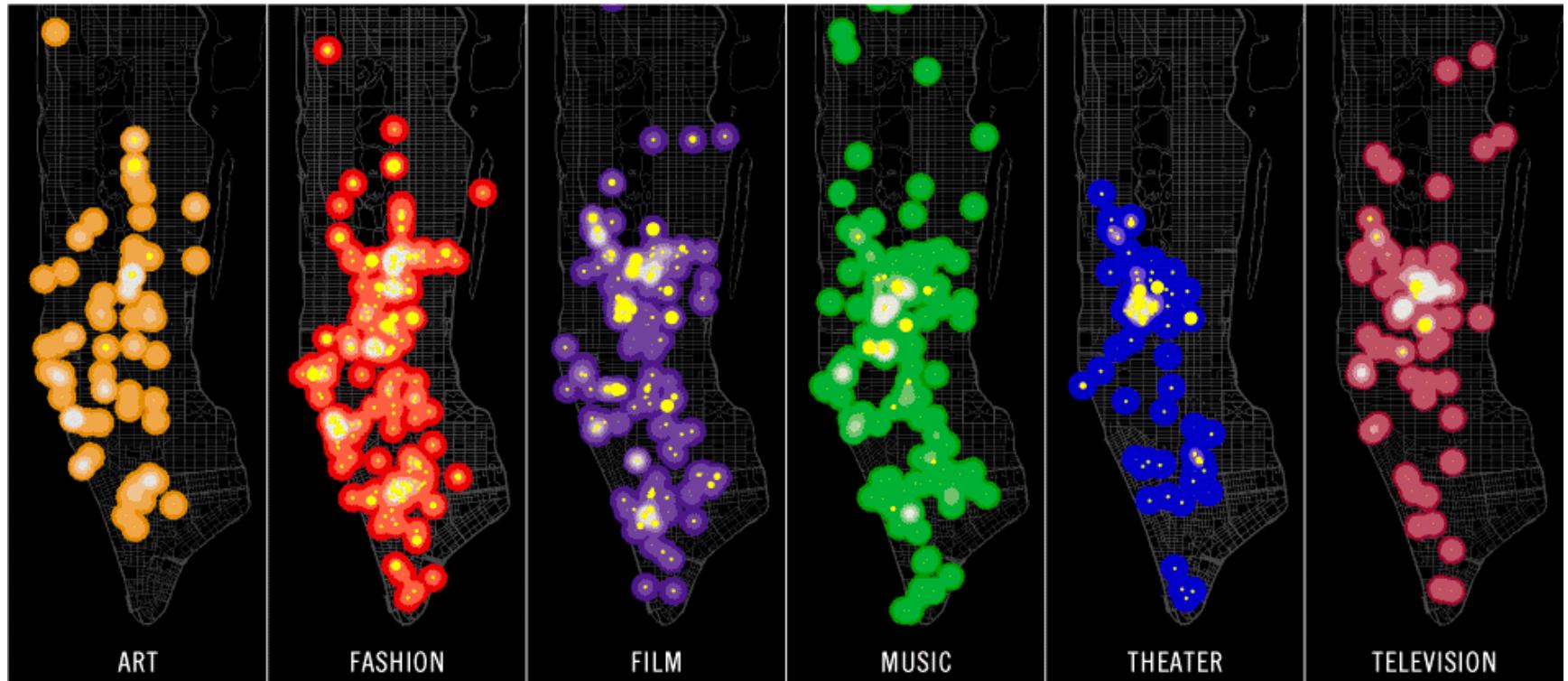
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Volunteered Geographic Information (VGI)

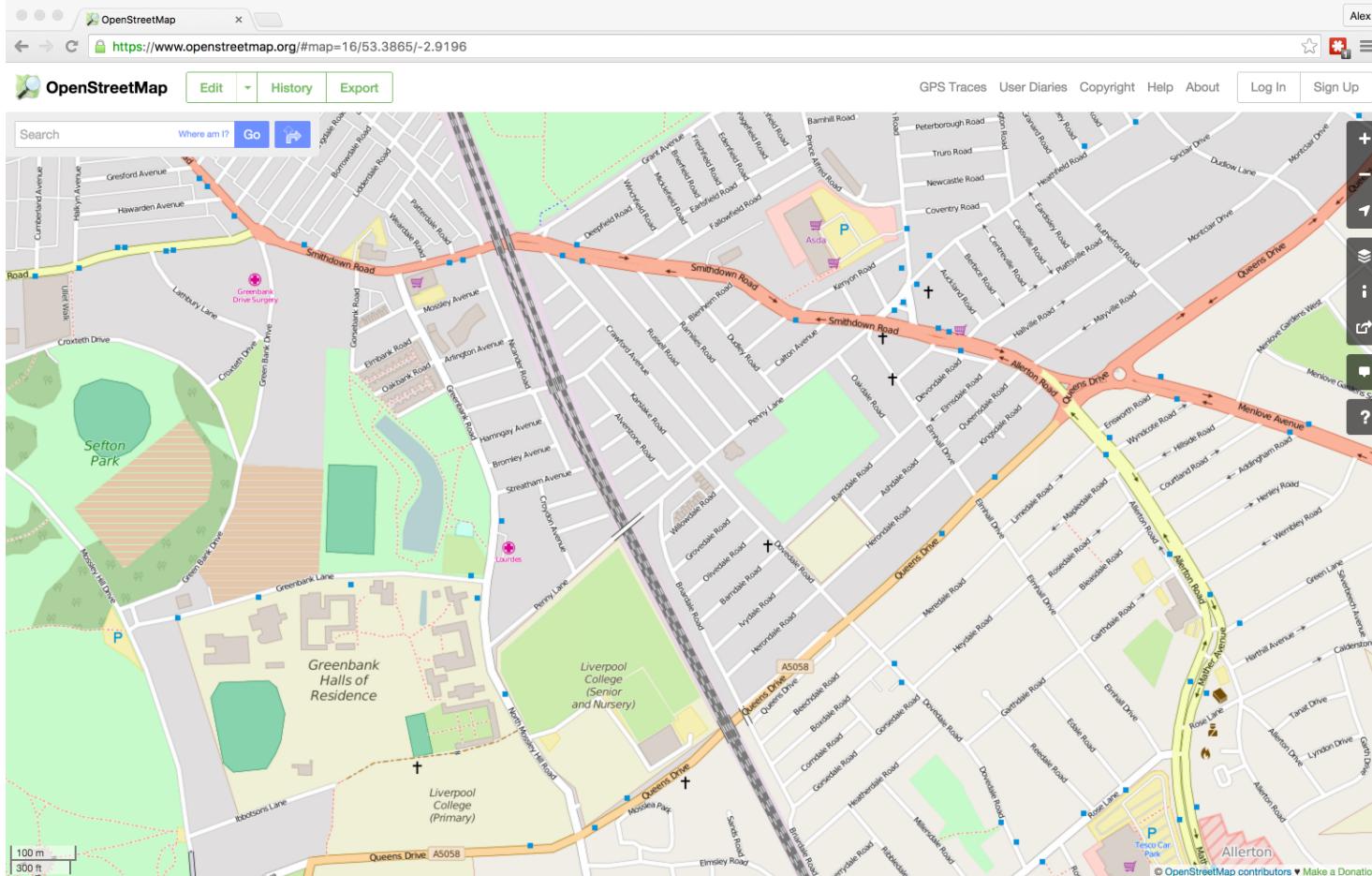


Volunteered Geographic Information (VGI)



<http://www.nytimes.com/interactive/2009/04/06/arts/20090407-buzz-maps.html>

Volunteered Geographic Information (VGI)



Volunteered Geographic Information (VGI)

labratrevenger ★ Portland Oregon: The Age of a City

Portland, Oregon: The Age of a City

Source: City of Portland

© 2014 Justin Palmer, OSM contributors

Just in case you were curious about the styling for the building age map, here it is:

```
vars
bg
labels
roads
polis

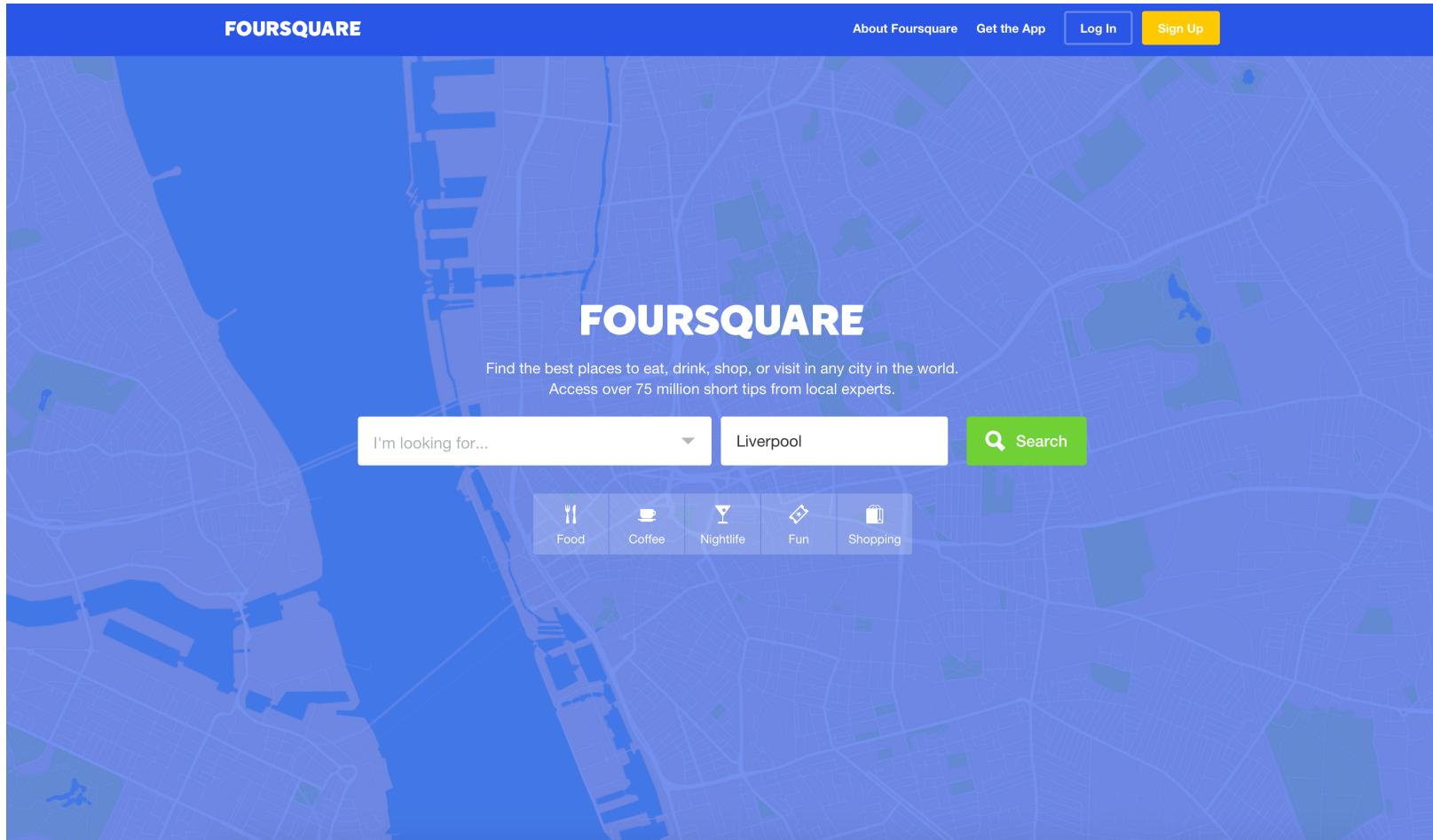
456 line-cap: round;
457 [zoom>=18] { line-width: 2; }
458 }
459
460 @black: ● #222;
461 @gray-1: #F5F5F5;
462 @gray-2: ○ ESESE5;
463 @gray-3: □ CCC;
464 @gray-4: ▲ 999;
465 @gray-5: △ #666;
466
467 @blue: ○ #21BSEA;
468 @blue_lt: lighten(@blue, 10);
469 @yellow: □ ffcf302;
470 @blue-gray: desaturate(@blue, 40);
471 // @green: ▢ #05E29E;
472 @green: ▢ #05e24e;
473 @green-desat: desaturate(@green, 30), 45;
474
475 // Land
476 #barrier_line[zoom>=14][class='land'] {
477 ['mapnik::geometry_type']=2 {
478 // These shouldn't be scaled based on pixel scaling
479 line-color:@land;
480 line-cap:round;
481 [zoom>=14] { line-width: 0.75; }
482 [zoom>=15] { line-width: 1.5; }
483 [zoom>=16] { line-width: 2; }
484 [zoom>=17] { line-width: 3; }
485 [zoom>=18] { line-width: 6; }
486 [zoom>=19] { line-width: 12; }
487 [zoom>=19] { line-width: 24; }
488 }
489 ['mapnik::geometry_type']=3 {
490 polygon-fill:@land;
491 }
492 }
493
494 // Cliff
495 #barrier_line[zoom>=12][class='cliff'] {
496 line-pattern-file: url(img/pattern/cliff-md.png);
497 [zoom>=16] { line-pattern-file: url(img/pattern/cliff-lg.png); }
498 }
```



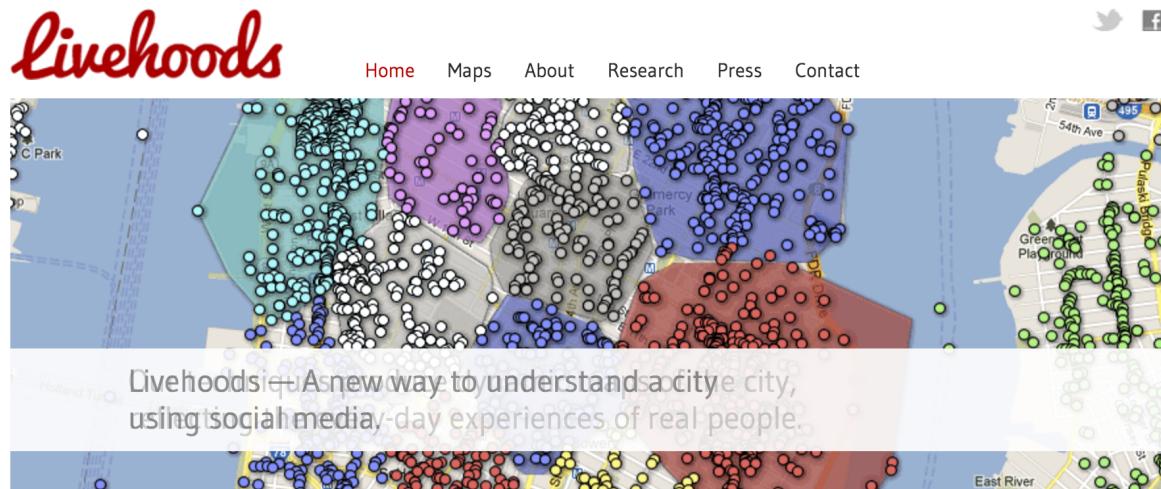
Volunteered Geographic Information (VGI)



Volunteered Geographic Information (VGI)



Volunteered Geographic Information (VGI)



Re-Imagining the City in the Age of Social Media

Livehoods offer a new way to conceptualize the dynamics, structure, and character of a city by analyzing the social media its residents generate. By looking at people's checkin patterns at places across the city, we create a mapping of the different dynamic areas that comprise it. Each Livehood tells a different story of the people and places that shape it.

[> MORE](#)

Using Machine-Learning to Study Cities

Our research hypothesis is that the character of an urban area is defined not just by the types of places found there, but also by the people that make it part of their daily life. To explore this idea, we use data from approximately 18 million check-ins collected from the location-based social network foursquare, and apply clustering algorithms to discover the different areas of the city.

[> MORE](#)

Current Maps



> New York City



> San Francisco



> Pittsburgh



> More Maps



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Bias and Use

facebook

Google

Free Data is not Open Data



foursquare®

Bias and Use

Open data is information that is available for anyone to use, for any purpose, at no cost.



Bias and Use

- Open data has to have a **licence that says it is open** data. Without a licence, the data can't be reused. The licence might also say:
 - that people who use the data must credit whoever is publishing it (this is called **attribution**)
 - that people who mix the data with other data have to also release the results as open data (this is called **share-alike**)

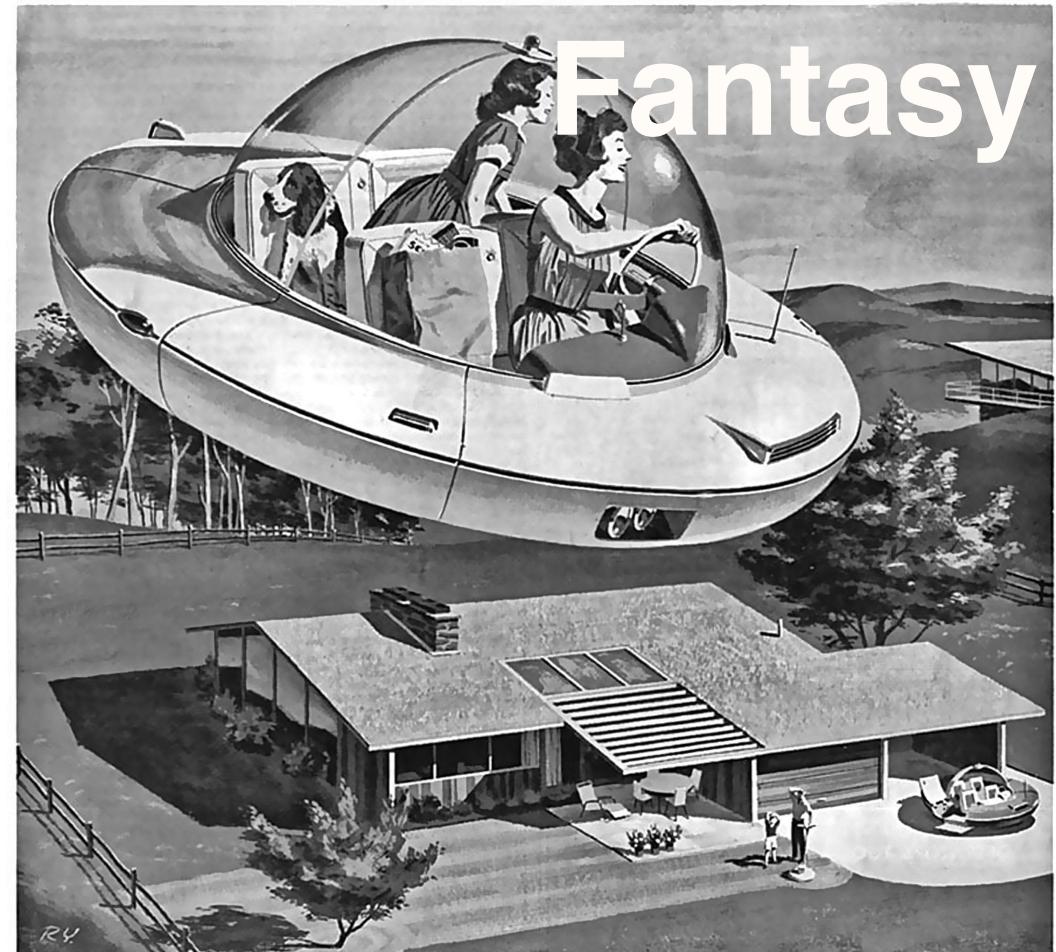
BIG DATA





Rio, Brazil

Reality



YOUR PERSONAL "FLYING CARPET" Step into it, press a button, and off you go to market, to a friend's home, or to your job. Take off and land anywhere; no parking problems. Plug in to any electric outlet for recharging. They're working on it!

MORE POWER TO YOU!

America's independent light and power companies build for your new electric living

Tomorrow's higher standard of living will put electricity to work for you in ways still unheard of!

The time isn't too far off, the experts say, when you'll wash your dishes without soap or water—ultrasonic waves will do the job. Your beds will be made at the touch of a button. The kids' homework

will be made interesting and even exciting when they are able to dial a library book, a lecture or a classroom demonstration right into your home—with sound. (Some of this is happening already.)

To enjoy all this, you'll want a lot more electric power, and the independent electric companies of America are already building

new plants and facilities to provide it. Right now these companies are building at the rate of \$5,000,000,000 a year, and planning to double the nation's supply of electricity in less than 10 years.

America has always had the best electric power service in the world. The electric companies are resolved to keep it that way.



Search

Hot Topic: School Ratings - Hillsborough - Liverpool lists - The Beatles - Traffic and Travel

Follow Us:  Facebook  Twitter  Newsletters » News » Liverpool News » Liverpool CouncilBy Marc Waddington |  7 Comments | 3 Jun 2013 08:00

Liverpool council to borrow £200m to end pothole crisis

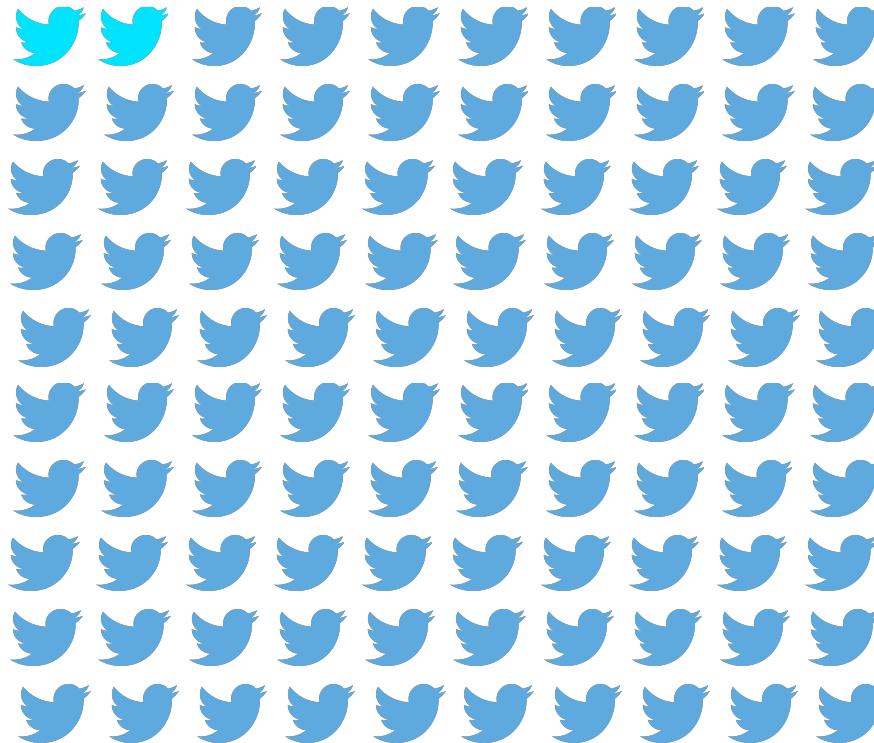
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See more stories you'll love

You've turned off story recommendations. Turn



Bias and Use



Bias and Use

STREET BUMP

About Sign In

Where's Street Bump being used?

430 trips, 32,577 bumps, 0 potholes filled, and 0 roadway problems identified

4 bumps reported in Monsignor William J Casey Hwy, Boston, MA 6 days ago

Map Satellite

Want to use Street Bump to improve your community? [Contact Us](#)

Map data ©2014 Google | Terms of Use | Report a map error

What's Street Bump?

Street Bump is a crowd-sourcing project that helps residents improve their neighborhood streets. Volunteers use the Street Bump mobile app to collect road condition data while they drive. The data provides governments with real-time information to fix problems and plan long term investments.

HELP KEEP YOUR STREETS SMOOTH

Download on the App Store Learn More

Bias and Use

Mobile Devices + Twitter Use

More than 280 million Tweets posted from mobile phones reveal geographic usage patterns in unprecedented detail.



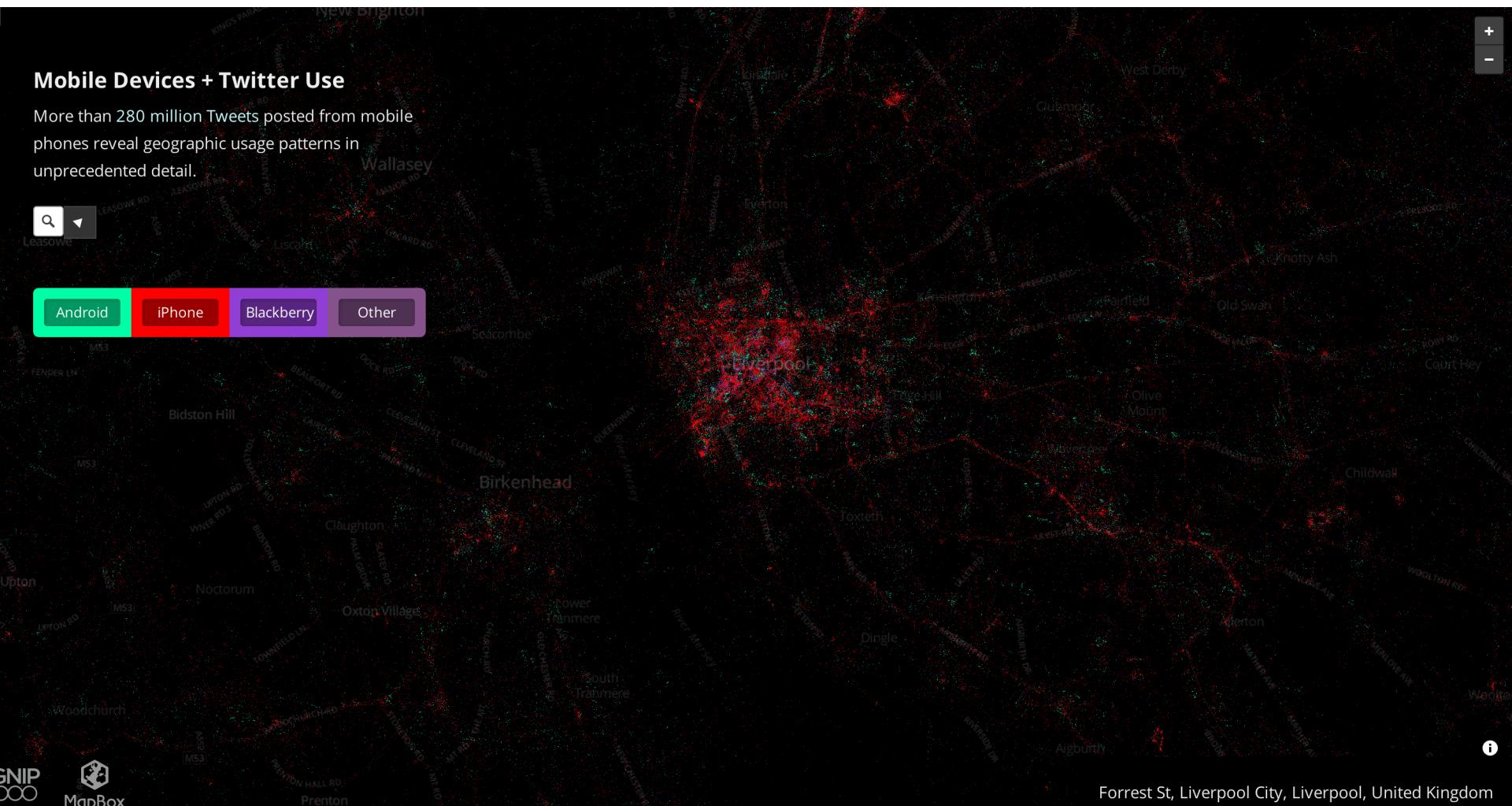
Leasowe

Android

iPhone

Blackberry

Other



Forrest St, Liverpool City, Liverpool, United Kingdom

Bias and Use

google.org Flu Trends

[Google.org home](#)

[Dengue Trends](#)

[Flu Trends](#)

[Home](#)

[United States](#) ▾
National

[Download data](#)

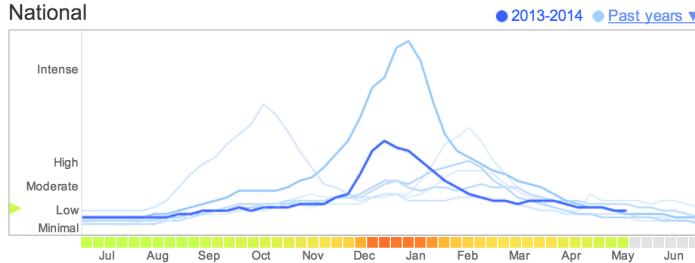
[How does this work?](#)

[FAQ](#)

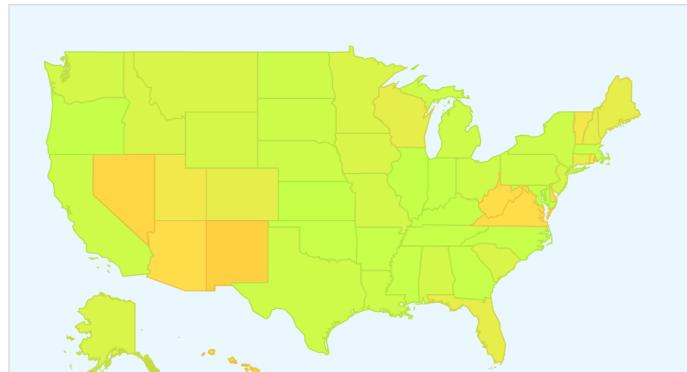
Explore flu trends - United States

We've found that certain search terms are good indicators of flu activity. Google Flu Trends uses aggregated Google search data to estimate flu activity. [Learn more »](#)

National

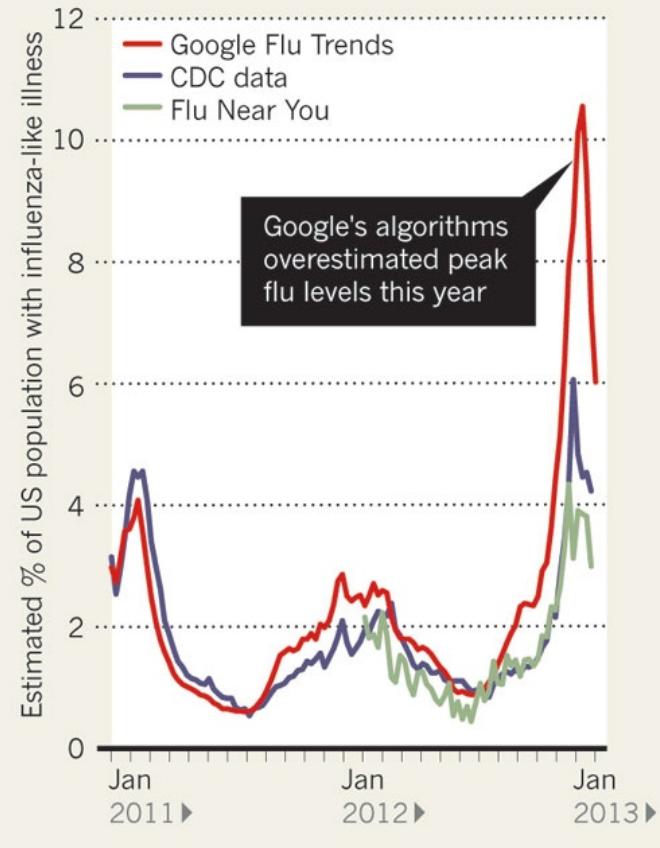


[States](#) | [Cities](#) (Experimental)



FEVER PEAKS

A comparison of three different methods of measuring the proportion of the US population with an influenza-like illness.



Data formats and Access

- Comma-separated values (CSV)
 - Tabular data format
 - Plain text
 - Delimiters values separate fields
 - Rows = records

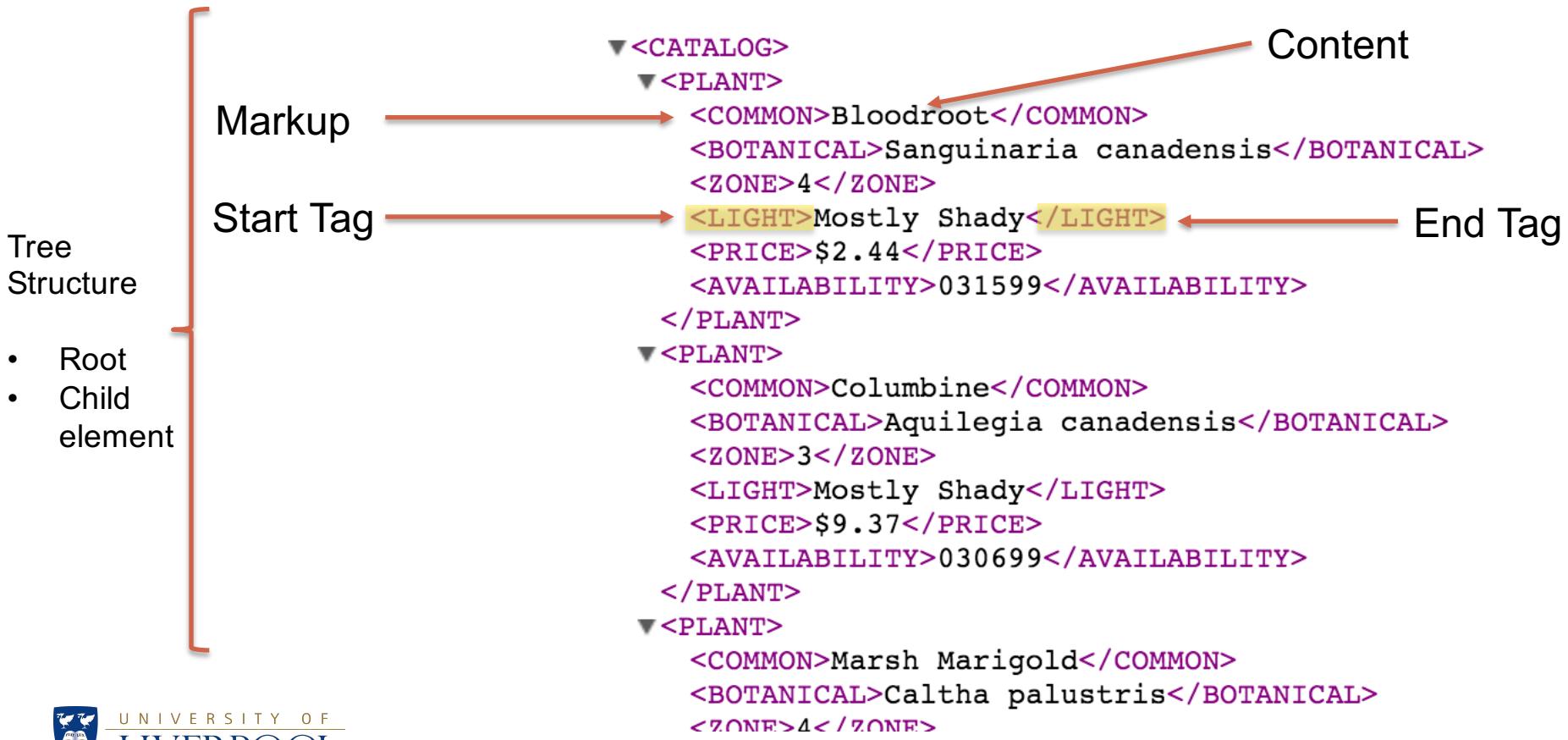
Forename,Surname,Age,Gender

Henry,Smith,15,Male

Fiona,Park,24,Female

Data formats and Access

- Extensible Markup Language (XML)



Data formats and Access



About ▾ Standards ▾ Innovation ▾ News & Events ▾ Membership ▾ Resources ▾

KML

- 1) Overview
- 2) Downloads
- 3) Official Schemas
- 4) Revision Working Group
- 5) Related News

1) Overview

Google submitted KML (formerly Keyhole Markup Language) to the Open Geospatial Consortium (OGC) to be evolved within the OGC consensus process with the following goal: KML Version 2.2 has been adopted as an OGC implementation standard. Future versions may be harmonized with relevant OGC standards that comprise the OGC standards baseline. There are four objectives for this standards work:

- That there be one international standard language for expressing geographic annotation and visualization on existing or future web-based online and mobile maps (2d) and earth browsers (3d).
- That KML be aligned with international best practices and standards, thereby enabling greater uptake and interoperability of earth browser implementations.
- That the OGC and Google will work collaboratively to ensure that the KML implementer community is properly engaged in the process and that the KML community is kept informed of progress and issues.
- That the OGC process will be used to ensure proper life-cycle management of the KML Standard, including such issues as backwards compatibility.

▼ OGC® Standards

- ARML2.0
- Cat: ebRIM App Profile: Earth Observation Products
- Catalogue Service
- CityGML
- Coordinate Transform
- Filter Encoding
- GML in JPEG 2000
- GeoAPI
- GeoPackage
- GeoSparql
- Geography Markup
- Geospatial eXtensible Markup Language (GML)
- IndoorGML
- KML
- Location Services (LOM)
- Moving Features
- NetCDF
- Observations and Measurements (OASIS)
- Open GeoSMS
- OpenMI
- OpenSearch Geo
- Ordering Services Framework for Earth Observation Products
- OWS Context
- PUCK

```
<?xml version="1.0" encoding="UTF-8"?>
<kml xmlns="http://www.opengis.net/kml/2.2">
  <Document>
    <Placemark>
      <name>New York City</name>
      <description>New York City</description>
      <Point>
        <coordinates>-74.006393,40.714172,0</coordinates>
      </Point>
    </Placemark>
  </Document>
</kml>
```

Data formats and Access

- JavaScript Object Notation (JSON)
- {} – Object
- [] - Array

Name-Value
Pairs

```
{  
  "firstName": "John",  
  "lastName": "Smith",  
  "age": 25,  
  "address": {  
    "streetAddress": "21 2nd Street",  
    "city": "New York",  
    "state": "NY",  
    "postalCode": "10021"  
  },  
  "phoneNumber": [  
    {  
      "type": "",  
      "number": "212 555-1234"  
    },  
    {  
      "type": "fax",  
      "number": "646 555-4567"  
    }  
  ]  
}
```

Data formats and Access

- GEOJSON

```
{ "type": "FeatureCollection",
  "features": [
    { "type": "Feature",
      "geometry": { "type": "Point", "coordinates": [102.0, 0.5]},
      "properties": { "prop0": "value0" }
    },
    { "type": "Feature",
      "geometry": {
        "type": "LineString",
        "coordinates": [
          [102.0, 0.0], [103.0, 1.0], [104.0, 0.0], [105.0, 1.0]
        ]
      },
      "properties": {
        "prop0": "value0",
        "prop1": 0.0
      }
    },
    { "type": "Feature",
      "geometry": {
        "type": "Polygon",
        "coordinates": [
          [ [100.0, 0.0], [101.0, 0.0], [101.0, 1.0],
            [100.0, 1.0], [100.0, 0.0] ]
        ]
      },
      "properties": {
        "prop0": "value0",
        "prop1": {"this": "that"}
      }
    }
  ]
}
```

Point		<pre>{ "type": "Point", "coordinates": [30, 10] }</pre>
LineString		<pre>{ "type": "LineString", "coordinates": [[30, 10], [10, 30], [40, 40]] }</pre>
Polygon		<pre>{ "type": "Polygon", "coordinates": [[[30, 10], [40, 40], [20, 40], [10, 20], [30, 10]]] }</pre>
		<pre>{ "type": "Polygon", "coordinates": [[[35, 10], [45, 45], [15, 40], [10, 20], [35, 10]], [[20, 30], [35, 35], [30, 20], [20, 30]]] }</pre>

Web API

- Programmable interfaces to services
 - Representational State Transfer (REST)
 - RESTful Web services
 - Architectural principles for the design of web services
 - Use HTTP methods (GET - retrieve, POST - create, PUT - change, DELETE - remove)
 - Be stateless (i.e. can scale under load)
 - Expose directory structure-like Uniform Resource Identifier (URI)
 - Output - XML, JavaScript Object Notation (JSON), or both

Web API

- Accessing API
 - Either
 - Send direct request
 - Require authentication first
 - May have rate limiting
 - Per hour / per day etc
 - Variable
 - Sometimes dynamic / unknown
 - Coding – useful factor in checks on use

Web API

 / Developers / Documentation / REST APIs Search English 

API Console Tool

Public API

- Uploading Media
- The Search API
- The Search API: Tweets by Place
- Working with Timelines
- API Rate Limits
- API Rate Limits: Chart
- GET statuses/mentions_timeline
- GET statuses/user_timeline
- GET statuses/home_timeline
- GET statuses/retweets_of_me
- GET statuses/retweets/:id
- GET statuses/show/:id
- POST statuses/destroy/:id
- POST statuses/update
- POST statuses/retweet/:id
- POST statuses/update_with_media
- GET statuses/oembed
- GET statuses/retweeters/ids
- GET statuses/lookup

REST APIs

The [REST APIs](#) provide programmatic access to read and write Twitter data. Author a new Tweet, read author profile and follower data, and more. The REST API identifies Twitter applications and users using [OAuth](#); responses are available in JSON.

If your intention is to monitor or process Tweets in real-time, consider using the [Streaming API](#) instead.

Overview

Below are the documents that will help you get going with the REST APIs as quickly as possible

- [API Rate Limiting](#)
- [API Rate Limits](#)
- [Working with Timelines](#)
- [Using the Twitter Search API](#)
- [Uploading Media](#)
- [Multiple Media Entities in Statuses](#)
- [Finding Tweets about Places](#)

Latest Updates

As of version 1.1 of the Twitter API, the more recent updates to our API are highlighted below. We're excited about what it means for developers and we've captured all the meaningful changes here so you don't miss a thing.

Web API

DATA.POLICE.UK

Cymraeg

Home Data API Changelog Contact About

[Home](#) >

Police API Documentation

The API provides a rich data source for information, including:

- Neighbourhood team members
- Upcoming events
- Street-level crime and outcome data
- Nearest police stations

The API is implemented as a standard JSON web service using HTTP GET and POST requests. Full request and response examples are provided in the documentation.

[Authentication](#)

Methods

[Availability](#)

Force related:

[Forces](#)

[Specific force](#)

[Force senior officers](#)

Crime related:

[Street level crimes](#)

[Street level outcomes](#)

[Crimes at location](#)

[Crimes with no location](#)

[Crime categories](#)

Web API

The screenshot shows the Flickr App Garden API Documentation page. At the top, there's a navigation bar with links for 'Sign Up', 'Explore', 'Create', a search bar, and a 'Sign In' button. Below the navigation, the title 'The App Garden' is displayed, along with links for 'Create an App', 'API Documentation', 'Feeds', and 'What is the App Garden?'. A note states that the Flickr API is available for non-commercial use by outside developers, with commercial use possible by prior arrangement. On the left side, there are several sections: 'Read these first:' (with links to 'Developer Guide', 'Overview', 'Encoding', 'User Authentication', 'Dates', 'Tags', 'URLs', 'Buddyicons', 'Flickr APIs Terms of Use', 'API Keys', and 'Developers' mailing list'); 'Photo Upload API' (with links to 'Uploading Photos', 'Replacing Photos', 'Example Request', and 'Asynchronous Uploading'); 'Request Formats' (with links to 'REST', 'XML-RPC', and 'SOAP'); and 'Response Formats' (with links to 'REST', 'XML-RPC', 'SOAP', 'JSON', and 'PHP'). On the right side, there are sections for 'API Methods': 'activity' (links to 'flickr.activity.userComments' and 'flickr.activity.userPhotos'); 'auth' (links to 'flickr.auth.checkToken', 'flickr.auth.getFrob', 'flickr.auth.getFullToken', and 'flickr.auth.getToken'); 'auth.oauth' (links to 'flickr.auth.oauth.checkToken' and 'flickr.auth.oauth.getAccessToken'); 'blogs' (links to 'flickr.blogs.getList', 'flickr.blogs.getServices', and 'flickr.blogs.postPhoto'); 'cameras' (links to 'flickr.cameras.getBrandModels' and 'flickr.cameras.getBrands'); 'collections' (links to 'flickr.collections.getInfo' and 'flickr.collections.getTree'); 'commons' (link to 'flickr.common.getInstitutions'); and 'contacts'.

Web API

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Marketing API

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Create API

API Information

General information about using the Marketing APIs, get access, versioning and more.



Quickstart

Make your first Marketing API call using our PHP or Python SDK just within a few minutes. If you never created an ad before, we recommend to create an ad without using the API first.

[Read Quickstart Guide](#) [Create Ad without API](#)

General Information

The documents below will go over the basic structure and usage of the Marketing API.

Access
The Marketing API has three levels of access: development, basic, and standard access levels. Each level of access has certain restrictions, described in this article.

Authentication
Set up your dev environment and obtain an access token

Testing
Learn how to test the Marketing API.

Using the Graph API
Review of the Graph API, covering the architecture of the API, how to make all CRUD operations, error handling, and debugging tips.

English (US) ▾

Marketing Developer Blog

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Quickstart

General Information

Versioning

Web API

The screenshot shows the Google Developers website with the URL <https://developers.google.com/maps/>. The page title is "Google Maps APIs". The main content area features a large image of three devices (a smartphone, a tablet, and a laptop) displaying Google Maps. Below the image are two buttons: "GET STARTED" and "VIEW PLANS". To the right of the devices is a "SEND FEEDBACK" link. The top navigation bar includes the Google Developers logo, a search bar, and a user profile for "alexandersingleton...".

Google Maps for every platform

Google Maps APIs are available for Android, iOS, web browsers and via HTTP web services.

[GET STARTED](#)



Android



iOS



Web



HTTP
Web Services

Latest updates

Predictive Travel Time

The predictive travel time feature in Directions and Distance Matrix APIs adds expected trip duration for any departure time, based on historical time-of-



Many thanks...

