

# AI Enabled GIS

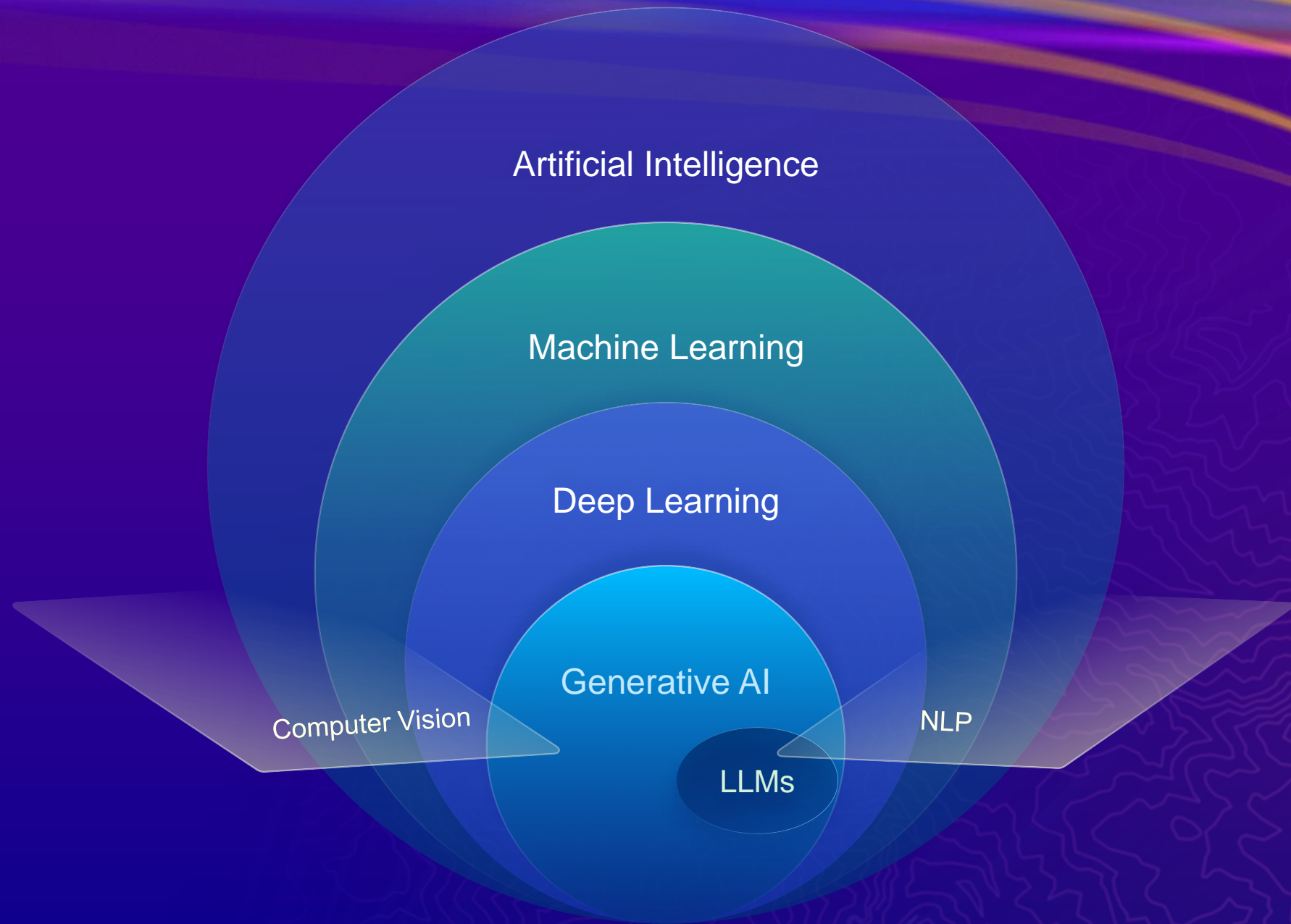
Working with us or against us?

Nick Land

Esri

# Why AI?

- Efficiency
- Innovation
- Insights





# AI in GIS



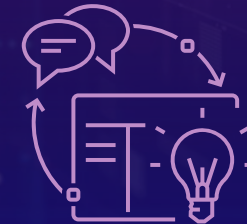
## GeoAI

Expanding and powering the *Science of GIS*, with AI models, tools and techniques, to automate data extraction at scale and uncover valuable insights faster than ever.



## AI Agents & Assistants

Enhancing the *Experience of GIS*, using intelligent *AI agents & assistants*, to understand intent, get insights, perform GIS tasks and generate GIS content.



# GeoAI in GIS

Unlock the power of AI in GIS

## Extracting Data

- Imagery
- Text

## Analyzing Data

- Vector
- Tabular
- Time series



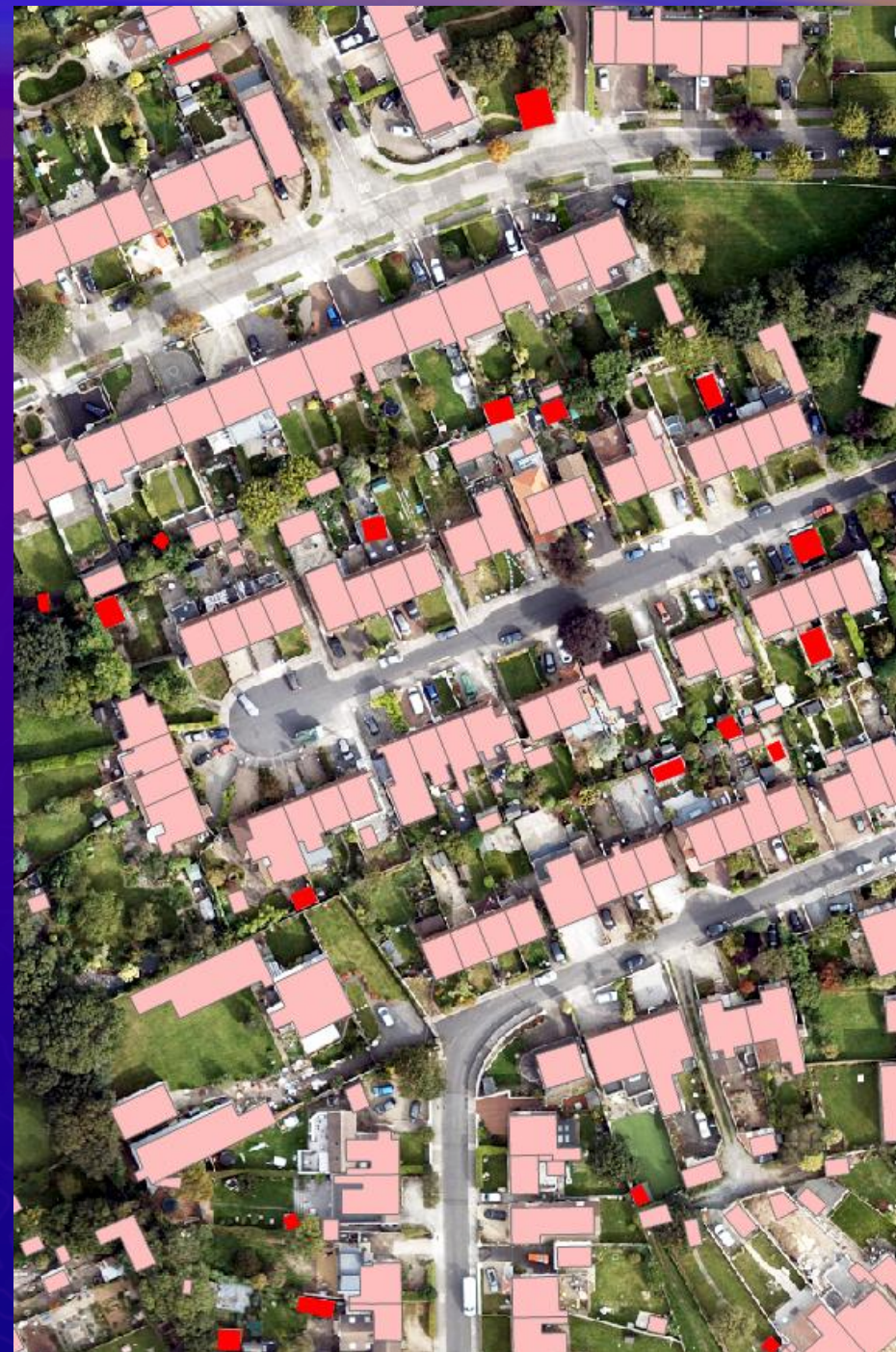
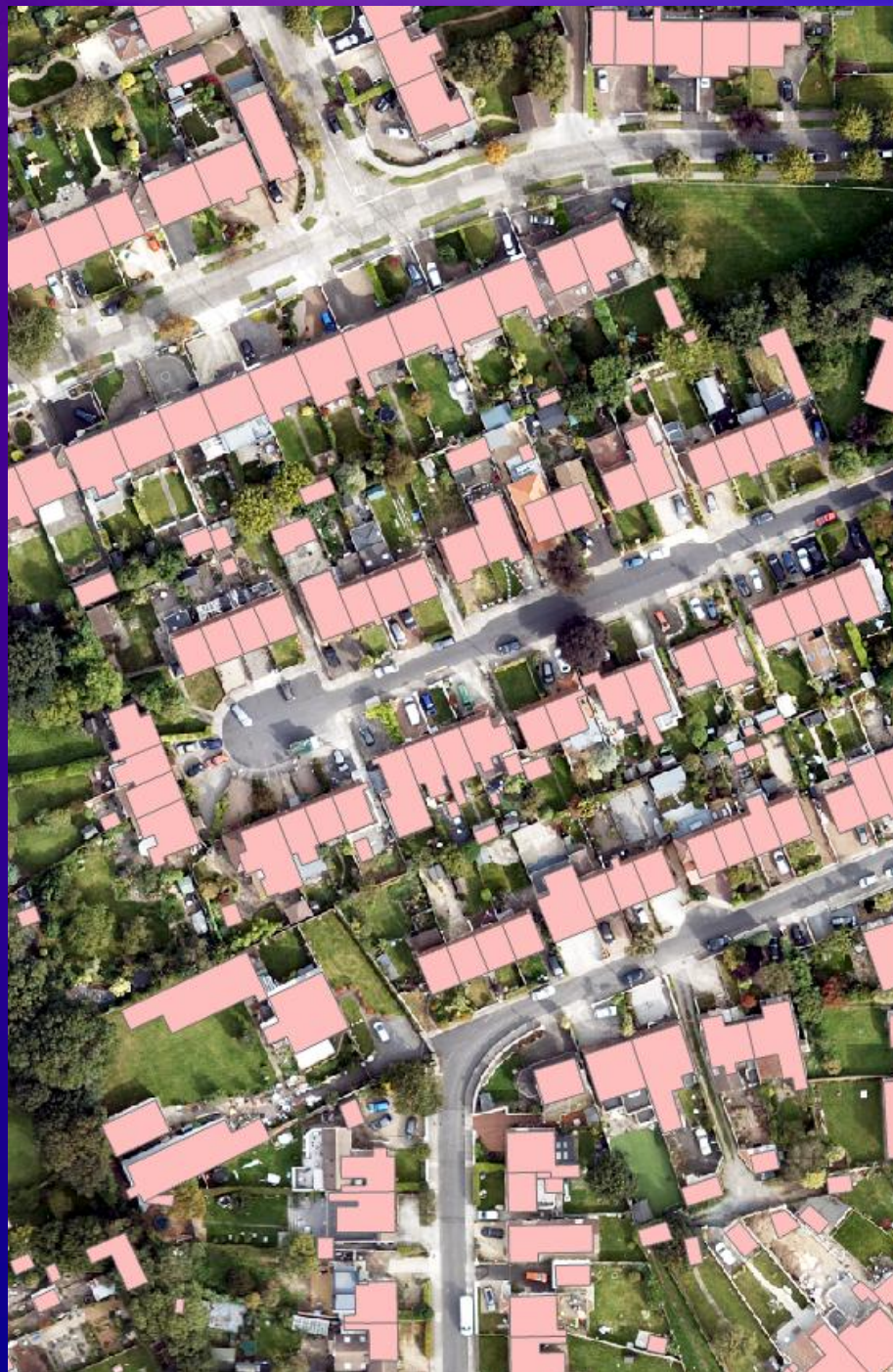
*Accelerating intelligent decision-making*



# Map Update using DL





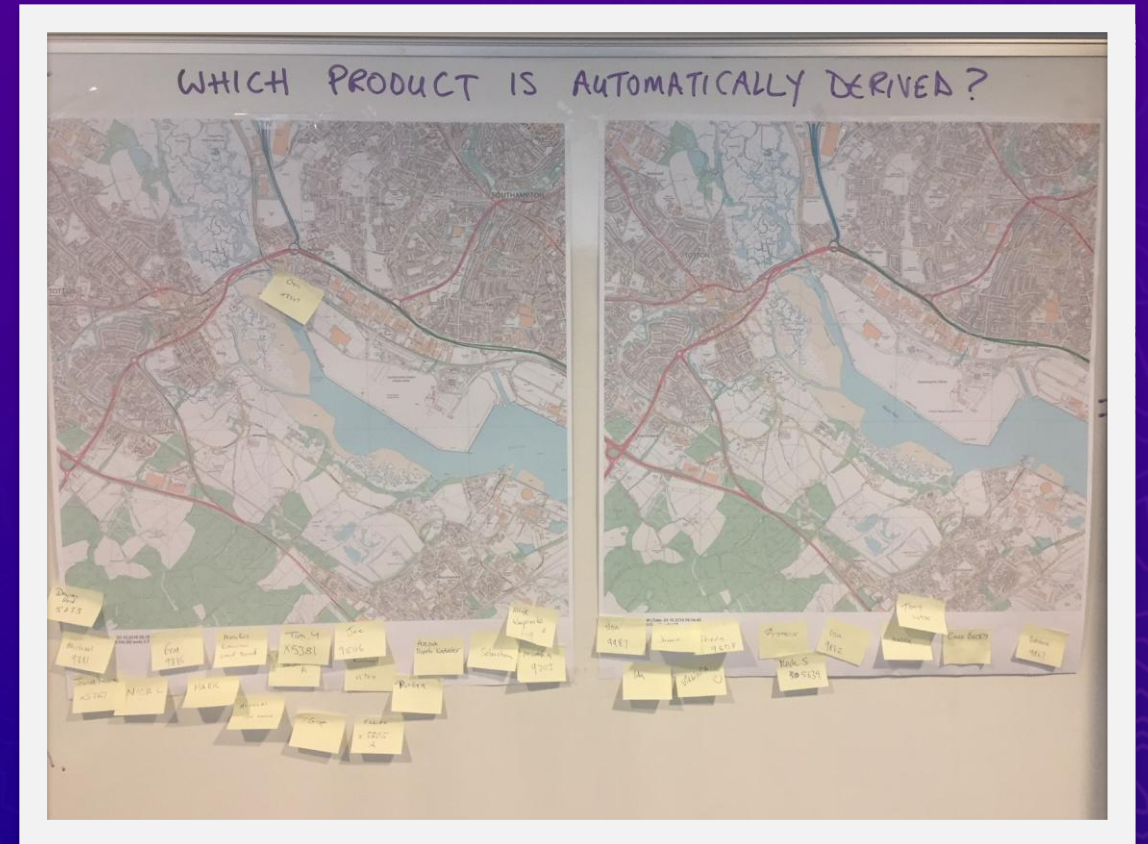




# Automated Generalisation

Lessons we can learn?

- Customer need?
  - Currency of product of Geometric accuracy
- Flexibility with product specification?
- Cost, Time, Quality?
- What's "Good enough"?

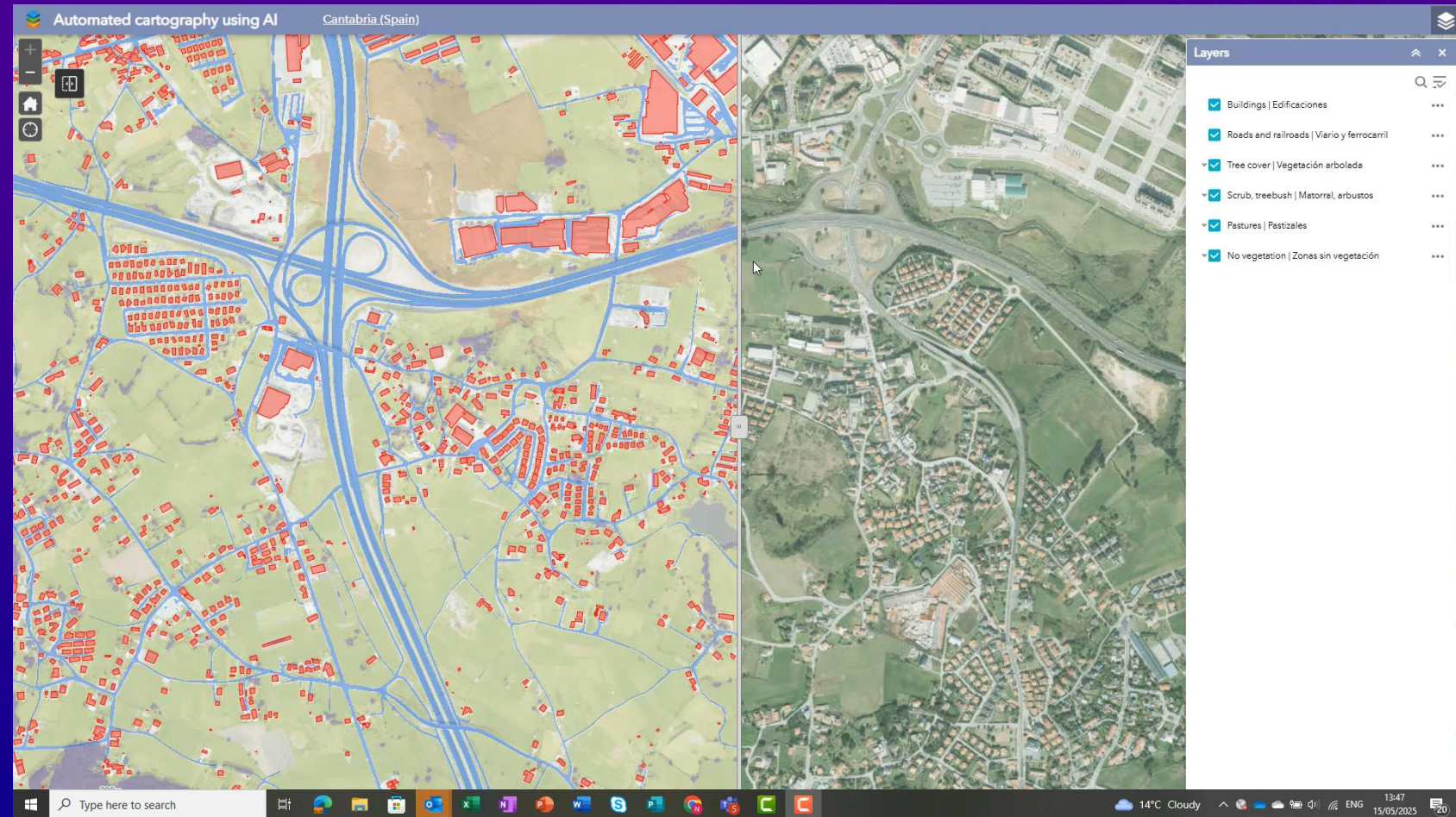




# GeoAI in Production

Dept of Mapping & GIS, Govt. of Cantabria, Spain

- Base Map Update
- Land Cover Mapping
- Tree Canopy Assessment
- Urban Sprawl Analysis
- Colourising Historic Imagery





# Use Case is Important

## Cadastral Database QA

- Unregistered = untaxed buildings
- 90%+ Buildings Detected
- Less than 5% false positives

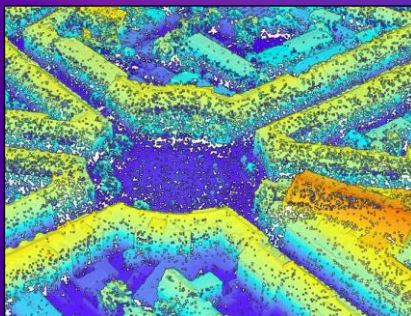




# Damage Detection – Rapid Response



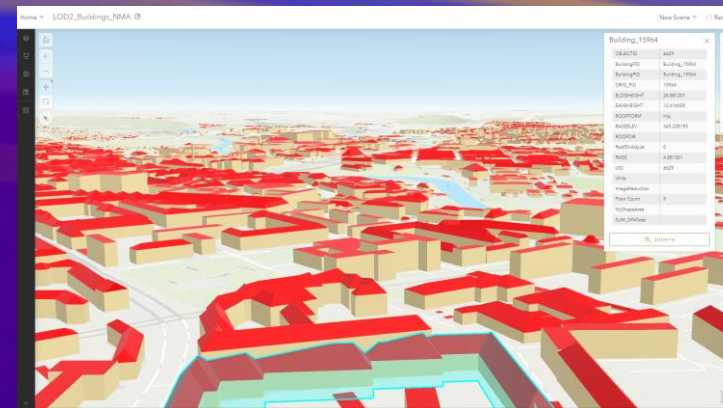




Point Cloud; DSM; True Ortho; 3D Mesh



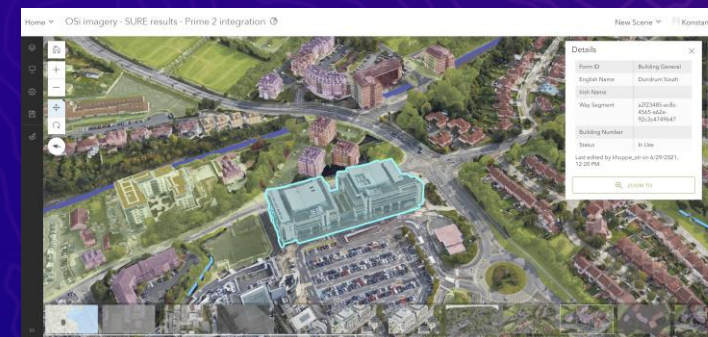
2D Buildings using DL from True Ortho



Generate LOD2 Buildings

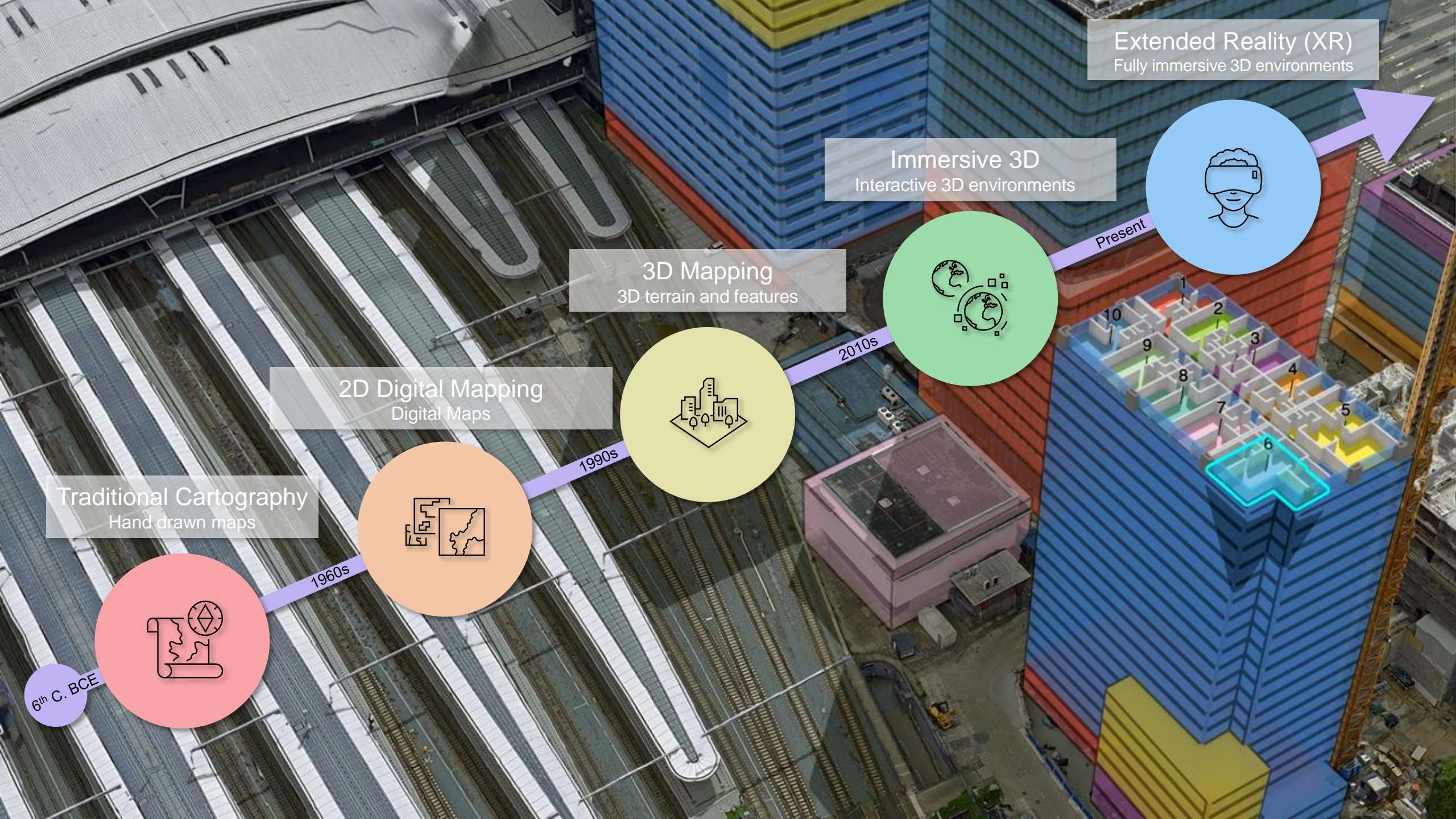


Integrate Ortho & LOD2 Buildings



Integrate 2D & 3D Mesh





Extended Reality (XR)  
Fully immersive 3D environments



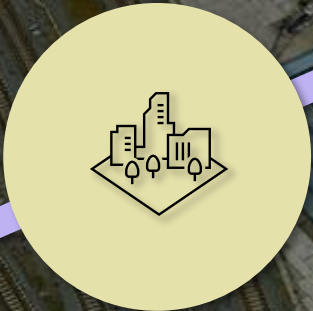
Present

Immersive 3D  
Interactive 3D environments



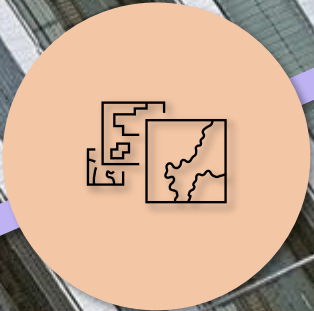
2010s

3D Mapping  
3D terrain and features



1990s

2D Digital Mapping  
Digital Maps



1960s

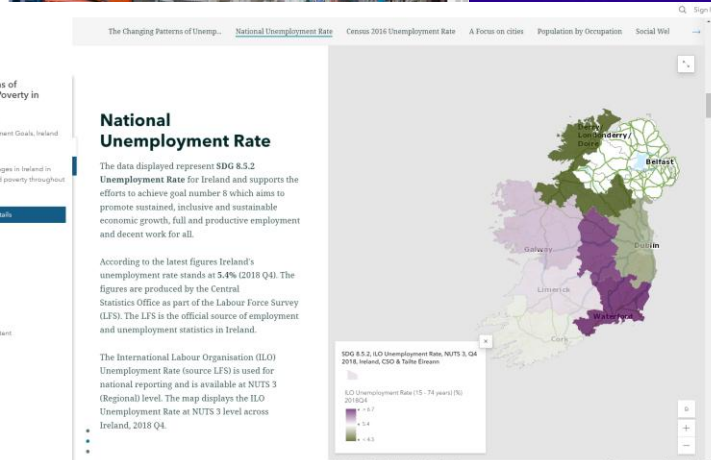
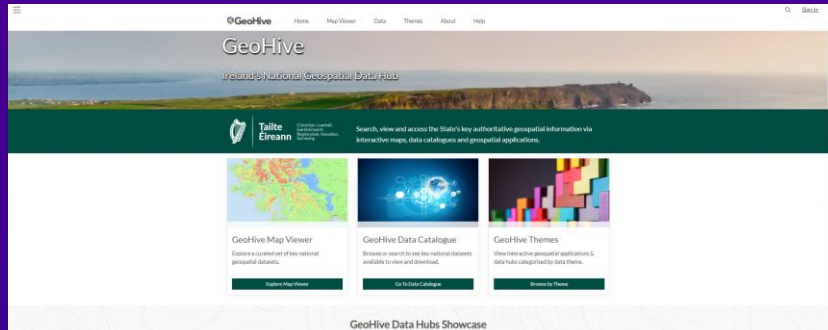
Traditional Cartography  
Hand drawn maps



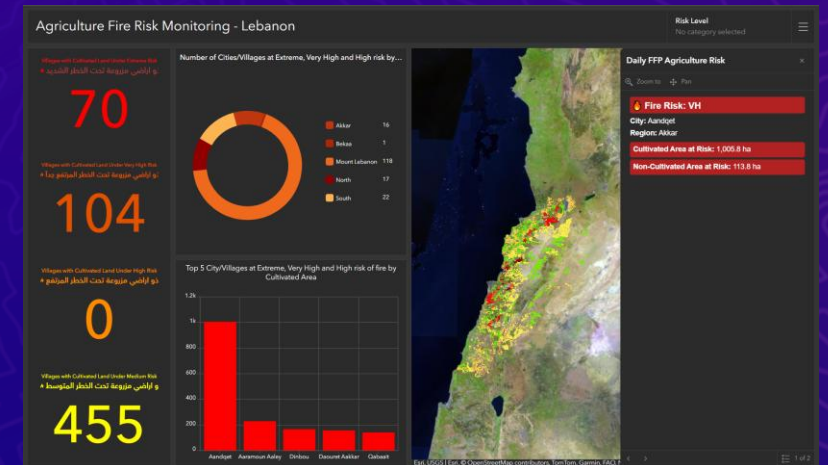
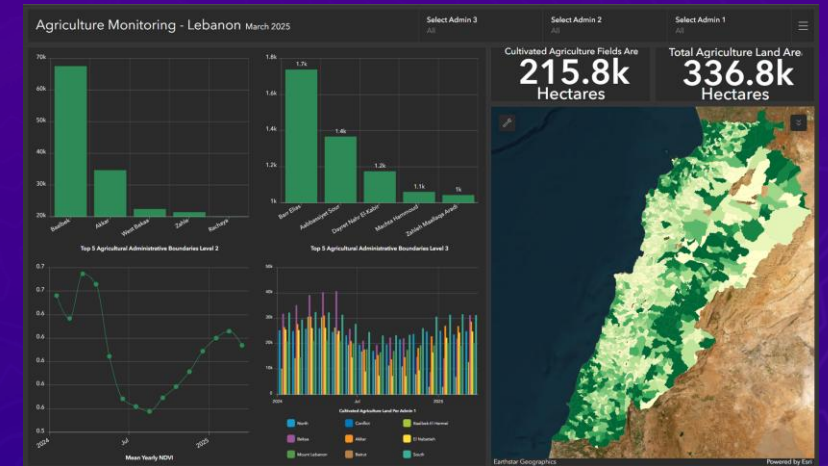
6th C. BCE



# Providing Insights

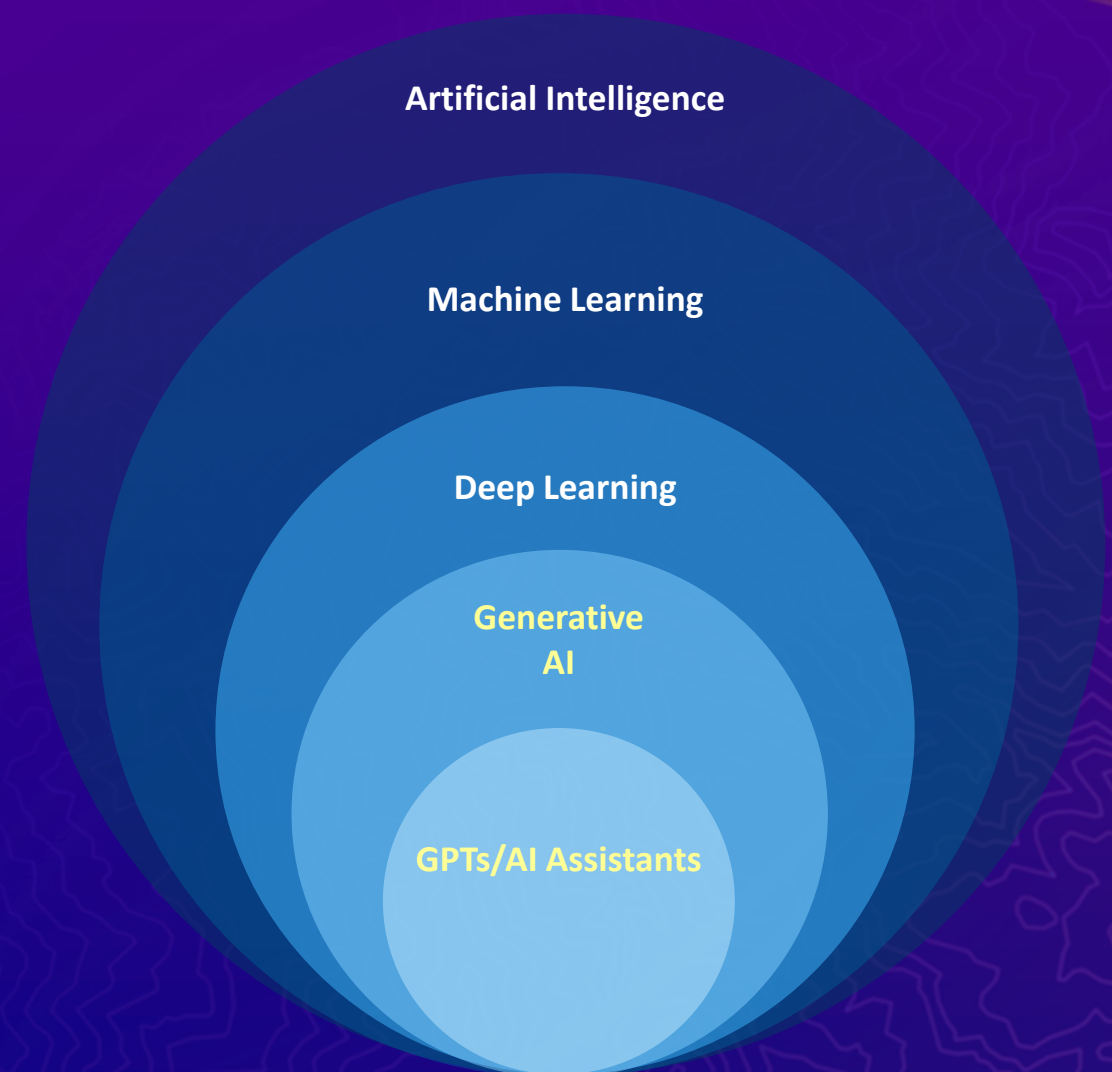
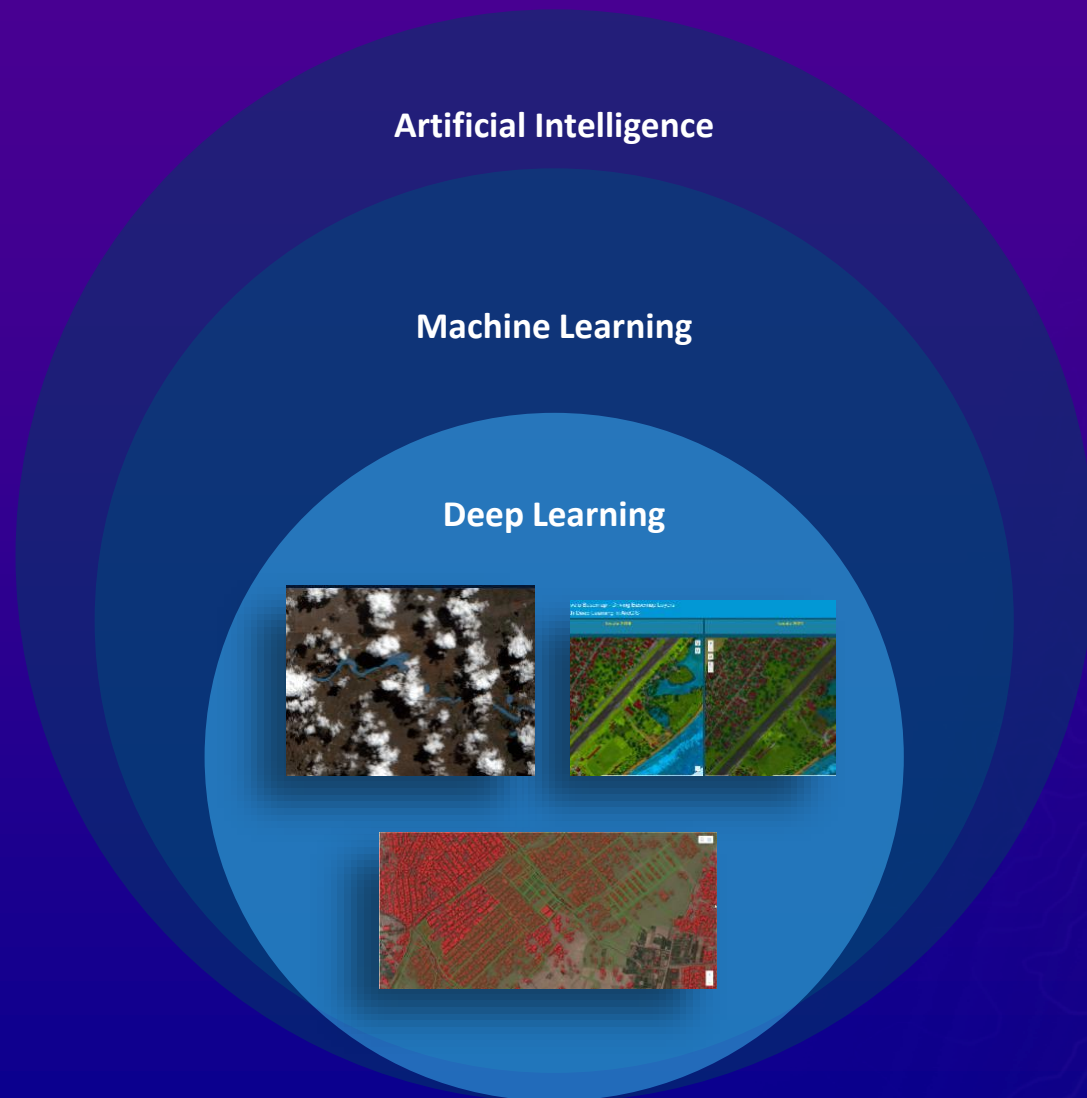


<https://www.geohive.ie/>





# Generative AI





# GenAI in GIS



## AI Agents & Assistants

Enhancing the *Experience* of GIS, using intelligent *AI agents & assistants*, to understand intent, get insights, perform GIS tasks and generate GIS content.





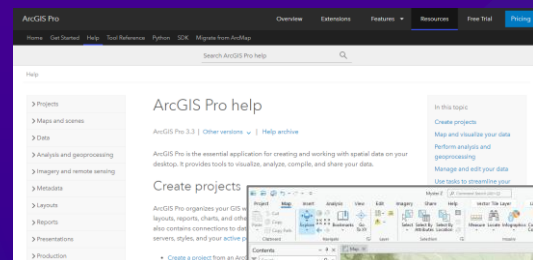
# AI Assistants

Leveraging Generative AI to streamline your work and make GIS easier for everyone

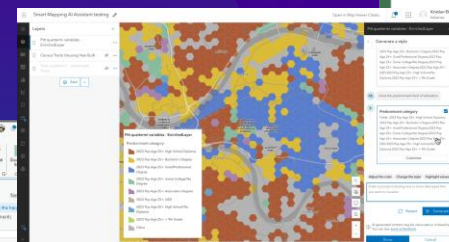
## Assistants for..

- Mapping
- Analysis
- App creation
- Data management
- Administration
- Search
- Learning
- ...

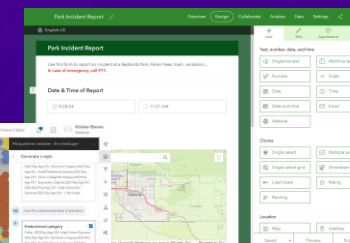
### Documentation



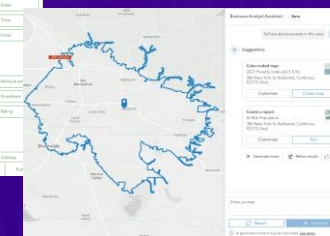
### Smart Mapping



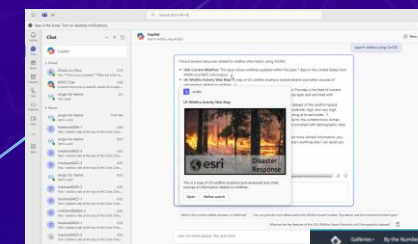
### ArcGIS Survey123



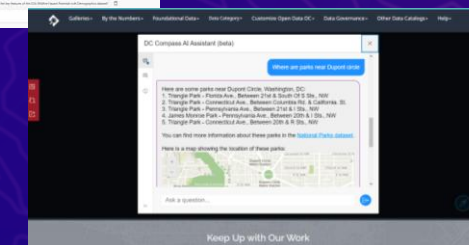
### Business Analyst



### ArcGIS for Microsoft Teams



### Configurable Assistant Apps



### ArcGIS Pro

## ArcGIS

## Also in the works...

- Enhanced search
- Coding assistants for Arcade and Python
- Streamlined metadata editor
- Many more...

Boosting productivity  
and making GIS easier





# Survey Assistant

ArcGIS Survey123

My surveys

Organization

?

Chris

My Surveys

+ New survey

Search

Surveys I own

Count: 38

Records: 0

Untitled survey\_3

by clesueur\_disc

Records: 0

Untitled survey\_2

by clesueur\_disc

Records: 0

Untitled survey\_1

by clesueur\_disc

Records: 0

Untitled survey

by clesueur\_disc

Records: 0

Airport Runway

by clesueur\_disc

Records: 0

Quick Tree Hazard Survey\_1

by clesueur\_disc

Records: 0

Quick Tree Hazard Survey

by clesueur\_disc

Records: 0

Boating Experience Survey

by clesueur\_disc



[Sign In](#)[Galleries](#)[By the Numbers](#)[Foundational Data](#)[Data Category](#)[Customize Open Data DC](#)[Data Governance](#)[Other Data Catalogs](#)[Help](#)

# Open Data DC

Engage with the District through government open data.



## Apps & Maps

Discover data in DC's urban landscape with these web maps & apps.



## Data Stories

Opportunities for all learners to read how DC is using data for operations, education and encouraging civic participation.



## Dashboards

Link today's data with yesterday and see patterns with these interactive web visualizations.



## DC Compass

This pilot AI assistant answers questions related to publicly available information on Open Data DC.



## Citywide Data Profile

Follow us to get occasional updates on data and tools.

[Follow](#)[Back to Top](#)

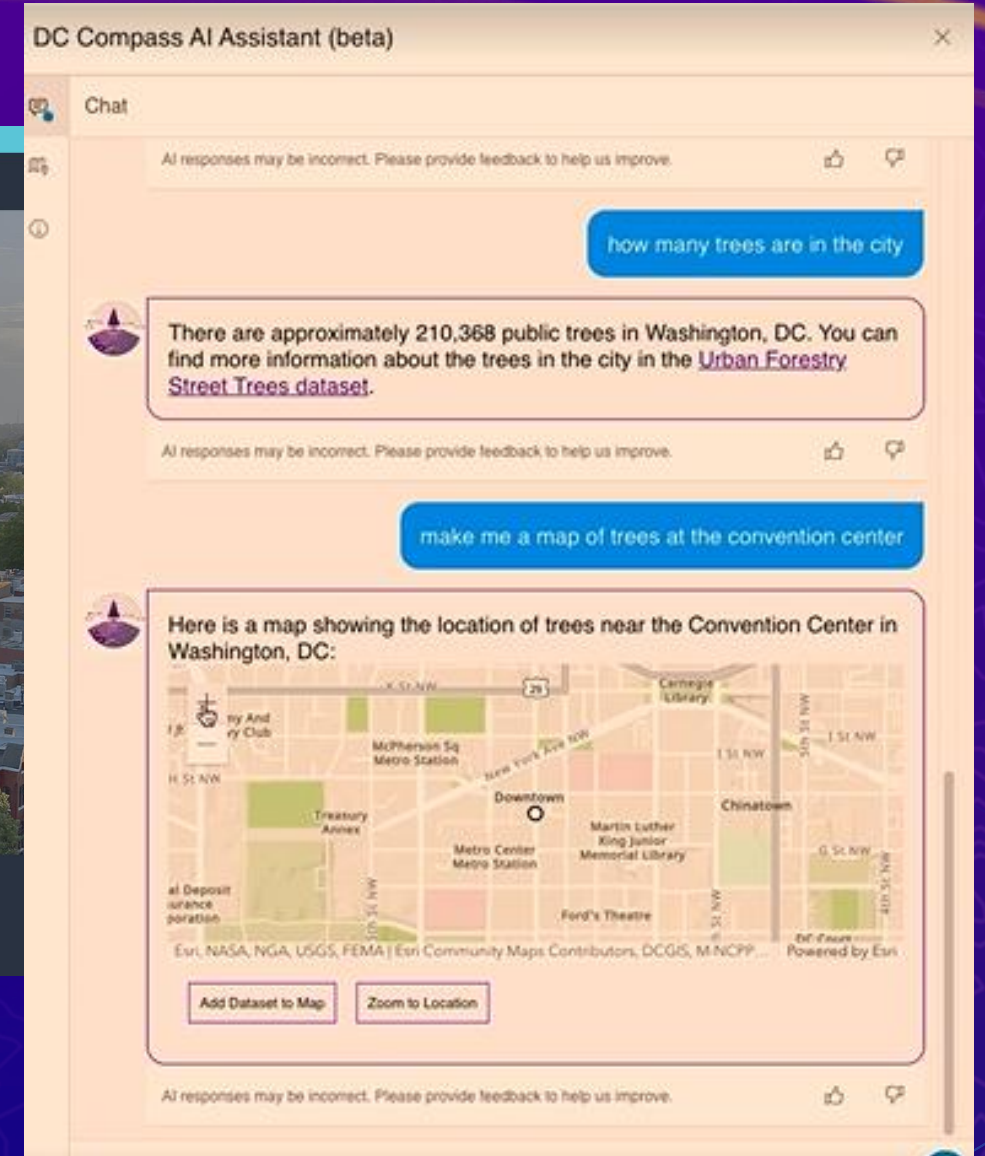


# DC Compass

## Pilot AI Assistant – Public Beta



“You no longer need to be a data scientist or a spreadsheet wizard to analyze DC’s vast open data catalog.”







“You haven’t really experienced AI until you have  
had three sleepless nights of existential anxiety”

Ethan Mollick, Wharton



# Advancing Trusted AI

- GenAI has expediated need for:
  - Greater Transparency
  - Control
  - Legal Compliance
- Esri's guiding principles for AI
  - Security
  - Privacy
  - Transparency
  - Fairness
  - Reliability
  - Accountability
- Governance Board

## AI Landscape Today

The AI landscape is rapidly evolving. Governments around the world are actively shaping the future of AI by enacting new laws and frameworks. For instance, the European Union recently adopted the EU AI Act, which establishes regulations on high-risk AI applications. Similarly, the United States has seen proposals like the AI Bill of Rights and Executive Order M-24-10 addressing potential risks and biases in AI systems.

Esri has recognized the importance of staying ahead of these evolving legal requirements, responsible development, and ethical considerations. We proactively align our AI practices with key regulations and industry-recognized frameworks. This includes following the guidance set forth by laws and regulations stated above.

## ArcGIS Guiding AI Principles

Esri's dedication to trusted AI is rooted in our core values, driving us to innovate with integrity. Our AI Principles guide our AI development and deployments, helping ensure our systems positively impact society, provide transparency, and protect user data. Esri's Trusted AI is anchored on a foundation of six core principles that guide our AI projects and initiatives.



**Security:** We are committed to safeguarding security and mitigating risks in our AI systems through a proactively protected lifecycle.



**Privacy:** We prioritize the AI lifecycle end-to-end by design method.



**Transparency:** We ensure decision-making is transparent.



**Fairness:** Esri has responsibility in its approach to decisions.



**Reliability:** Our AI is dependable results.



**Accountability:** We follow frameworks, hold ourselves accountable, ensuring human oversight.

## ArcGIS AI Transparency Card - Business Analyst Assistant

Section	Description	Response
Product - Name	ArcGIS product name (links to doc)	<a href="#">ArcGIS Business Analyst Web App</a>
Product - Certification	Certification status of the ArcGIS Product	In-Progress 2025 - FedRAMP Moderate
Product - Deployment	Deployment model of the product	SaaS
Name	AI feature name in the product. (links to doc)	<a href="#">Business Analyst Assistant</a>
Purpose	Actions AI feature is expected to perform within the product.	In-app productivity tool that uses AI to recommend popular workflows, data, infographic reports, and tips. It provides intelligent suggestions and understands geographic context through prompts or search queries.
Release Status	Release status of AI feature	Beta
Certification	Certification status of AI feature or its subprocessors	None
Deployment	AI feature provided via what deployment model.	Software as a Service (SaaS)
Management	How AI feature can be enabled or disabled?	Opt-in by AGO Administrator
Management - Feedback	Can/how user AI feedback be enabled or disabled?	Opt-in by User
Management - Telemetry	How user AI telemetry data can be enabled or disabled?	Required (Telemetry data is collected)
Prompt Stored	Are prompts submitted to the AI stored?	Not by default (only when feedback provided). Retention: 2 years, <a href="#">Review Burden</a> , <a href="#">Esri's AI Transparency</a>
Response Stored	Are AI generated responses stored?	
Personal Data	Is personal data in training, testing, or validation datasets?	
Processing Location	Where data is processed across the product, feature, and LLA levels, including details on any subprocessors.	
Intended Users	Primary intended users of the AI feature	
Out-of-Scope Uses	Scenarios AI feature may not perform accurately or reliably.	
Key Function	Key capabilities and how the AI feature enhances workflows.	
Model Type & Technique	AI model type and technique	
Model Used	Specific model(s) used, such as GPT-4, TS, etc.	
Model License	License of AI model powering the AI feature.	
Training Data Sources	Data sources used for development of AI feature.	

### Car Detection - USA

Deep learning model to detect cars in high-resolution imagery. 5B+ Deep learning package from Esri. Managed by esri\_analyst. Item created May 21, 2024. Item updated Dec 27, 2024. Number of downloads: 17,485.

[Authenticate](#) [Using AIKit](#)

**Description**  
This deep learning model is used to detect cars in high-resolution drone or aerial imagery. Car detection can be used for applications such as traffic management and analysis, parking lot utilization, urban planning, etc. It can also be used as a proxy for deriving economic indicators and estimating retail sales. High-resolution aerial and drone imagery can be used for car detection due to its high spatial-temporal coverage.

**Using the model**  
Follow the [guide](#) to use the model. Before using this model, ensure that the supported deep learning libraries are installed. For more details, check [Deep Learning Libraries Installer for ArcGIS](#).

**Fine-tuning the model**  
This model can be fine-tuned using the Train Deep Learning Model tool. Follow the [guide](#) to feature this model.

**Input**  
High-resolution RGB imagery (30 centimeter spatial resolution)

**Output**  
Feature class containing detected cars.

**Applicable geographies**  
This model is expected to work well in the United States.

**Model architecture**  
This model uses the MaskRCNN model architecture implemented in ArcGIS API for Python.

**Details**  
Size: 154.6MB  
ID: esri/analyst/arcgisai/ai-models/car-detection-usa  
[Share](#)  
[Download](#)  
Created by: esri\_analyst  
Tags: car-detection, deep-learning, pretrained-model, traffic, urban-planning, mapping, ai-models, esri-analyst

## ArcGIS Trust Center

The human is in the loop .....



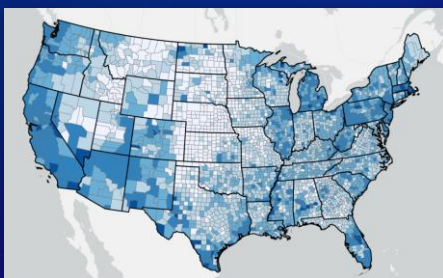
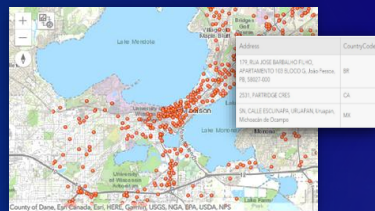
# GIS is Being Enhanced with AI

## GeoAI Analysis

Feature extraction



Georeferencing text



Predictions

## AI Framework

Tools  
Data  
Services

Skills

Pre-Trained  
Models

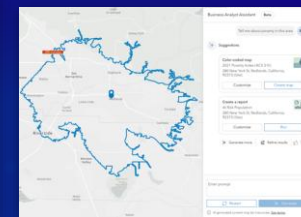
LLMs

## AI Assistants

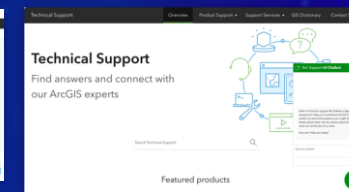
Mapping



Answering questions



Documentation & search



Tech support chatbot

*Boosting productivity and making GIS easier*

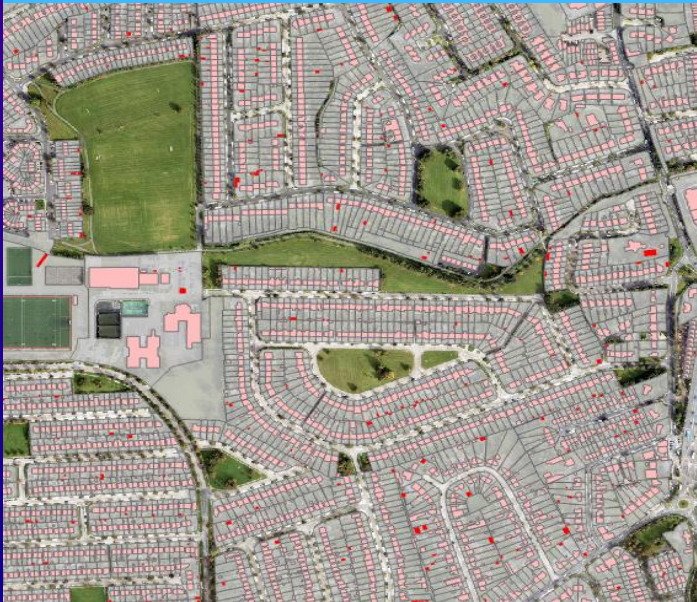


# NMCA Mission is Being Enhanced by AI

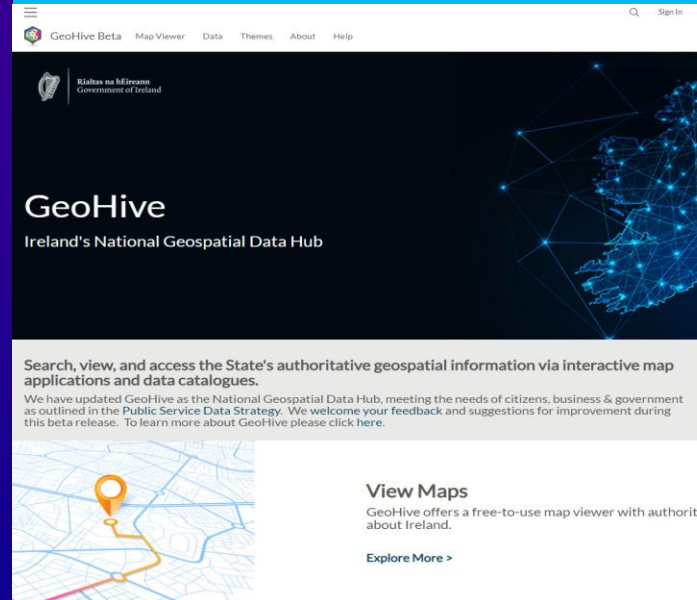
From Sensor to Insight



## Authoritative Foundational Data



## Underpinning National Geospatial Infrastructure



## Knowledge Services





# esriChatGPT

A private & secure implementation of ChatGPT for employee use.

Nick Land

6 May 2025 4:33 PM

Is AI technology working with us or against us?

esriChatGPT-3.5

6 May 2025 4:33 PM

AI technology can be viewed from both perspectives, as working with us and against us. Here are some points to consider for each viewpoint:

## Working with Us:

1. **Efficiency:** AI can automate repetitive tasks, freeing up human resources for more creative and strategic work.
2. **Accuracy:** AI can process vast amounts of data quickly and accurately, leading to better decision-making in various fields.
3. **Personalization:** AI can personalize user experiences, such as in recommendation systems, improving customer satisfaction.
4. **Safety:** AI can be used in areas like healthcare and transportation to enhance safety and save lives.
5. **Innovation:** AI can drive innovation by enabling the development of new technologies and solutions.

## Against Us:

1. **Job Displacement:** AI automation can lead to job losses in certain industries, impacting employment rates.
2. **Bias:** AI algorithms can inherit biases present in the data they are trained on, leading to discriminatory outcomes.
3. **Privacy Concerns:** AI systems can collect and analyze vast amounts of personal data, raising concerns about privacy.
4. **Autonomy:** There are concerns about the ethical implications of AI systems making autonomous decisions without human oversight.
5. **Security Risks:** AI can be exploited by malicious actors for cyber attacks and other security threats.

In conclusion, the impact of AI technology depends on how it is developed, deployed, and regulated. By addressing concerns such as bias, privacy, and job displacement, we can harness the benefits of AI while mitigating potential risks.





**esri**<sup>®</sup>

**THE  
SCIENCE  
OF  
WHERE<sup>®</sup>**

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