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Matkul: SIG Berbasis Web

Geolocation dan Location-Based Service

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Today: Geolocation dan LBS

- Location Based Service (LBS)
- Geolocation/Mobile Positioning
- Aplikasi Geolocation

LOCALLY ROOTED, GLOBALLY RESPECTED



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Location Based Service

What and How Is It?

GIS: Analysis of Location



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"Location, location, location."

Power of Location:

*"Everything happens
somewhere"*

Knowing where things happen is critically important



Geolocated Data

#onemilliontweetmap

0,016,001

Sign In

Regular Search Hashtag Battle

keywords, #hashtags or @username

Heatmap Layer

Cluster Layer

Day/Night Layer

Rendering

Cluster View

Sentiment View

Time Filter

No Filter

Time Range

Start Now

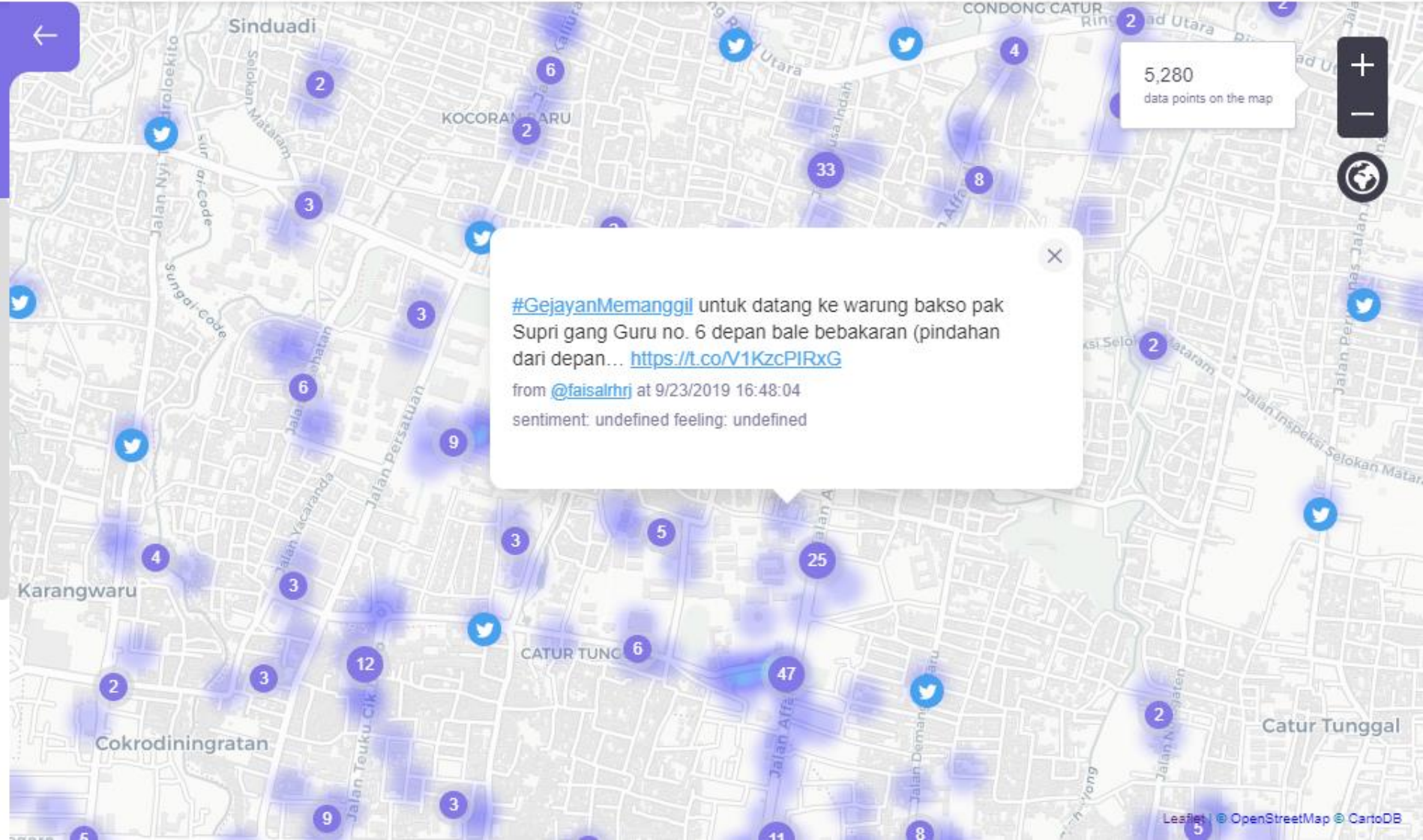
Save current search

Top 5 Countries

[View more analytics](#)

Indonesia

258



Location Based Service



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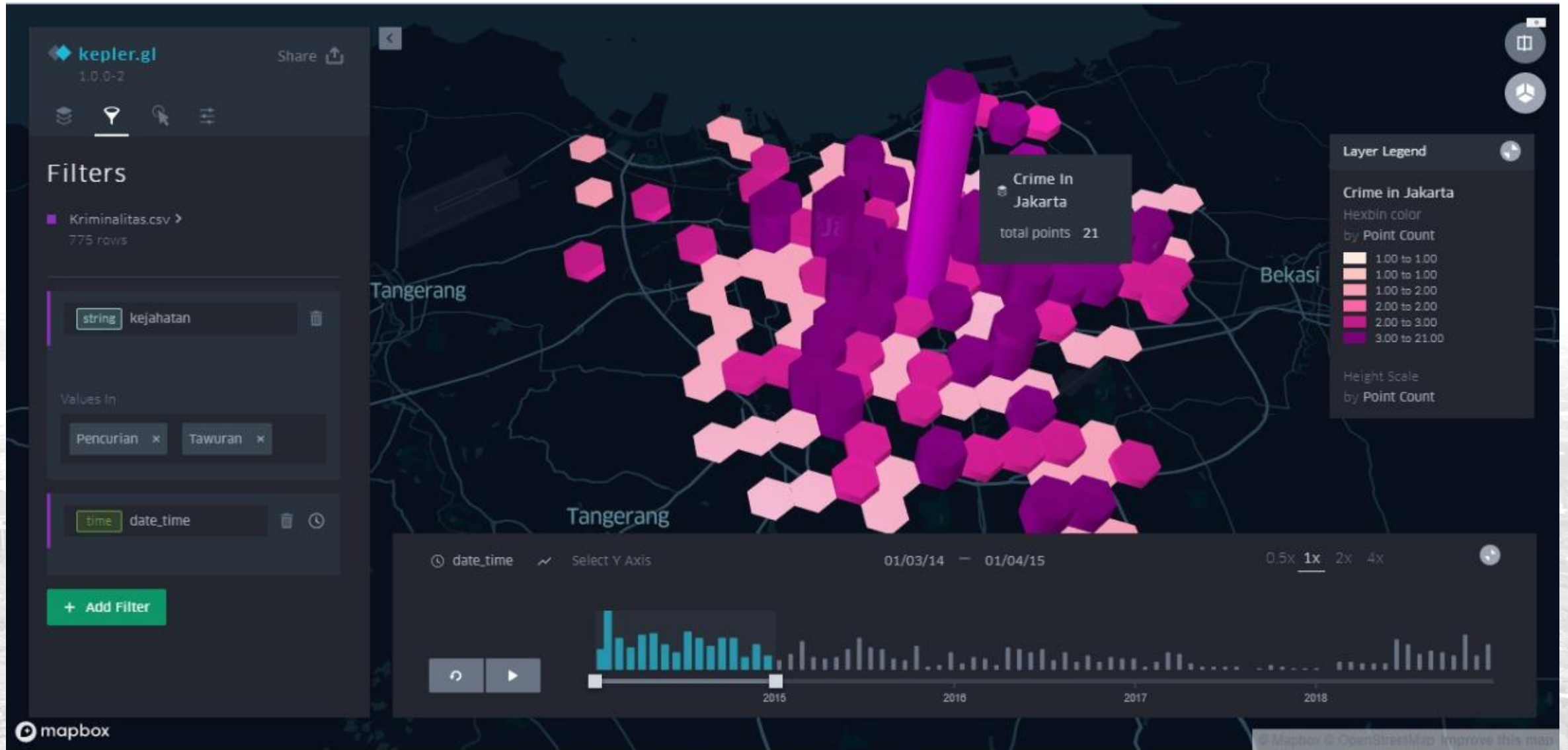
WebGIS: **Web Powered GIS**

Power of **Web**: **Connectivity**

Power of **GIS**: **Location**



Power of Location: Geoinsight

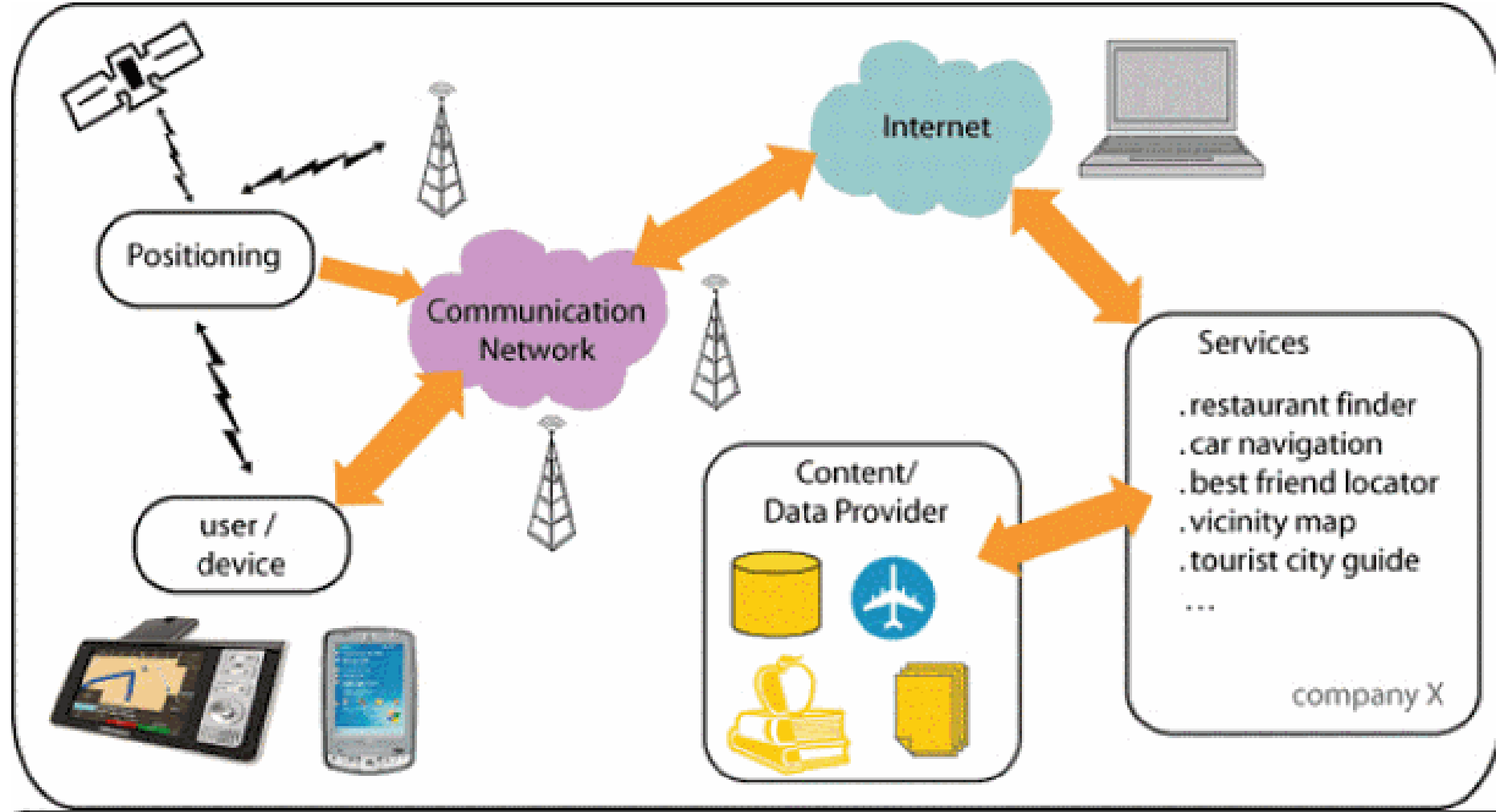


<https://geoinsight.ugm.ac.id/jakartacrime/>



Location Based Service

Location Based Service:
Different services
in different
location



Location Based Service

Contoh:
Targeted (Geo) Marketing



LBA SMS (Location Based Advertising SMS)

Sasar pelanggan potensial anda dengan metode promosi SMS berbasis lokasi dan waktu yang telah ditentukan !

LBA SMS bisa diatur berdasarkan kriteria tertentu (Gender, Usia, Kota, dsb)

Contoh:
Target akan mendapatkan SMS ketika berada di sekitar Mall Taman Angrek



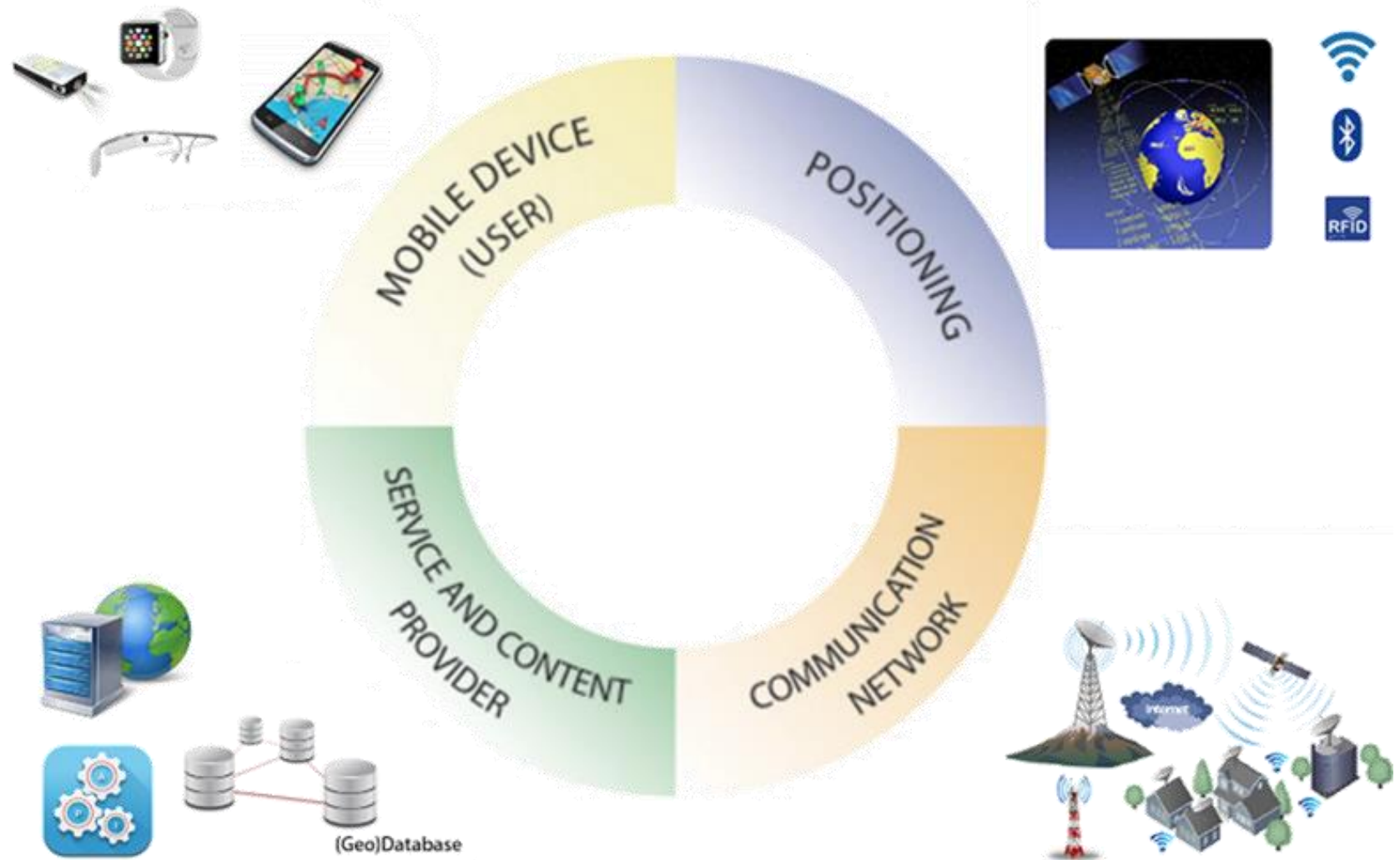
bintiQ
CREATIVE

www.bintiQ.com

Location Based Service



Scope of LBS (or LBIS -- Location-based Information System) grows exponentially along with communication technologies





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Geolocation

What and How Is It?

Geolocation

How locations are identified in a webpage:

- IP Address (a.k.a. GeoIP)
- Cell Tower IDs (CID)
- WiFi/Bluetooth MAC Address
- Global Positioning System (GPS) chips
- **Other, such as Hybrid Positioning**



I told him not to rely on his GPS when out running!

Geolocation: GeoIP



Surabaya, 08 (Indonesia)

Surabaya

Labansari

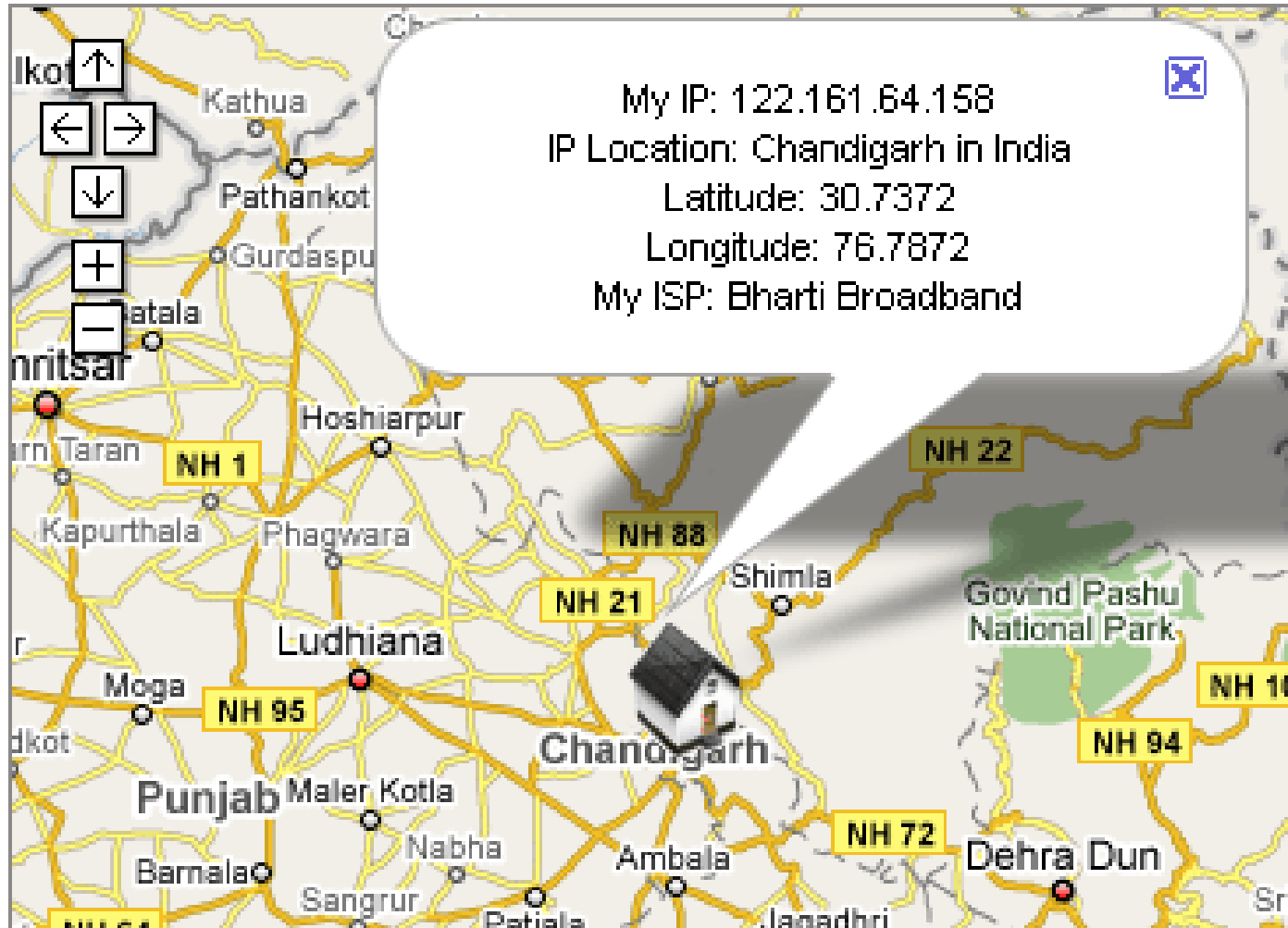
Leaflet | Map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under ODbL.

IP Address	City	Country Flag	DMA Code
182.1.126.92 ⓘ ⓘ	Surabaya W		n/a
Provider	State (Code)	Latitude	Area Code
Pt. Telekomunikasi Selular ⓘ	Jawa Timur (08) W	-7.2484	n/a
Hostname	Country	Longitude	Postal Code
182.1.126.92 ⓘ ⓘ	Indonesia W	112.7419	n/a
Timezone	Continent	TLD	GMT Offset
Asia/Jakarta W	Asia W	ID W	7

Info from GeoIP:

- (Approximate) Location
- Computer IP
- ISP (Internet Service Provider)
- Country, etc

Geolocation: GeoIP



Pros:

Very Fast First-time fixed position

Cons:

Largely Inaccurate

Geolocation: Cell Tower-ID



1:42 0.0KB/s 4G 45

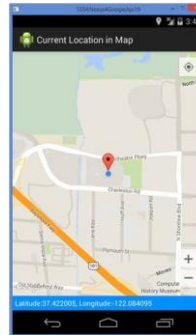
< Phone info1

IMEI: 862963034035648
Phone number:
Current network: IND TELKOMSEL

Run ping test

Ping IpAddr:
Ping Host Name (www.google.co.uk):
HTTP Client test:
Signal strength: -100 dBm 40 asu
ASDiv Status:
Location: LAC = e1c **CID = 290bd1f**
Neighbouring CID: no neighboring cells
CellInfo:
DcRtInfo: mTime=9223372036854775807
mDcPowerState=2147483647
Roaming: Not roaming
GSM service: In service
GPRS service: Connected
Network type: LTE
Message waiting: false
Call redirect: false
Call status: Idle
Radio resets: 0
Data attempts: 0
Data successes: 0

###4636#*##*



Hexadecimal to Decimal Converter

To use this online **hex to decimal converter** tool, type a hex value like 1E into the left field below, and then hit the Convert button. You can convert up to 16 hex characters (max. value of 7fffffffffffff) to decimal.

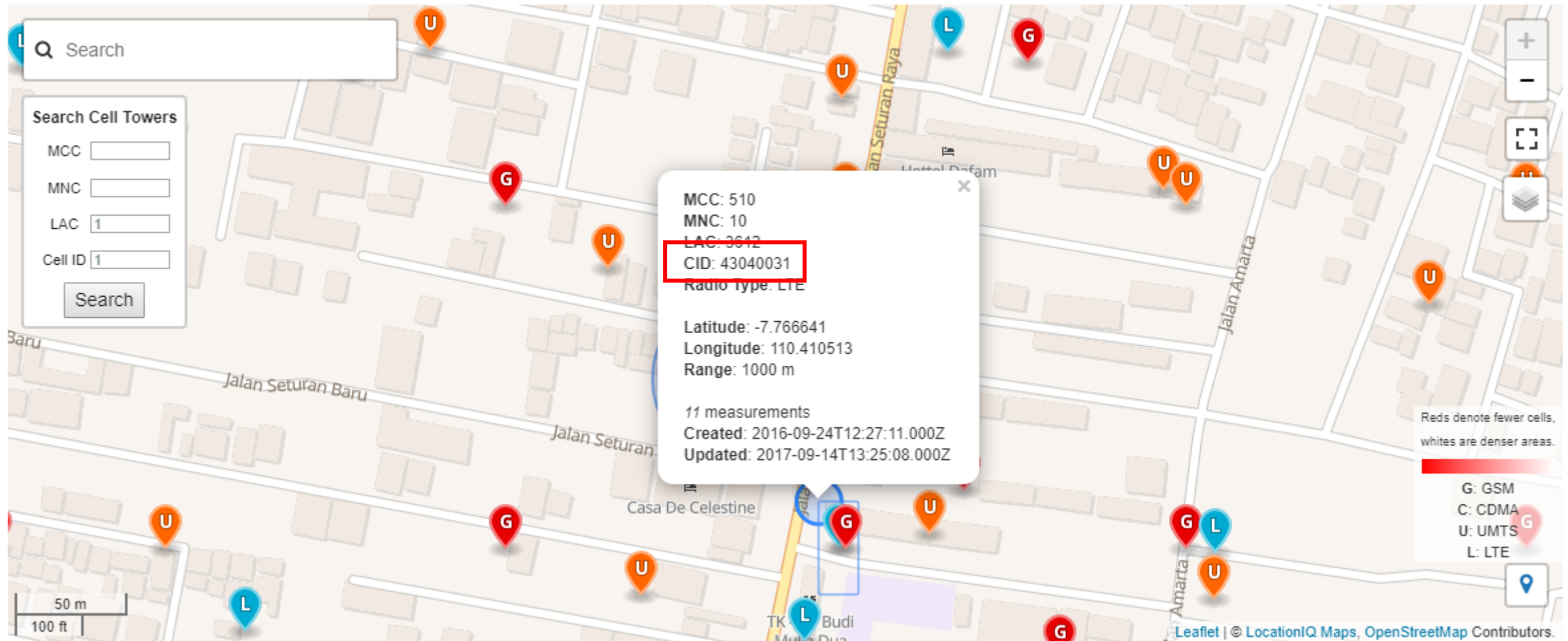
Facebook Twitter

Hex Value (max. 7fffffffffffff) **Decimal Value**

290bd1f 43040031

Convert swap conversion: [Decimal to Hex](#)

Geolocation: Cell Tower-ID



<https://opencellid.org/#zoom=18&lat=-7.765929&lon=110.410376>

Geolocation: Cell Tower-ID

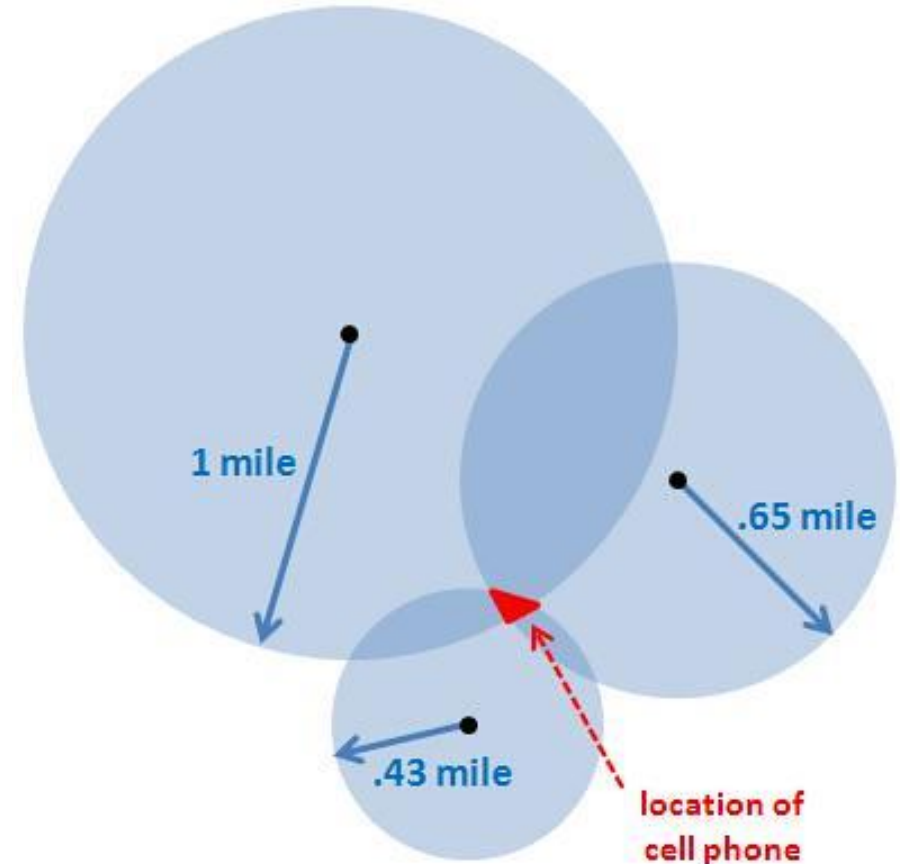


Distance from single tower



Cell phone detected within a certain distance of a single tower.

Cell tower Triangulation



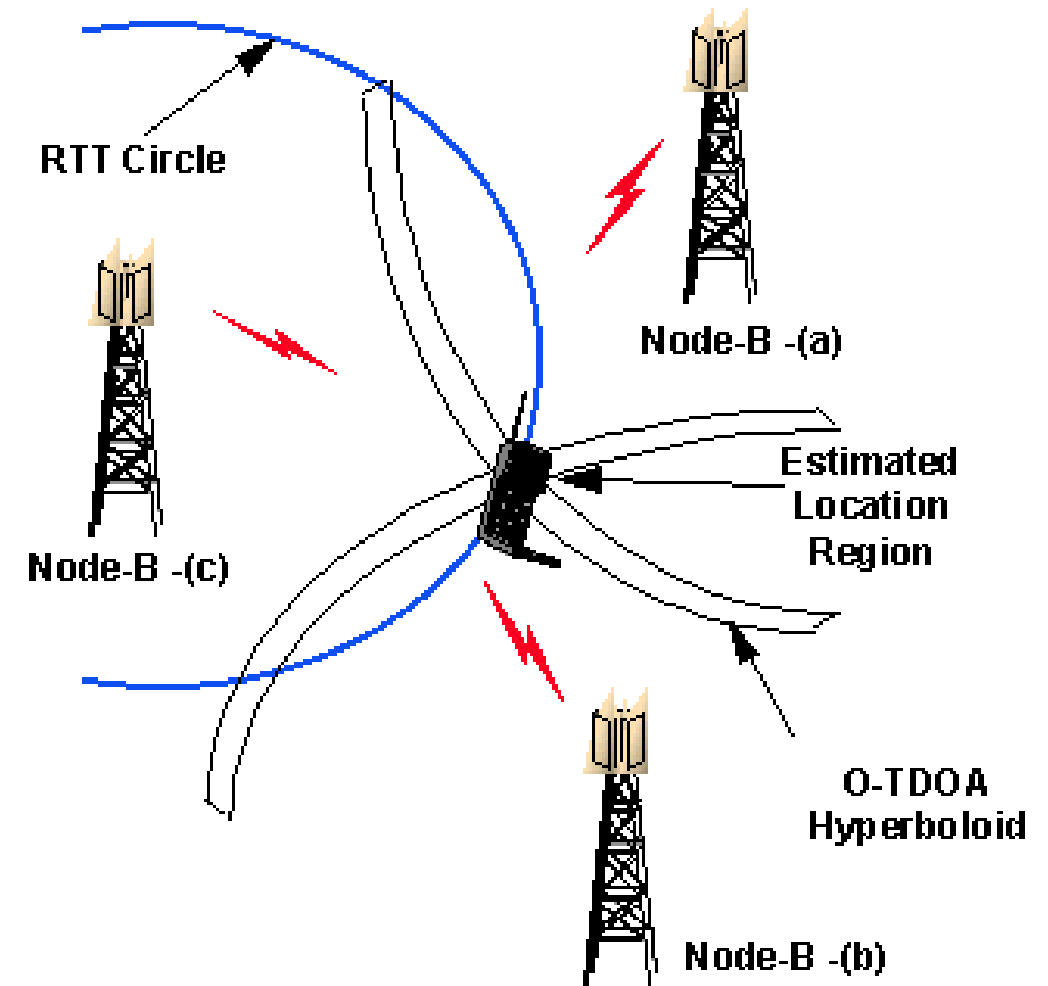
Triangulation - cell phone detected within a certain radius of each of 3 cell towers – the area where each cell tower overlaps the phone is where it is pinpointed.

Geolocation: Cell Tower-ID



Pros:
Fast First-time fixed position

Cons:
Still Inaccurate



Cell-ID Location

Geolocation: GNSS Chip

Pros:

High Accuracy

Cons:

Slow initial fixed time

The screenshot displays a mobile application interface titled "Status". The top status bar shows the time as 2:53 PM and battery at 72%. The application header includes a menu icon, the title "Status", a share icon, and a toggle switch. The main content area is divided into two sections. The upper section provides summary statistics for the GNSS fix, and the lower section is a table of active satellites.

Summary Statistics:

- Lat: 29.6251356°
- Long: -82.3917117°
- Alt: -8.1 m
- Alt (MSL): 14.3 m
- Speed: 32.2 m/sec
- S. Acc: 1.2 m/sec
- PDOP: 0.9
- Time: 02:53:59 PM
- TTFF: 1 sec
- H/V Acc: 3.2/4.0 m
- # Sats: 19/23
- Bearing: 147.9°
- B. Acc: 2.1°
- H/V DOP: 0.6/0.7

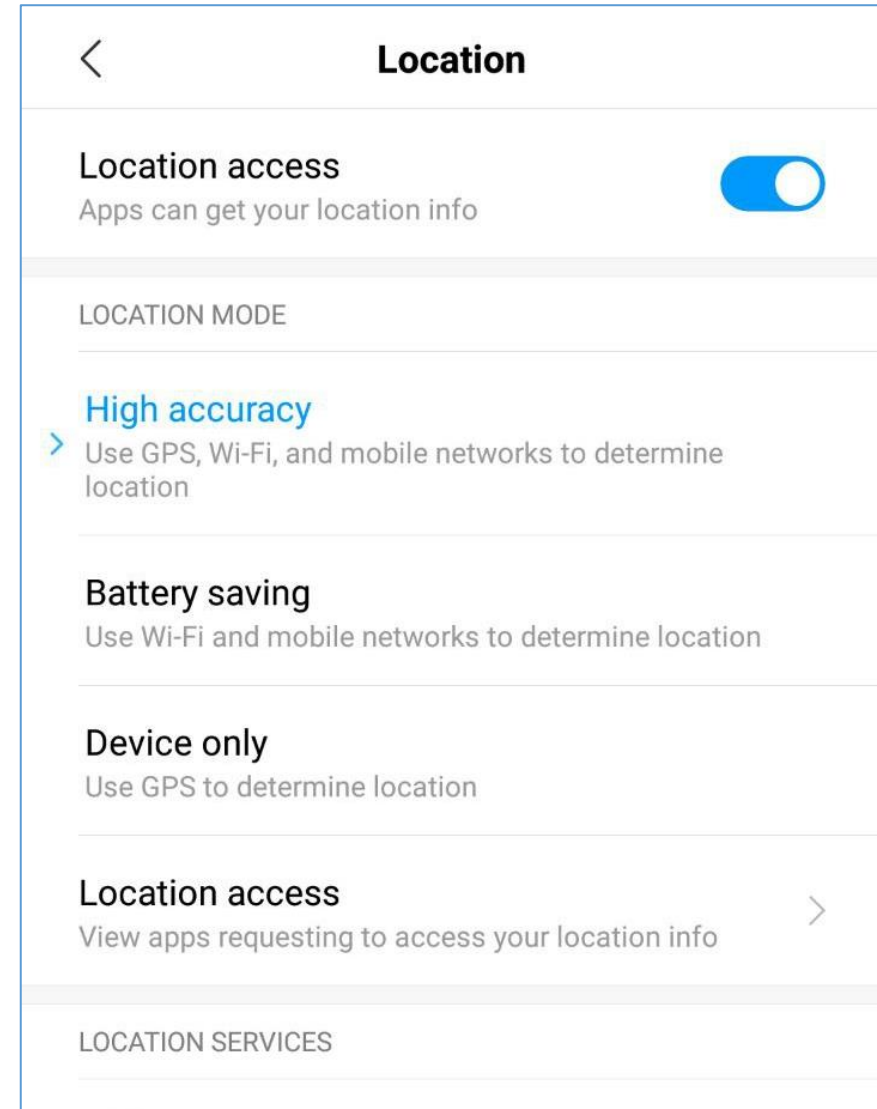
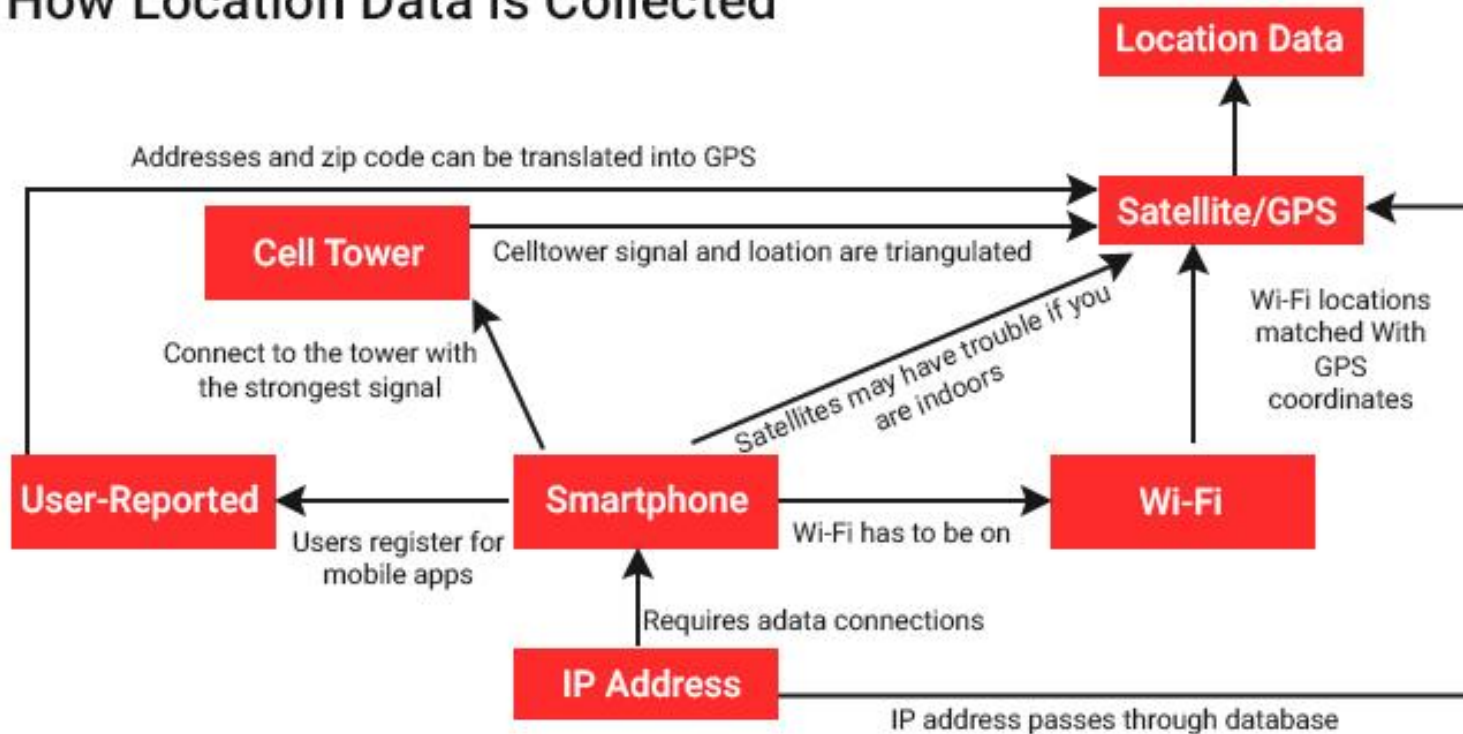
Satellite Data Table:

ID	GNSS	CF	C/N0	Flags	Elev	Azim
3			33.0	AEU	12.0°	212.0°
4			27.1			
7			28.3	A U	14.0°	300.0°
8			34.8	A U	41.0°	177.0°
9			22.0	A U	40.0°	310.0°
16			18.1	AEU	47.0°	28.0°
22			19.8	AEU	5.0°	194.0°
23			30.5	AEU	73.0°	260.0°



Geolocation: Hybrid positioning System (A-GPS)

How Location Data is Collected



Geolocation: Hybrid positioning System (A-GPS)



Location Accuracy and Usage



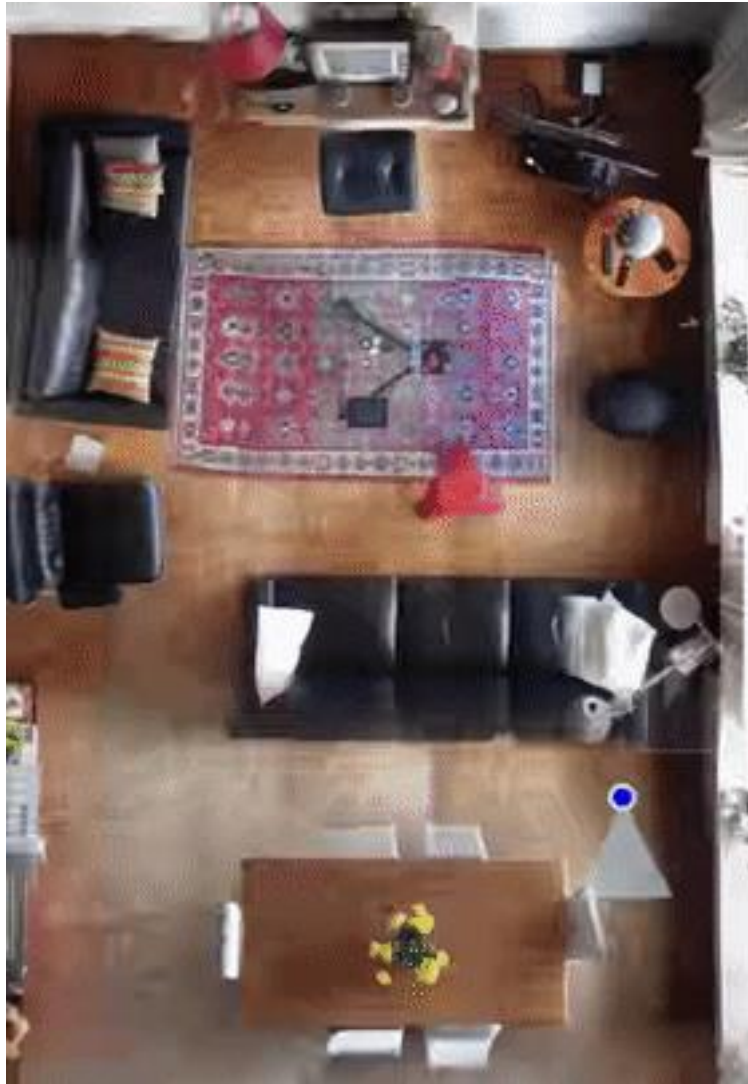
Precise Location Acquisition Assisted -GPS



- GPS has a **slow time to fix** unless it is permanently tracking satellites
- Assisted GPS is based upon providing GPS satellite information to the handset, **via the cellular network**
- Assisted GPS gives improvements in Time to First Fix

Pros:
Very Accurate

Cons:
Slow initiation time, but is better than GPS only



Pozyx
Indoor positioning



Hyper-accurate location, powered by computer vision.

We're harnessing AI to allow camera devices to recognize their surroundings, outdoors and at an infinite scale.

[Read our latest blog post](#)

[Learn about our SDK](#)

<https://www.scape.io/>



Geolocation: Implementation



HTML-JS Geolocation Using:

```
navigator.geolocation.getCurrentPosition(showPosition);
```

Results:

```
function showPosition(position) {  
  position.coords.latitude      = Latitude (float)  
  position.coords.longitude   = Longitude (float)  
}
```

See for yourself:

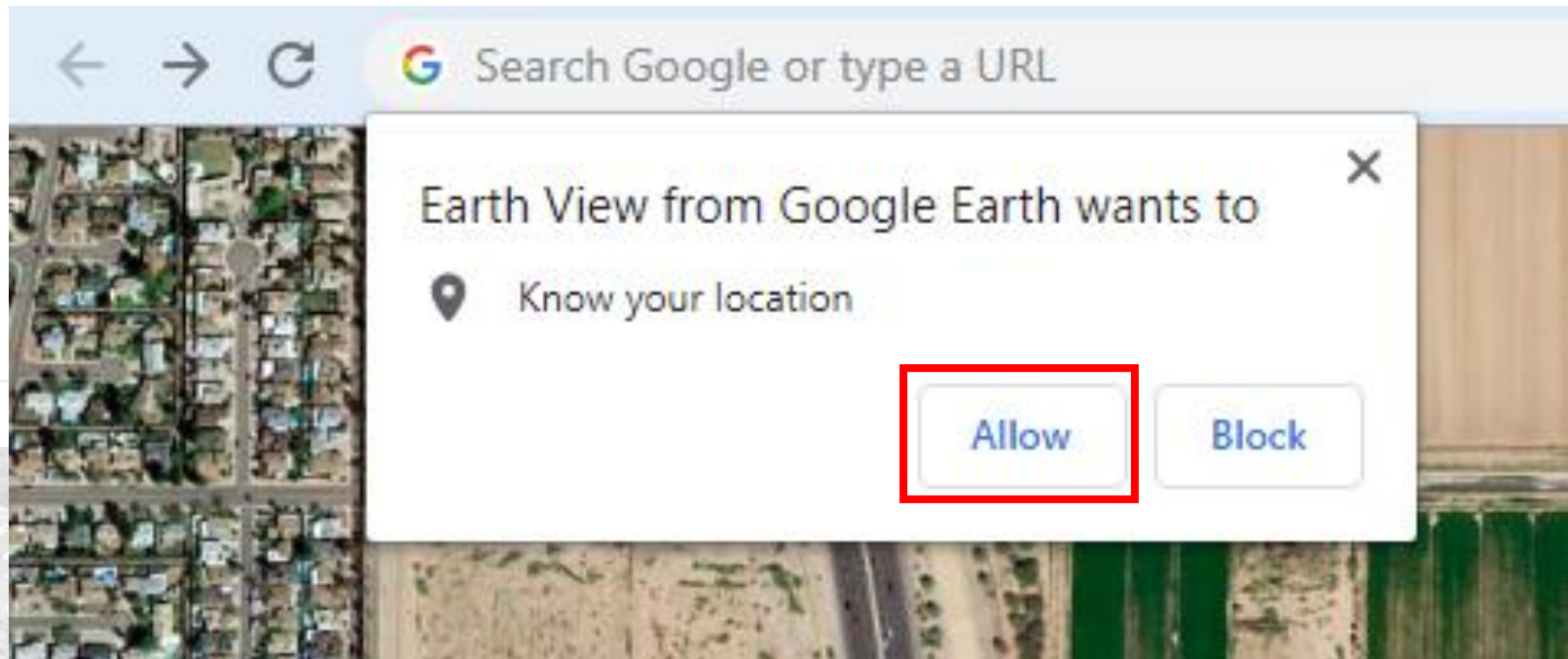
http://www.w3schools.com/html/tryit.asp?filename=tryhtml5_geolocation

Geolocation in Browser

```
> navigator.geolocation.getCurrentPosition(lokasi=>{console.log(lokasi)})  
< undefined
```

⚠ Is the **'geolocation' permission** appropriate? See <https://developer.chrome.com/extensions/manifest.html#permissions>.

```
▼ Position {coords: Coordinates, timestamp: 1569262688076} ⓘ  
  ▼ coords: Coordinates  
    accuracy: 40  
    altitude: null  
    altitudeAccuracy: null  
    heading: null  
    latitude: -7.766165699999999  
    longitude: 110.41018779999999  
    speed: null  
    ▶ __proto__: Coordinates  
  timestamp: 1569262688076  
  ▶ __proto__: Position
```

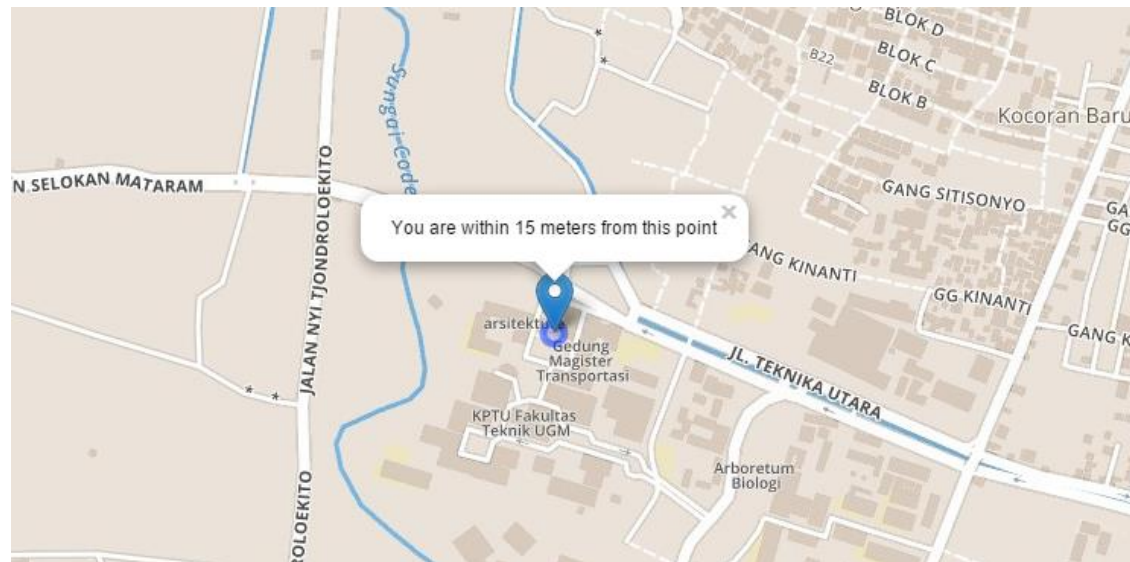


Geolocation: GeoLocation in Leaflet



It's as easy as:

```
map.locate({setView: true, maxZoom: 16});
```



See for yourself: leafletjs.com/examples/mobile-example.html



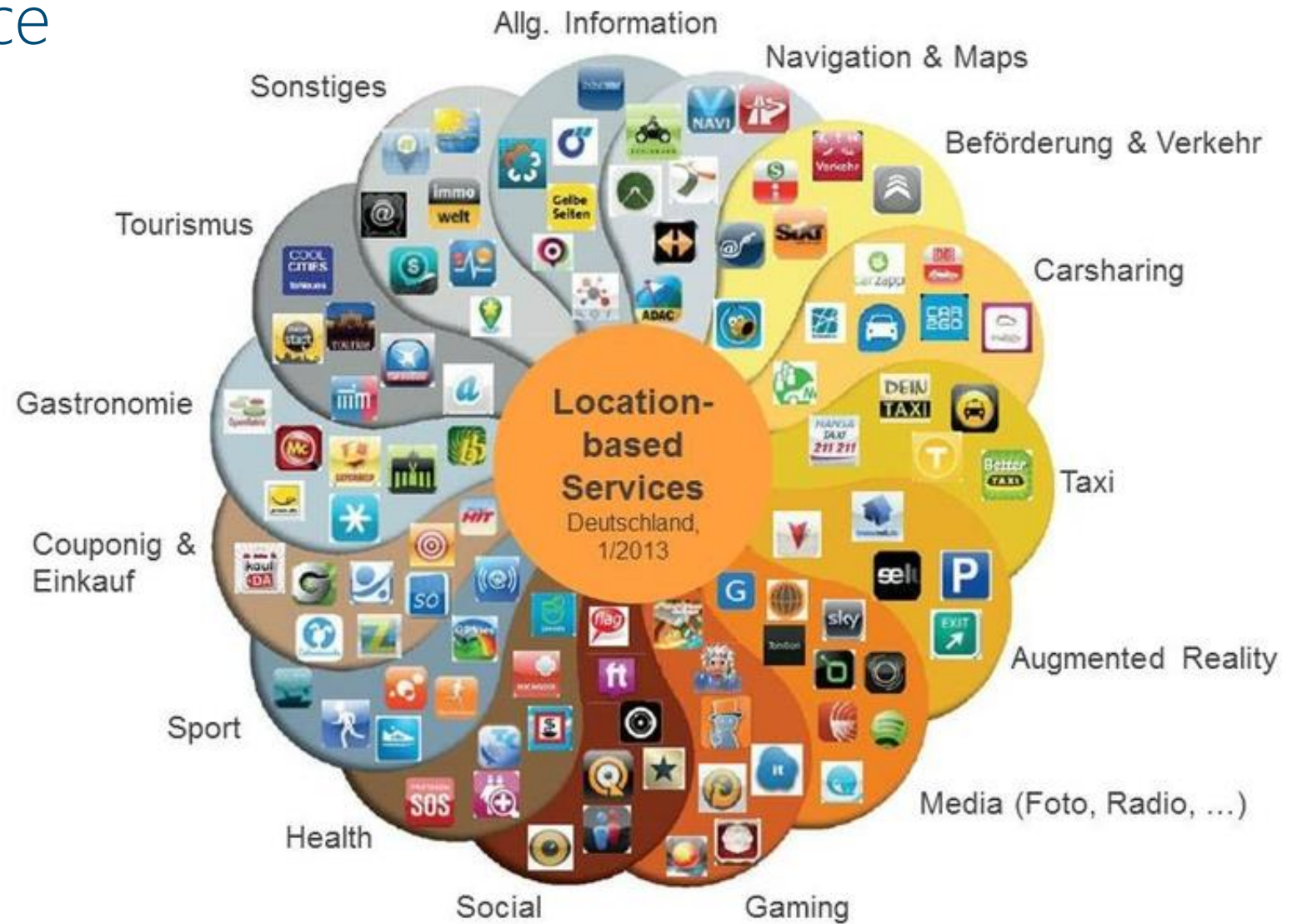
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Aplikasi LBS-Geolocation

What and How Is It?

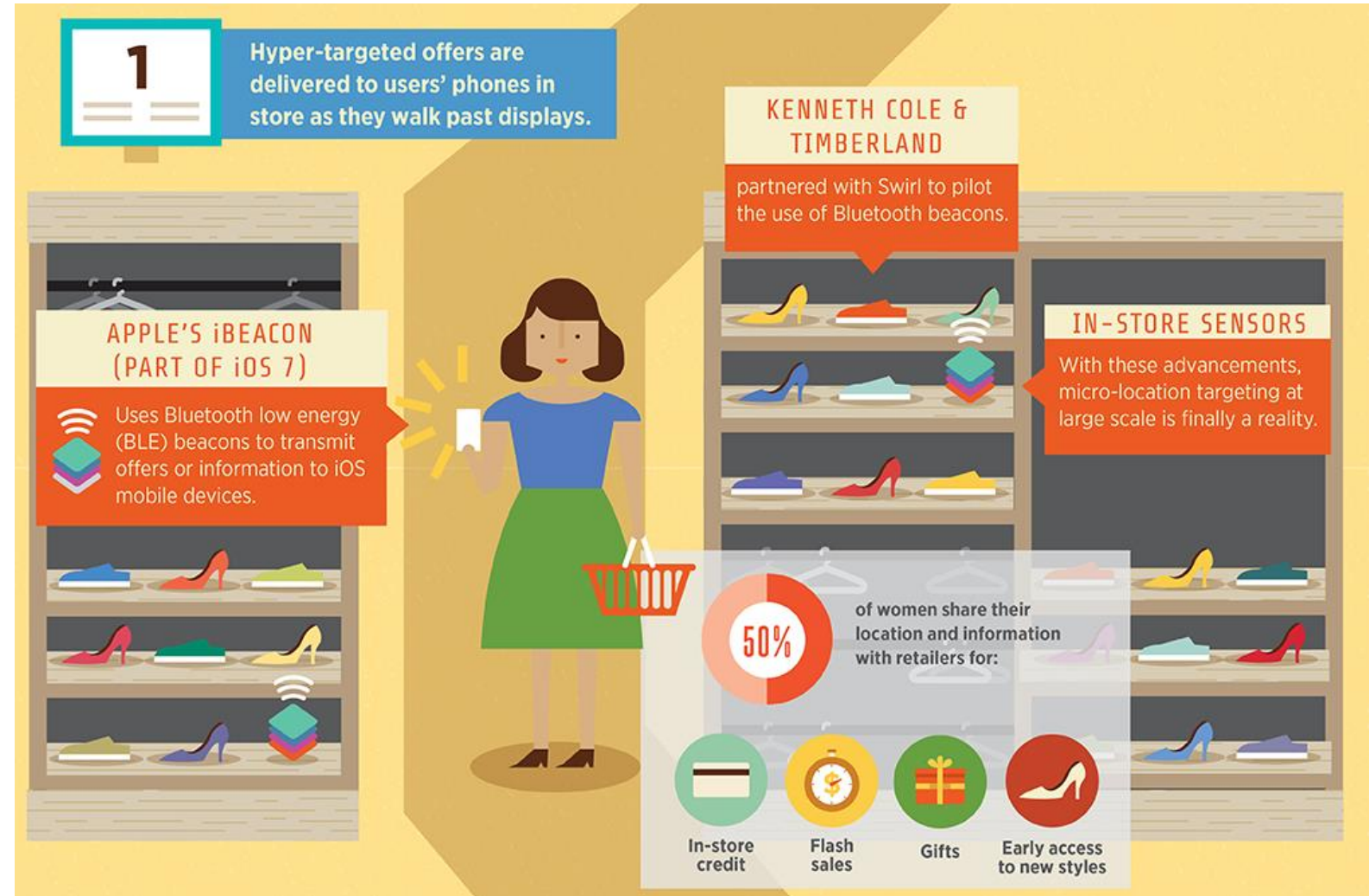
Location Based Service

The many faces of LBS



© Goldmedia

Location Based Service



Contoh:
Indoor (Geo) Marketing

Volunteered Geographic Information ('Crowdsourcing')



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PetaBencana.id

Laporkan banjir

f t

Pantaibahagia

Serang

Ranca Ilat

Tangerang

Jakarta

Rangkasbitung

Cigudeg

Bogor

10 km

Info

USAID FROM THE AMERICAN PEOPLE

UrbanRISKLab

PetaBencana.id memanfaatkan kekuatan media sosial untuk mengumpulkan, menyortir, dan menampilkan informasi banjir secara real-time.

Mitra Pelaksana

BADAN NASIONAL PENANGGULANGAN BENCANA BNPB

Mitra Proyek

PACIFIC DISASTER CENTER

Humanitarian OpenStreetMap Team

Mitra Penyedia Data

qlue

PASANG MATA.COM

z

t

Application: Geofencing



Geotagging



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Panoramio

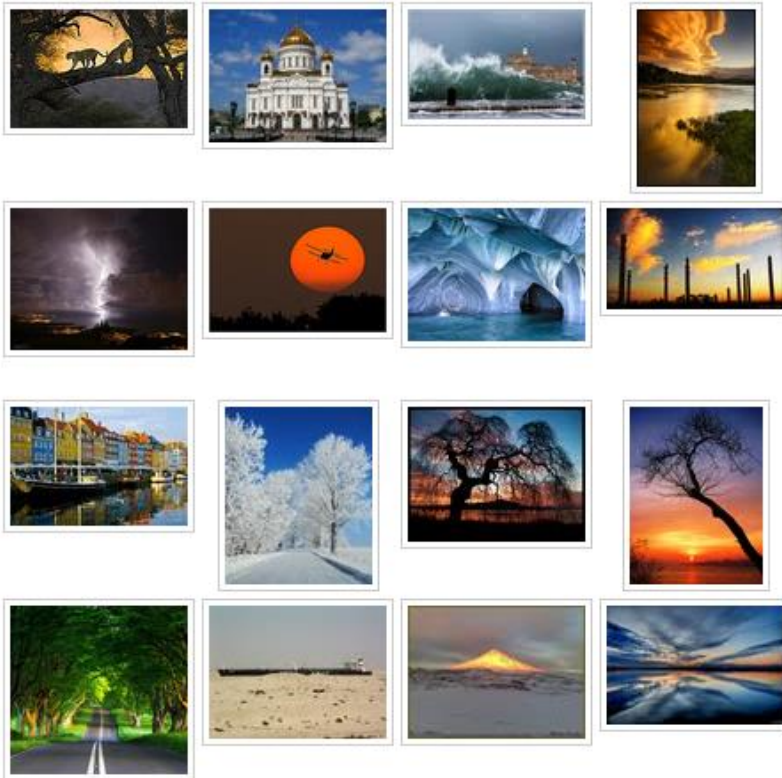
Your Photos | Upload | Groups | Contest | Places | Tags

Forum | Blog | Settings | Sign out | Help

Search place

Popular | Recent | Your photos

Also show photos not selected for Google Earth



Augmented Reality Games



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The world around you is not what it seems.

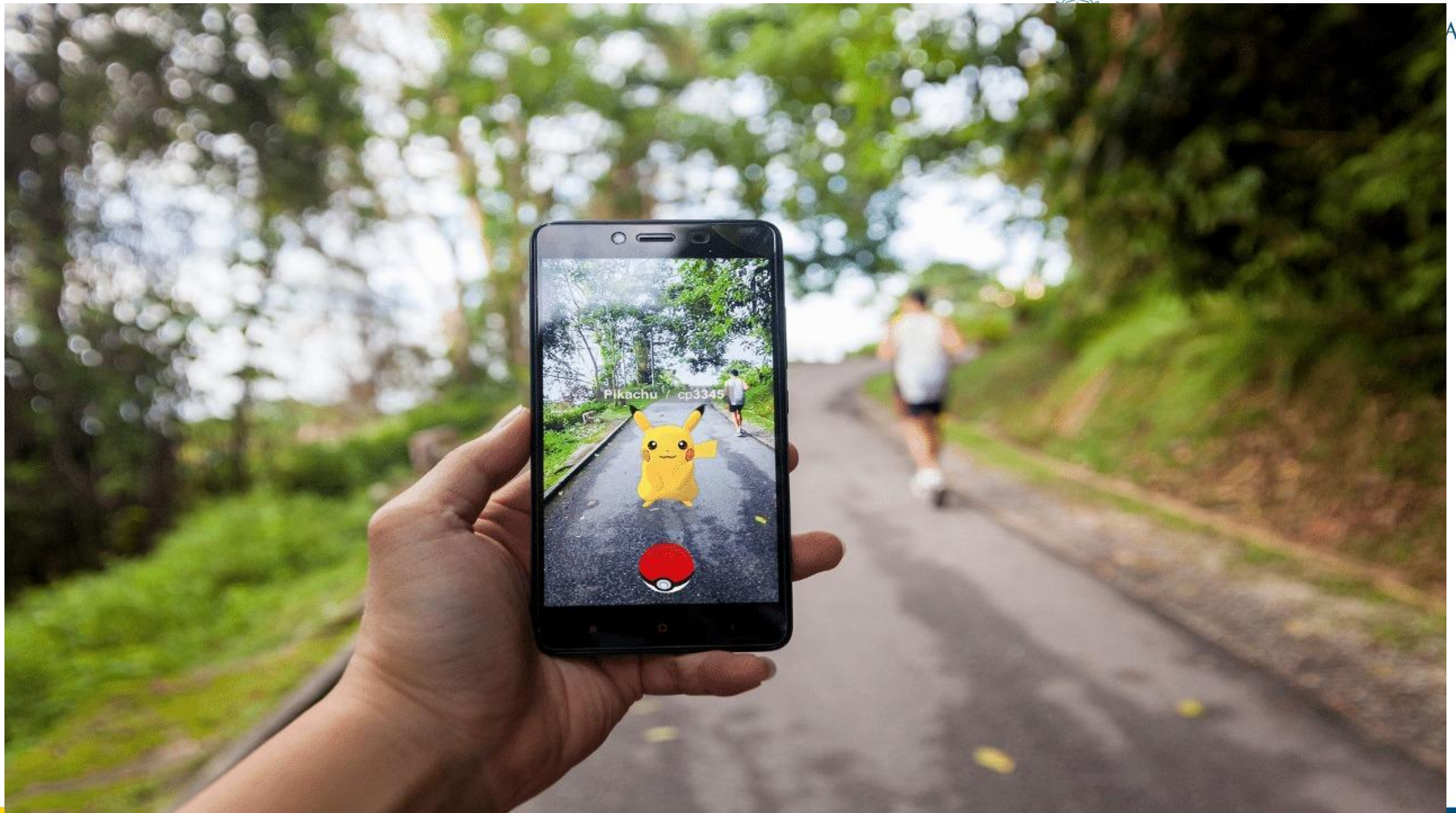
Ingress. The game.
It's happening all around you. They aren't coming. They're already here.

Request an Invite
Email Address ENTER

Have an invite already? Get the App from the [Play Store](#)
Copyright 2012. NianticLabs@Google. All rights reserved. [Privacy](#) & [Terms](#). [Help](#)

INGRESS
31fps
12:37PM Resistance 131 - Enlightened 6
COMM

GET IT ON
Google play



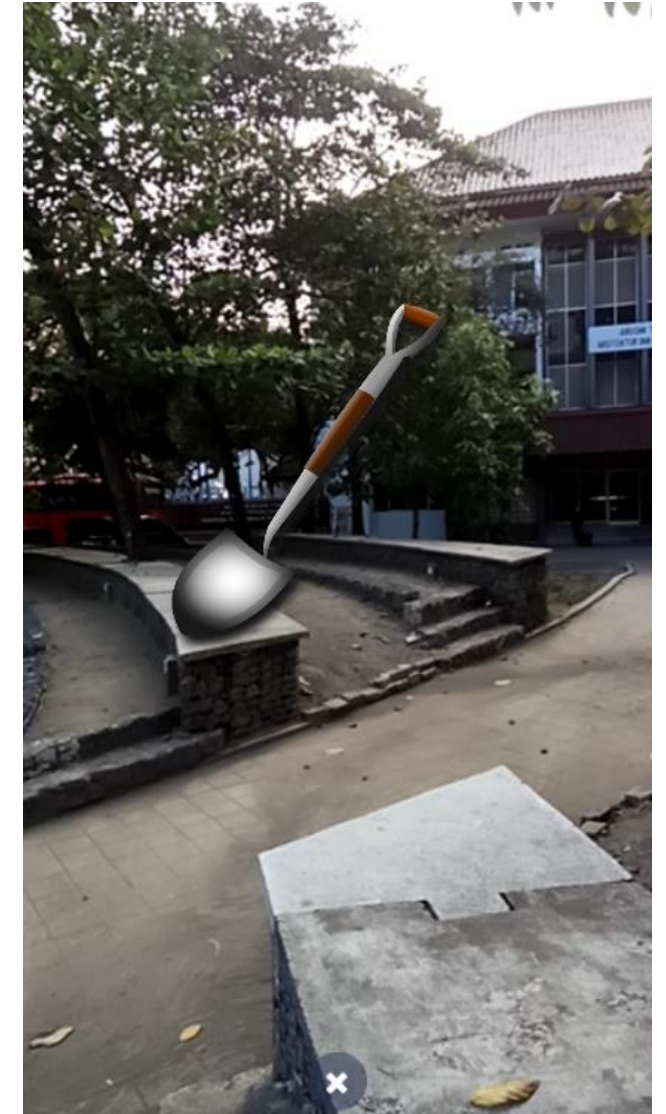
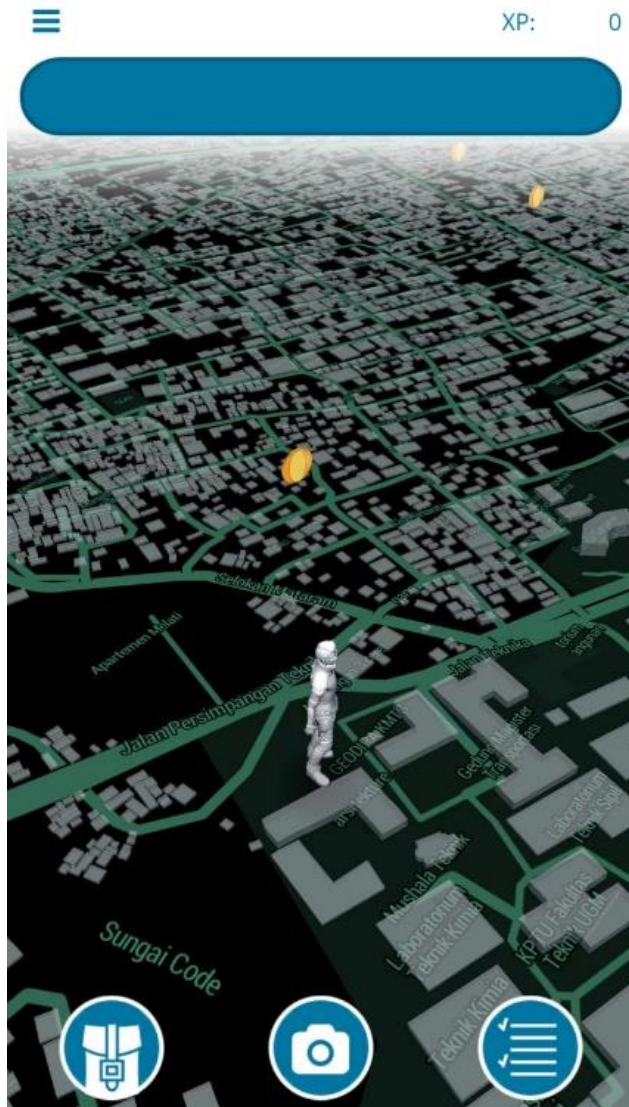
Augmented Reality Games



Augmented Reality Games



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Augmented Reality Museum



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TERIMA KASIH

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