

Geocoding and Mapping Tools

MASSIVE OPEN ONLINE COURSE (MOOC)

Project N. 2023-1-IT02-KA220-HED-000161770

ANALYST - A New Advanced Level for Your Specialised Training

What is GEOINT?

- **Geospatial Intelligence (GEOINT)** is the collection, analysis, and visualisation of information related to the geographic location of objects, events, or phenomena on Earth. GEOINT combines geographic data (such as maps, satellite images, and GPS coordinates) with other forms of intelligence (like text, images, and sensor data) to provide insights that help decision-making, risk assessment, and strategic planning.

Role of GEOINT in Threat Analysis

- **Mapping incidents** – plotting threat events (e.g., protests, crimes, conflict) on a map to help visualise patterns and hotspots over time.
- **Proximity analysis** – Assesses how close threats are to critical infrastructure like offices, supply chains, or public places.
- **Supports decision making** – Gives decision makers clear visual insights on where to act. Helps in planning evacuations, rerouting logistics or deploying security teams.

What is Geocoding?

- **Geocoding** is the process of converting place-based information — such as an address, place name, or description — into precise geographic coordinates (latitude and longitude). These coordinates can then be used to **visualise**, **analyse**, or **map** the location in geographic information systems (GIS) or mapping tools.

Example 1: Geocoding text-based information into co-ordinates

CONWAY, Ark. – Officials with the Conway Police Department are investigating a Sunday evening shooting at a park that left two dead and nine injured.

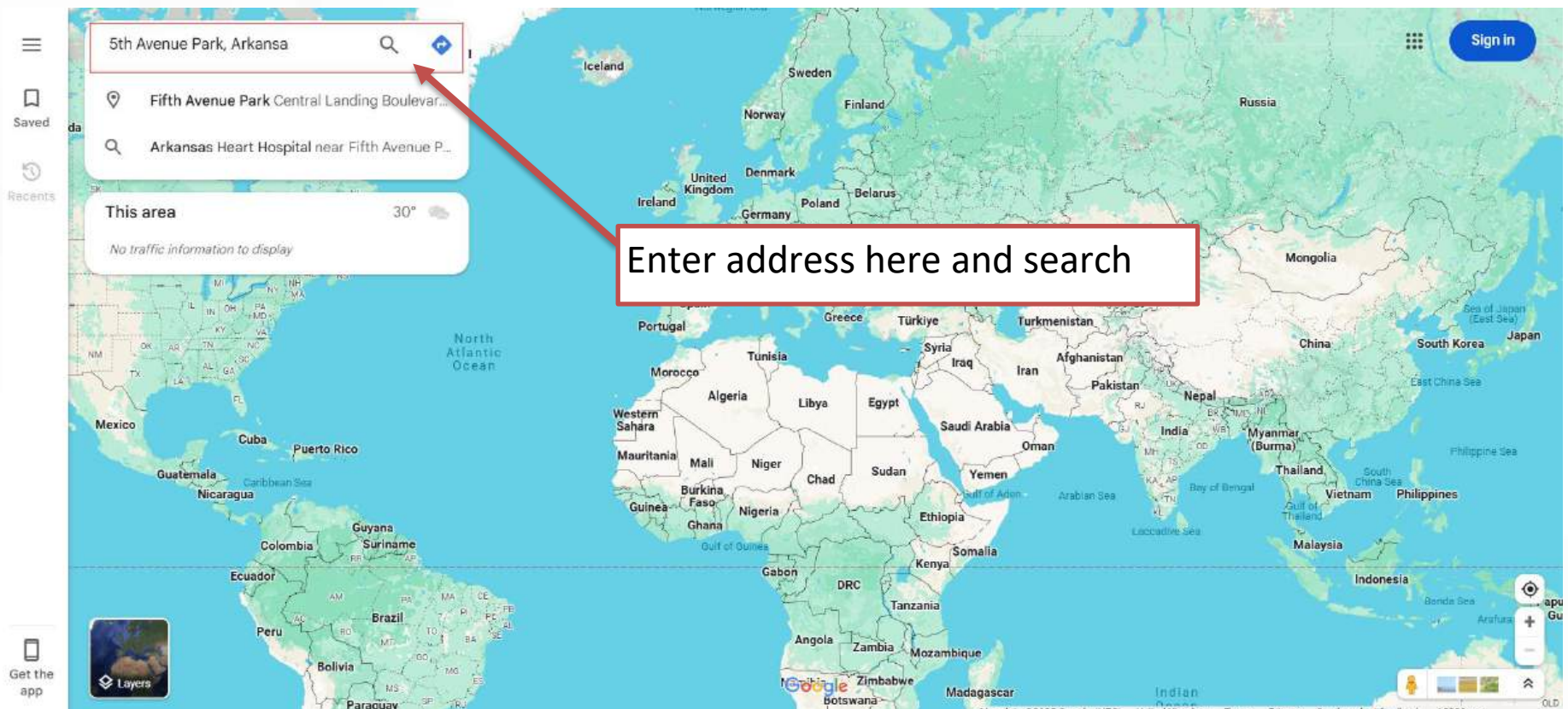
According to [a post on social media](#), the shooting happened at 5th Avenue Park.

Police said that the people who were injured in the shooting have been taken to area hospitals and are currently considered stable.

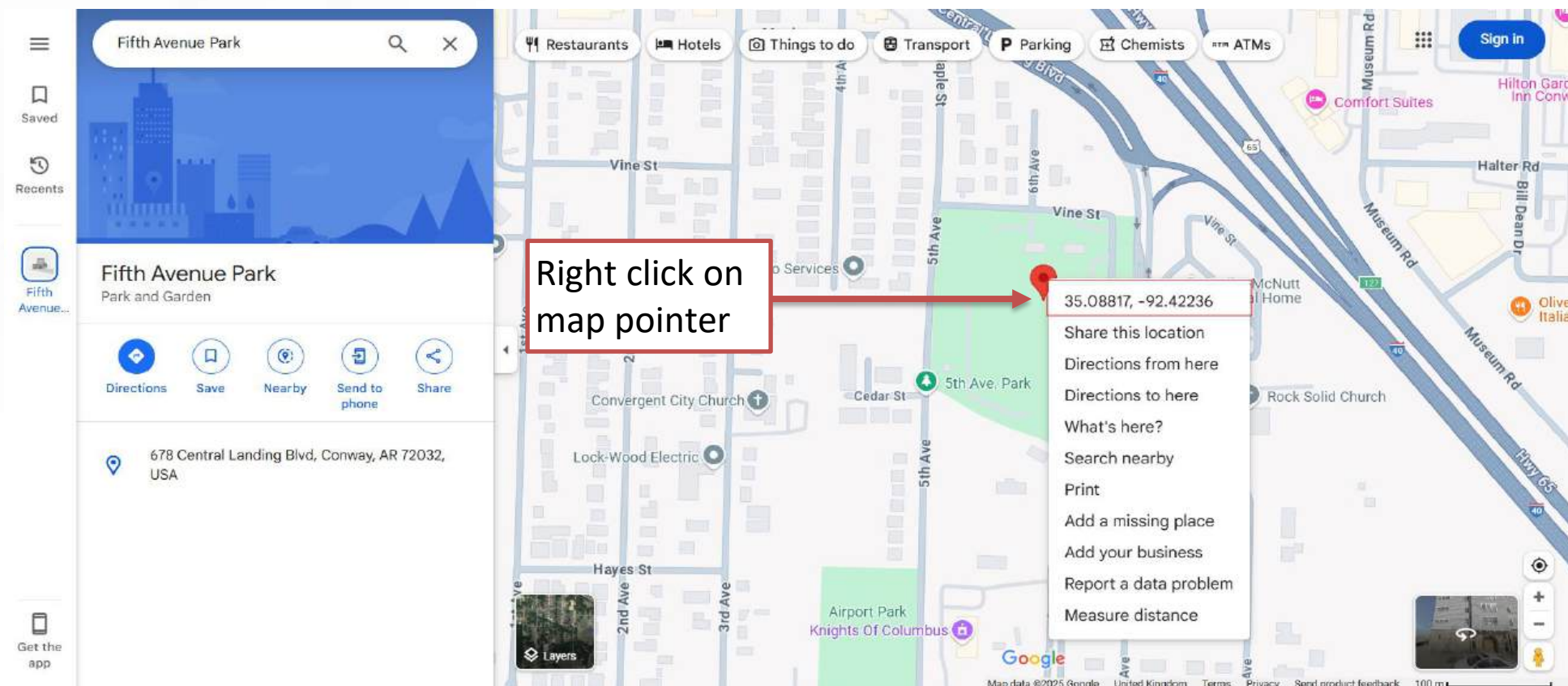
Officials have not released any information on possible suspects or the names of those who died.

Geocoding

Example 1: Geocoding text-based information into co-ordinates



Example 1: Geocoding text-based information into co-ordinates



Example 2: Geocoding text-based information into co-ordinates

INCIDENT 127 - ATTACK

Incident Date:
10 Oct 2024

Incident Time:
0010UTC

Source: Master
Issued: 10 Oct 2024 0100UTC

UKMTO has received a report of an incident 70NM southwest of Al Hudayah, Yemen.

Authorities are investigating.

Vessels are advised to transit with caution and report any suspicious activity to UKMTO.

Example 2: Geocoding text-based information into co-ordinates

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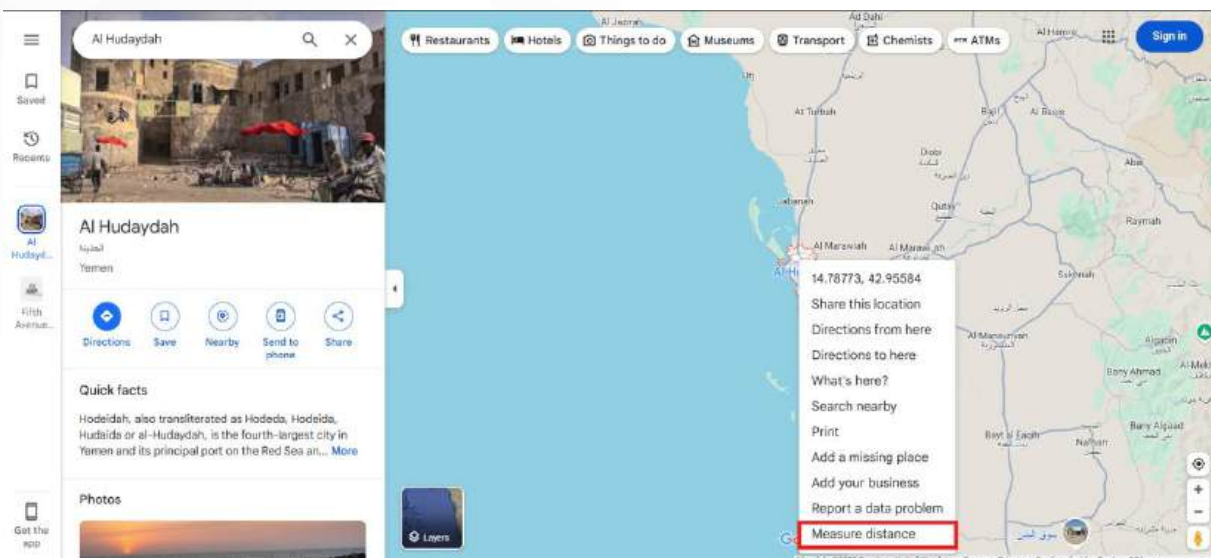
Step 1: Convert NM (Nautical Miles) into km/miles

Step 2: locate the nearest point of reference i.e. Al Hudayah, Yemen on Google Maps

Example 2: Geocoding text-based information into co-ordinates

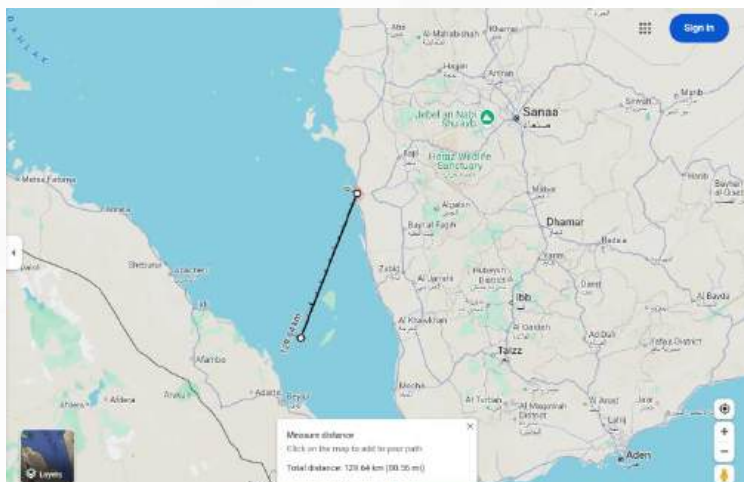
Length

70	=	129.64
Nautical mile		Kilometre

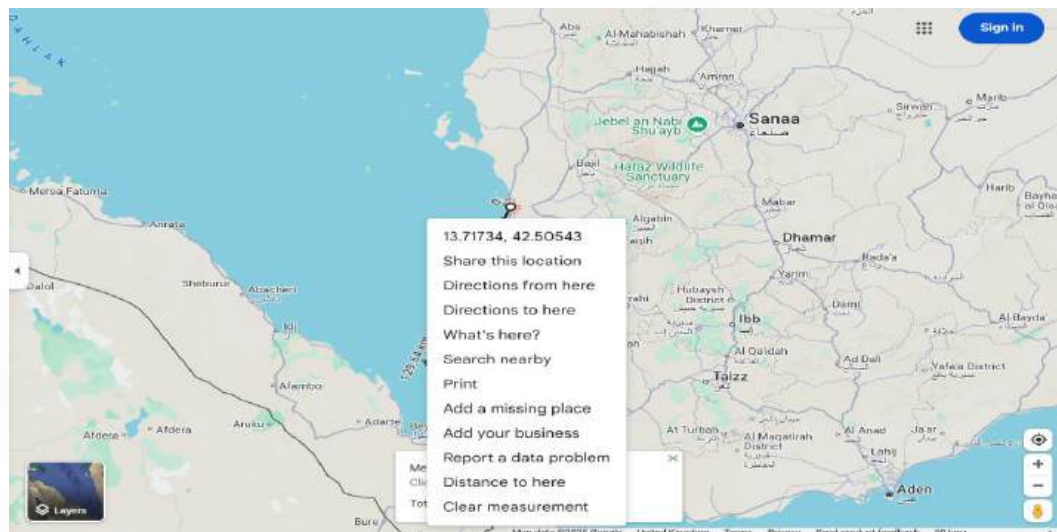


Step 3: Right-click on Al Hudaydah and go to measure distance – this will allow you to draw a line corresponding to the direction and distance i.e. 129.64 km southwest of Al Hudaydah

Example 2: Geocoding text-based information into co-ordinates



Step 4: Once the line has been drawn in the correct direction and distance, right click on the measured distance to obtain the co-ordinates.



Geocoding

Tools to help with Geocoding

Google Maps

Google Earth

OpenStreet Map

Wikipedia

Wikimapia

Geonames

What is Visual Geolocation?

- Visual geolocation is the process of determining the real-world location of an image or video using visual cues, metadata, and mapping tools – often without direct GPS data.

Category	Examples
Built Environment	Buildings, street layouts, architectural styles
Text	Street signs, shop names, languages, fonts
Transportation	Vehicle types, license plates, traffic signs
Geography	Mountains, rivers, coastlines
Nature	Flora, tree types, seasons
Utilities	Power lines, cell towers, road markings
Cultural Clues	Flags, advertisements, clothing, alphabets

Common tools used for Visual Geolocation

Tool	Use
Google Street View / Earth	Matching landmarks and street views
Yandex Maps	Better street-level imagery for Eastern Europe, Russia
EXIFTool / Metadata Viewer	Extract hidden GPS data (if present)
Reverse Image Search (Google, Yandex, TinEye)	Find matches or similar images online
Mapillary	Street-level imagery from global users
SunCalc.org	Estimate time and direction based on shadows
Bellingcat's Geo Tips	Resource guides for real-world investigations

Visual Geolocation

Example: Let's try and pinpoint the location from the picture below



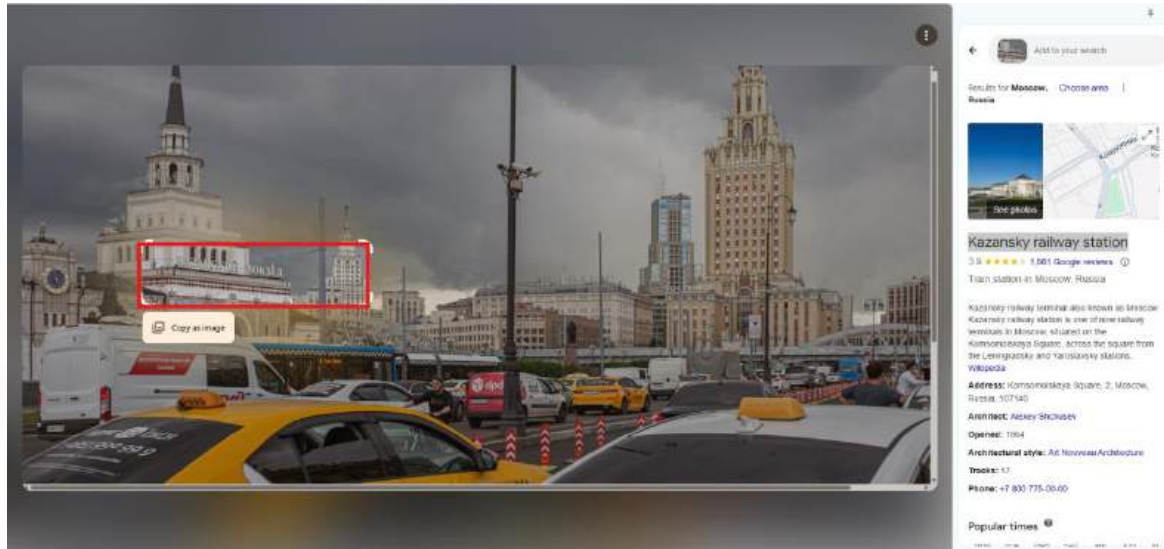
Visual Geolocation

Clues within the picture

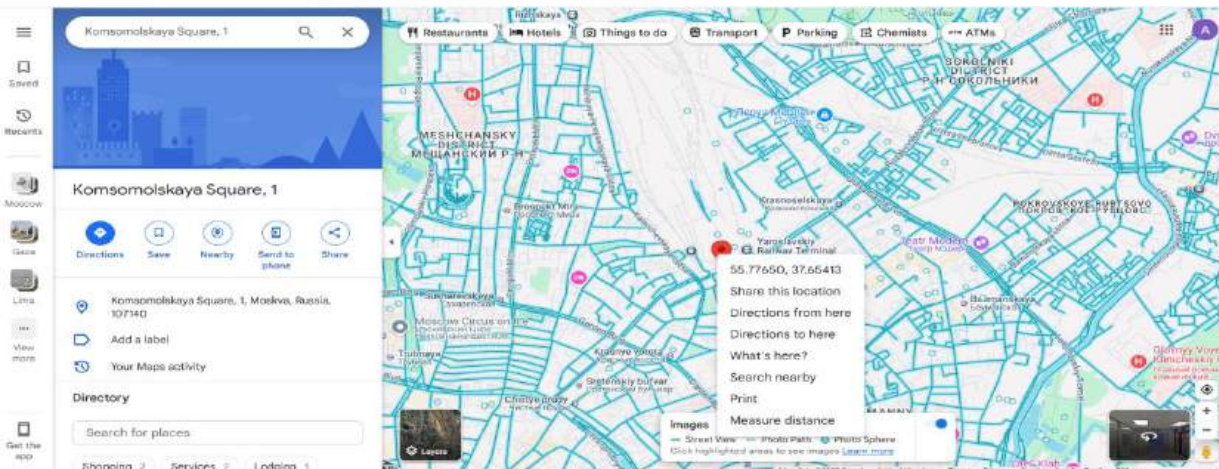
Clue	Inference
Cyrillic script	Likely a country using Cyrillic — e.g., Russia, Ukraine, Bulgaria
Taxi color	Yellow-and-white taxis are common in Moscow
Soviet-style housing	Common in former USSR countries
Russian area code	(495) Area code on the taxis is for Moscow

From the above, we can ascertain that the location is in Moscow, Russia. However, let's try to get a more accurate location.




Visual Geolocation



Using Google Lens and Google Street View, we can come to the conclusion the location is at Komsomolskaya Square, 1



Real vs Fake Images

 Feature	 Real Image	 Fake (AI/Deepfake) Image
Hands & Fingers	Natural count, proportions, and pose	Extra/missing fingers, twisted shapes, weird nails
Teeth	Individual, properly spaced	Blobby, melted look, no separation
Eyes & Reflection	Even lighting, natural reflections, lively gaze	Asymmetrical reflections, "dead" or glassy look
Background	Makes sense with subject, consistent focus	Warped shapes, dreamlike blur, distorted people/objects
Text (e.g. signs)	Clear, readable, meaningful	Gibberish, backward letters, inconsistent fonts
Facial Features	Asymmetry, subtle flaws, expression variations	Overly symmetrical, flawless skin, static expressions
Lighting & Shadows	Consistent with light source, soft gradients	Inconsistent or missing shadows, sharp/harsh lighting
Context & Logic	Matches real-world events, weather, clothing	Out-of-place elements, mismatched time or setting
Image Metadata (EXIF)	Includes camera data, timestamps, GPS	Often stripped or missing metadata
Movement (in videos)	Smooth, realistic motion and lip-sync	Jerky movements, unnatural expressions or lip-sync delay

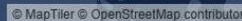
Using GIS tools to create visual risk assessments

- Mapping Threat Locations: GIS allows you to plot various types of incidents such as crime, protests, conflict, natural disasters etc.
- Overlaying Company Assets or Critical Infrastructure: GIS allows you to map internal data like office locations, supply chains or data centres; and overlay them with external risks.
- Temporal Analysis: GIS can show you how risks evolve over time by showcasing timeline of incidents, heat maps that change with time or impact. This supports proactive risk forecasting.

Using GIS tools – a simple guide

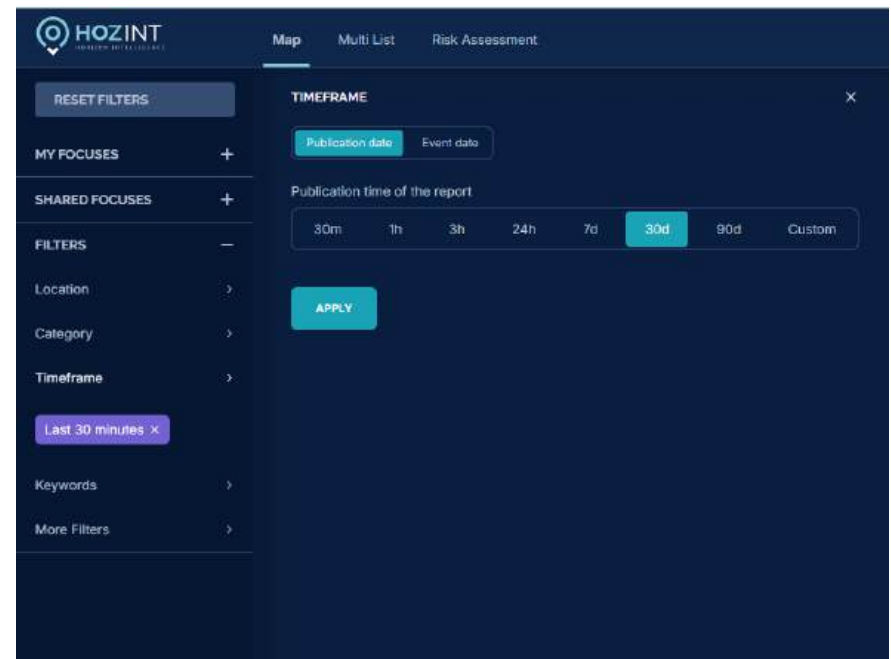
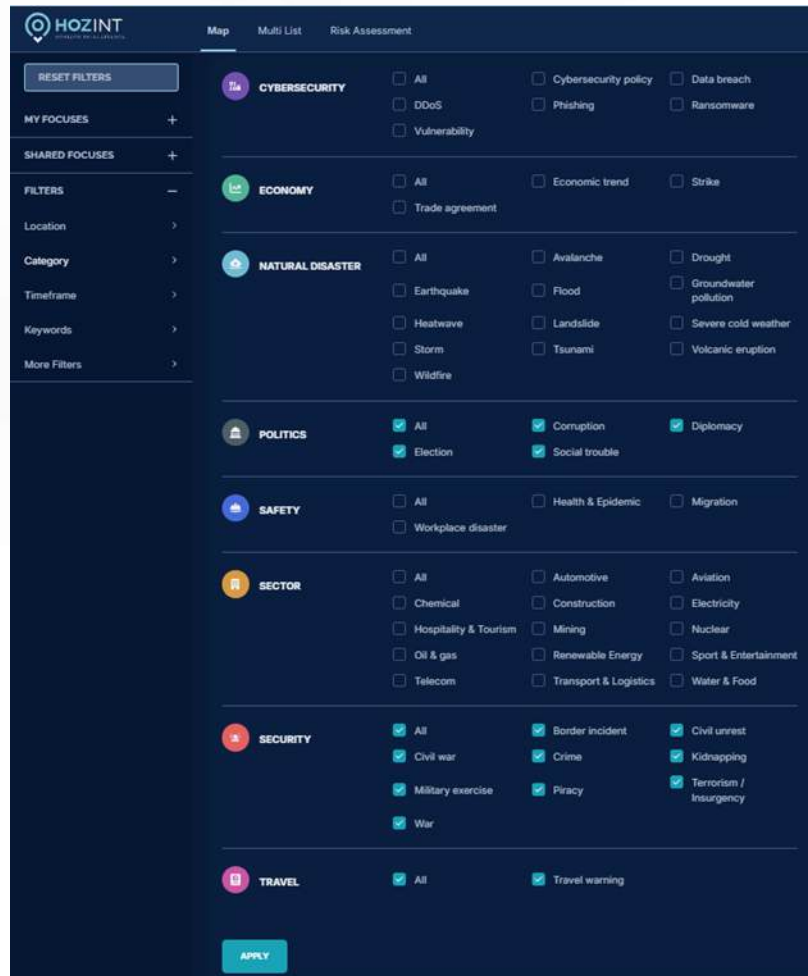
- Step 1: Import threat data (protests, conflict, crime) from sources like ACLED, police reports, or news feeds
- Step 2: Import company asset locations or points of interests (lat/long or addresses)
- Step 3: Overlay layers in GIS
- Step 4: Use proximity tools to identify threats within X km radius
- Step 5: Style the map with meaningful symbology (colours, icons, severity)
- Step 6: Export visual maps or publish to a dashboard

Let's use Hozint to create a visual risk assessment



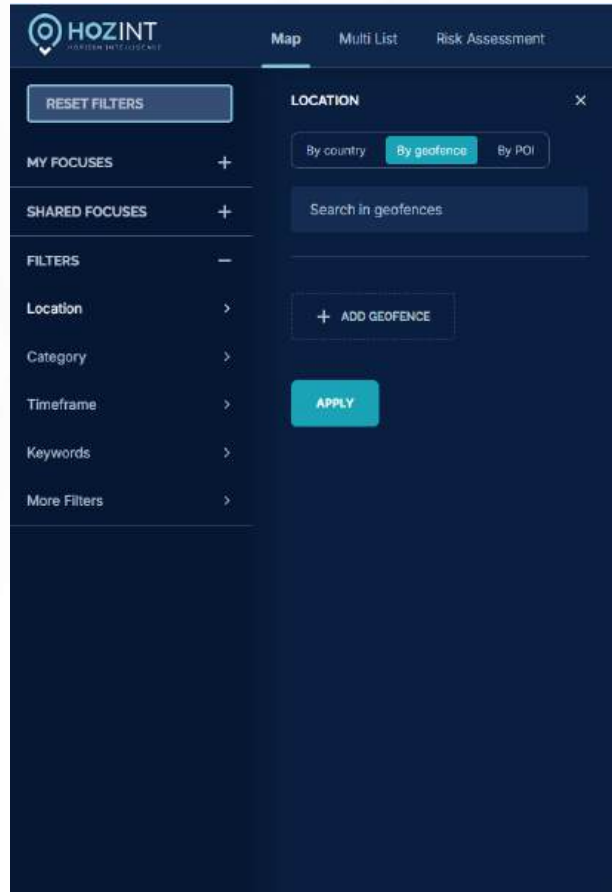
GIS Platforms

Let's use Hozint to create a visual risk assessment



GIS Platforms

Let's use Hozint to create a visual risk assessment



HOZINT
HORIZON INTELLIGENCE

Map Multi List Risk Assessment

RESET FILTERS

MY FOCUSES +

SHARED FOCUSES +

FILTERS -

Location >

Category >

Timeframe >

Keywords >

More Filters >

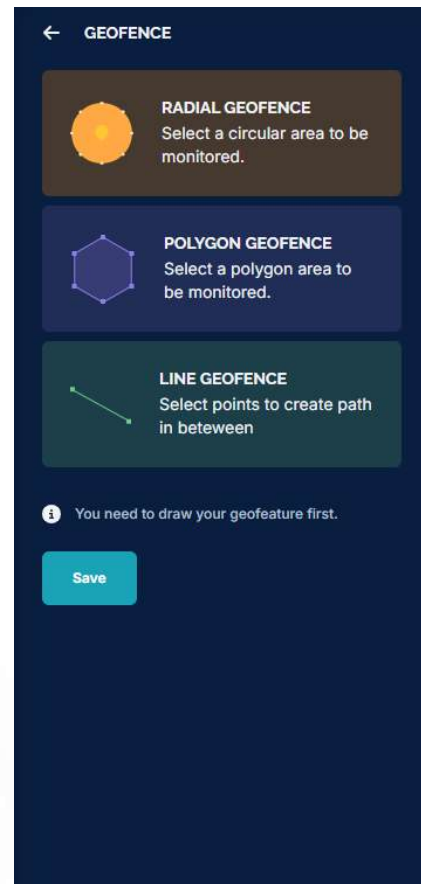
LOCATION X

By country By geofence By POI

Search in geofences

+ ADD GEOFENCE

APPLY



← GEOFENCE

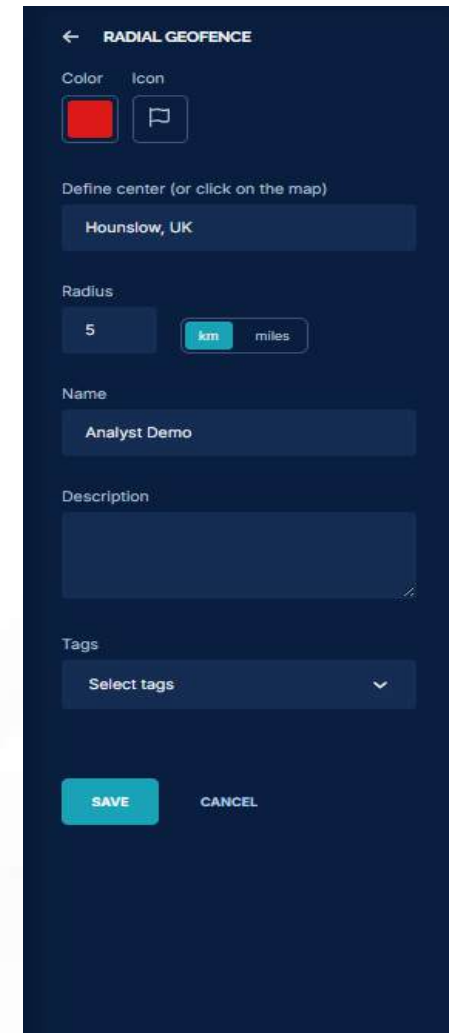
RADIAL GEOFENCE
Select a circular area to be monitored.

POLYGON GEOFENCE
Select a polygon area to be monitored.

LINE GEOFENCE
Select points to create path in between

i You need to draw your geofeature first.

Save



← **RADIAL GEOFENCE**

Color Icon

Define center (or click on the map)

Hounslow, UK

Radius

5 km miles

Name

Analyst Demo

Description

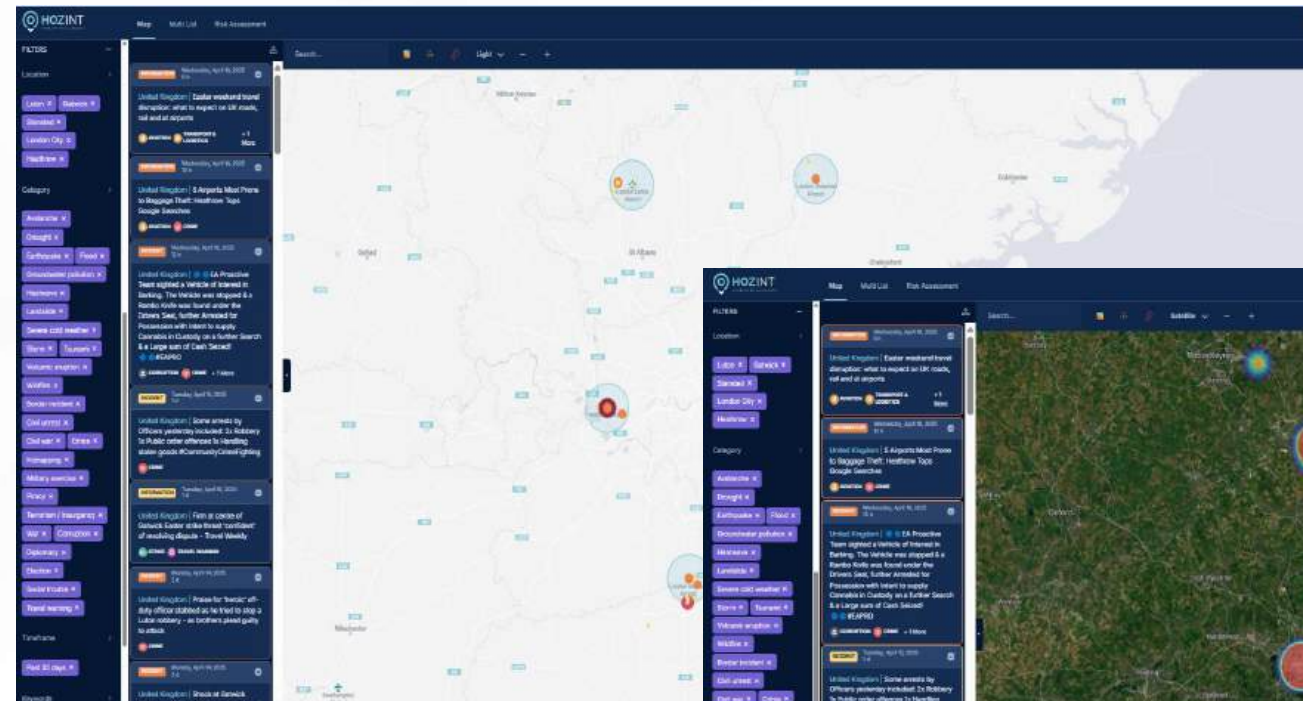
Tags

Select tags

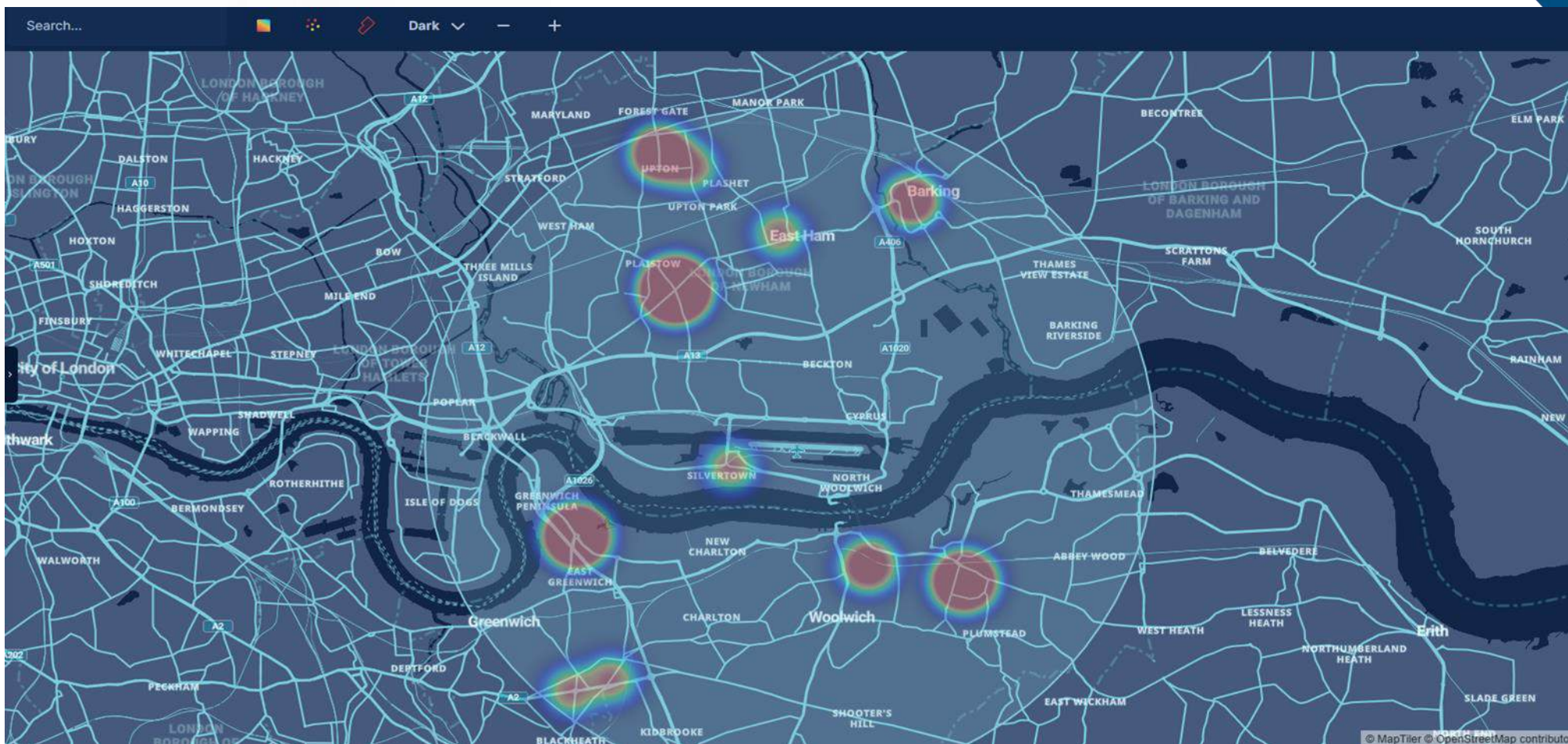
SAVE CANCEL

GIS Platforms

Let's use Hozint to create a visual risk assessment



Let's use Hozint to create a visual risk assessment



THANK YOU FOR YOUR
ATTENTION!