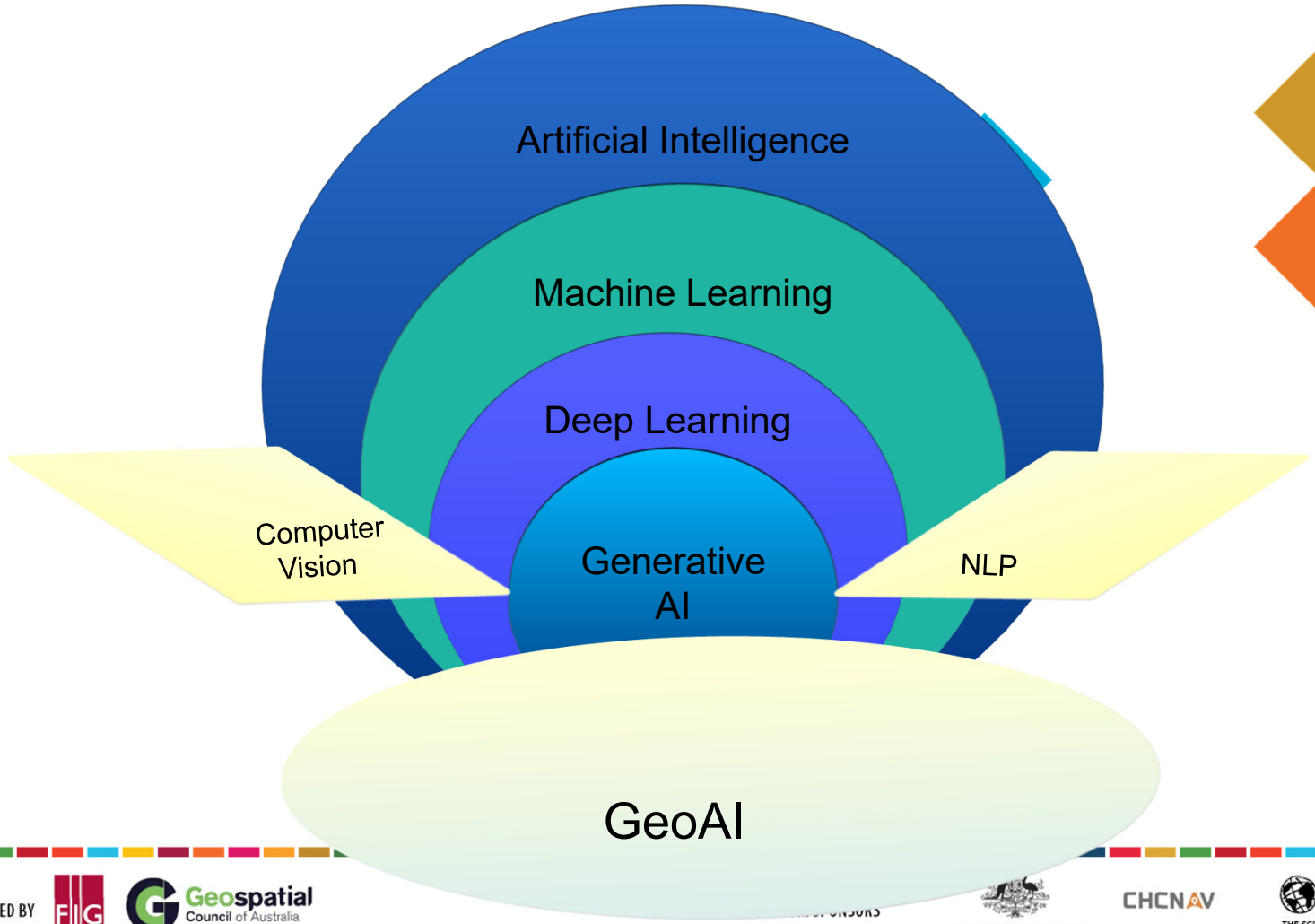
FIG WORKING WEEK 2025
AND Locate25 THE NATIONAL GEOSPATIAL CONFERENCE
Collaboration, Innovation and Resilience: Championing a Digital Generation
FIG Geospatial Council of Australia
Brisbane, Australia 6–10 April

Presented at the FIG Working Week 2025,
6-10 April 2025 in Brisbane, Australia

Embracing AI in Land Administration

Nick Land, Esri Inc.
Linda Foster, Esri Inc.
Lauren Voelker, Esri Inc.

ORGANISED BY FIG Geospatial Council of Australia
PLATINUM SPONSORS Australian Government CHCNAV esri THE SCIENCE OF WHERE Leica Geosystems Meter Surveyors Australia


Artificial Intelligence
Machine Learning
Deep Learning
Generative AI
Computer Vision
NLP
GeoAI

GeoAI

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

AI Assistants

Creating more natural and intuitive ***Experiences of ArcGIS***, using intelligent *AI assistants and agents*, to empower GIS users and boost productivity.

GeoAI

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

AI Assistants

Creating more natural and intuitive Experiences of ArcGIS, using intelligent AI assistants and agents, to empower GIS users and boost productivity.

GeoAI in GIS

Extracting data

- Computer vision on Imagery, 3D, and Video data
- Natural Language Processing on Unstructured Text data

Analyzing data

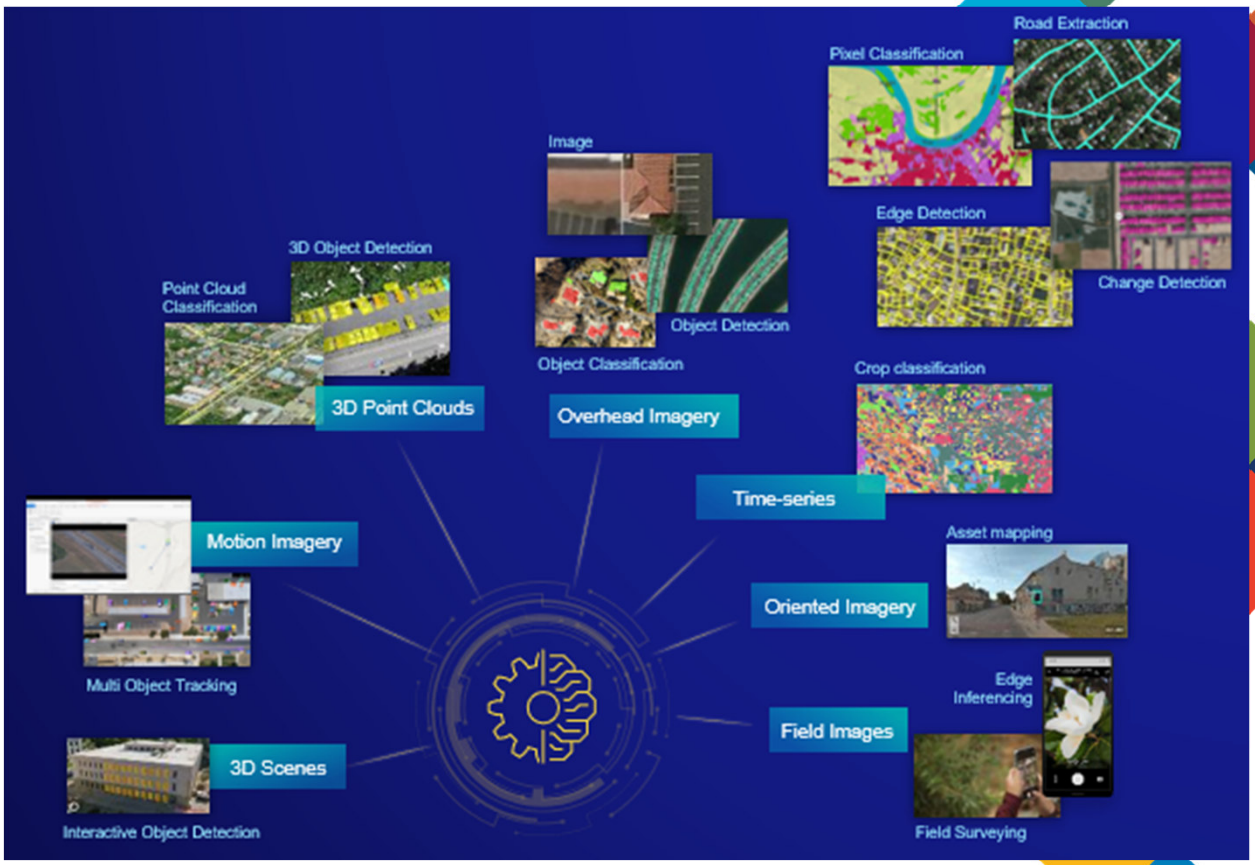
- Machine learning and deep learning on Vector, Tabular, and Time series data

Extracting Spatial Data

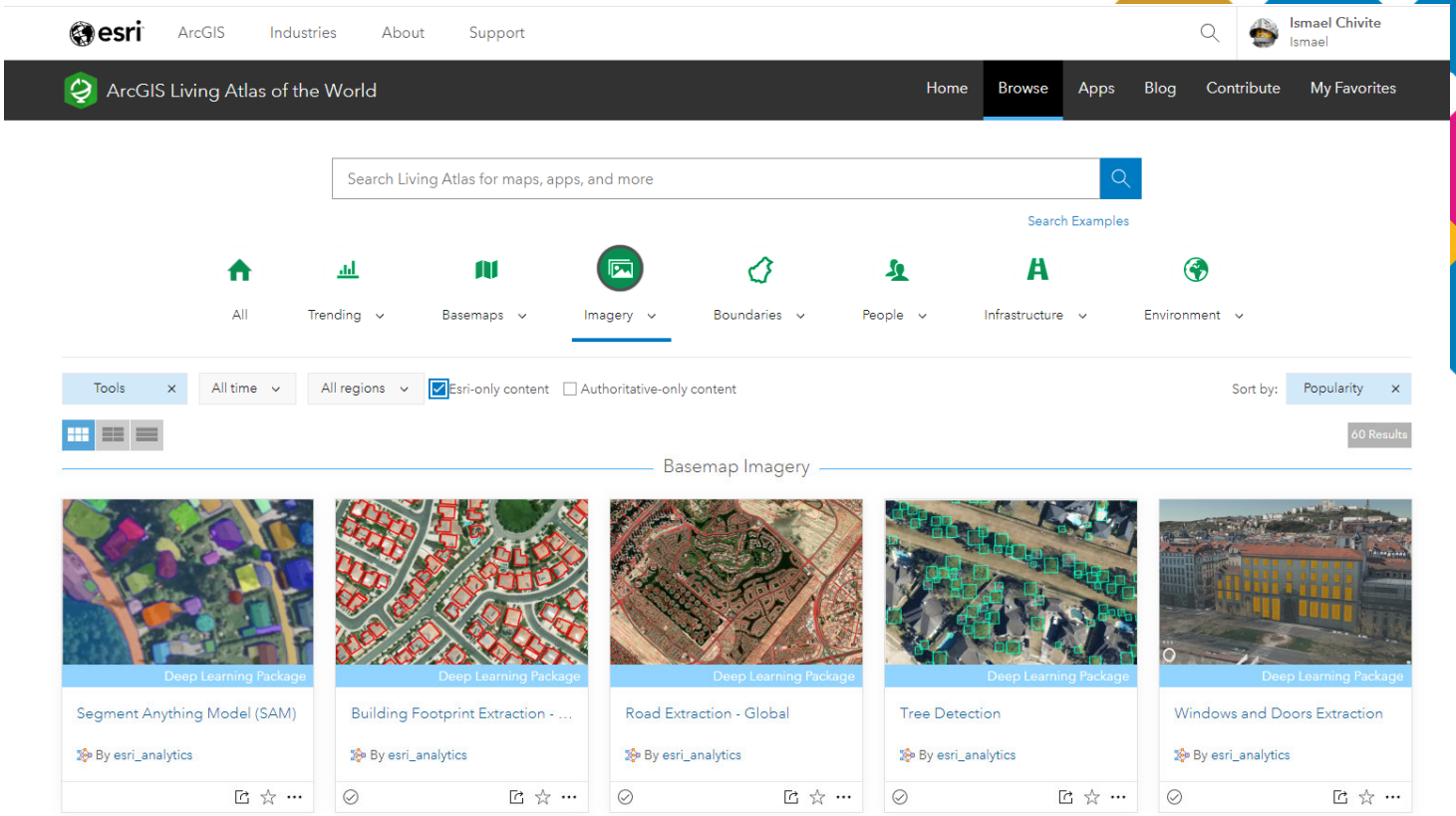
Feature extraction from Imagery, 3D, and Video

Highlights

- Model training wizard
- AutoDL
- Multi-feature extraction
- Attachments
- Time-series
- SuperRes New Model (Pro)
- SAMLoRA fine-tune (Pro)
- Prithvi fine-tune (Pro)
- Text prompts for labelling
- Multi-GPU inferencing
- 3D Object Detection



GIS Living Atlas of the World



Pretrained GeoAI Models

- Cars
- License Plate Blurring
- Parking Lots
- Parking Spots
- Humans
- Crowd Counting
- Face Blurring
- Land Cover
- Buildings
- Roads
- Parcels
- Ag Fields
- Swimming Pools
- Well Pads
- Oil Spills
- Palm Trees
- Power Lines
- Transmission Towers
- Insulator Defects
- Wind Turbines
- Solar Arrays
- Solar Panels

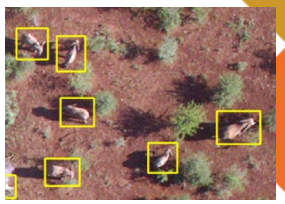
- Ships
- Shipwrecks
- Oil Spills
- Palm Trees
- Trees
- Plant Leaf Disease
- Common Object Detection
- Text Parsing from Photo
- Object Tracking
- Segment Anything Model (SAM)
- **CLIP Zero Shot Classifier**
- **Text SAM**
- **Prithvi (Crops, Burn Scars, Floods)**
- Building Point Classification
- Wildfire Delineation
- Oil Tanks
- Pylons
- Optical Character Recognition
- Cooling Towers
- Agricultural field boundaries
- Cloud Mask Generation
- Ship Detection
- Tree Segmentation
- Transmission H-Structure Detection

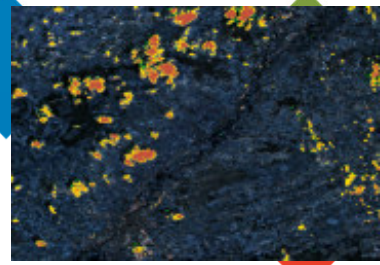
. . . and Many More

State & Local Government
Public Safety
Conservation
Transportation
Natural Resources
Commercial Business
National Security
Insurance
Utilities

Wind Turbine Detection

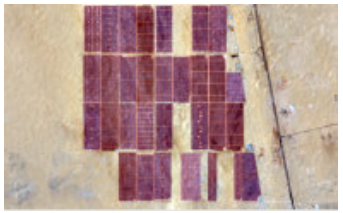
Road Extraction (Global)

Elephant Detection


Cloud Mask Generation


Building Footprints

Parking Spot Detection

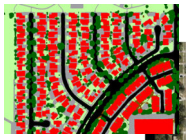

Solar Park Classification

Land-Cover Classification

Extracting Spatial Data

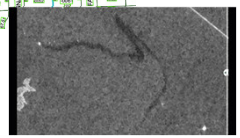
Government

Land Cover Classification



Pool Segmentation (SAM)

Optical Character Recognition



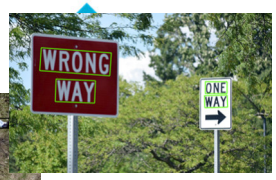
Address Correction

	non_std_address	Result
1	23, yerrace crescent north east, medicine hat, ca	23, terrace crescent ne, medicine hat, ca
2	8, cl prieta padornelo, 49574, es	8, cl prieta padornelo, 49574, es
3	60, chemin de la clôtre, lissieu, 69380, fr	60, chemin de la clôtre, lissieu, 69380, fr
4	132ter, rue oluis petit, denain, 59220, fr	132ter, rue louis petit, denain, 59220, fr

Oil Spill Detection (SAR)

Public Safety

Human Detection (Drone Imagery)



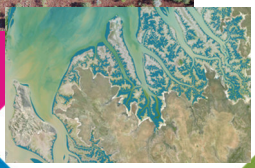
Optical Character Recognition

Conservation

Waterbody Extraction (USA)

Elephant Detection

Seabird Detection



Mangrove Detection

Utilities

Insulator Defect Detection

Solar Photovoltaic Park Classification (Global)

Transmission H-Structures

Solar Panel Detection

Natural Resources

Well Pad Detection

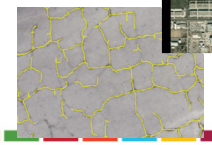
Agricultural Field Delineation

Tree Segmentation

Transportation

Parking Spot Detection

Parking Lot Detection



Road Crack Detection

Highlights

- 75+ models
- Foundation models
  - Segment Anything Model (SAM)
  - Text SAM
  - Prithvi
  - Clip Zero-Shot Classifier
- Building Point Classification
- Wildfire Delineation

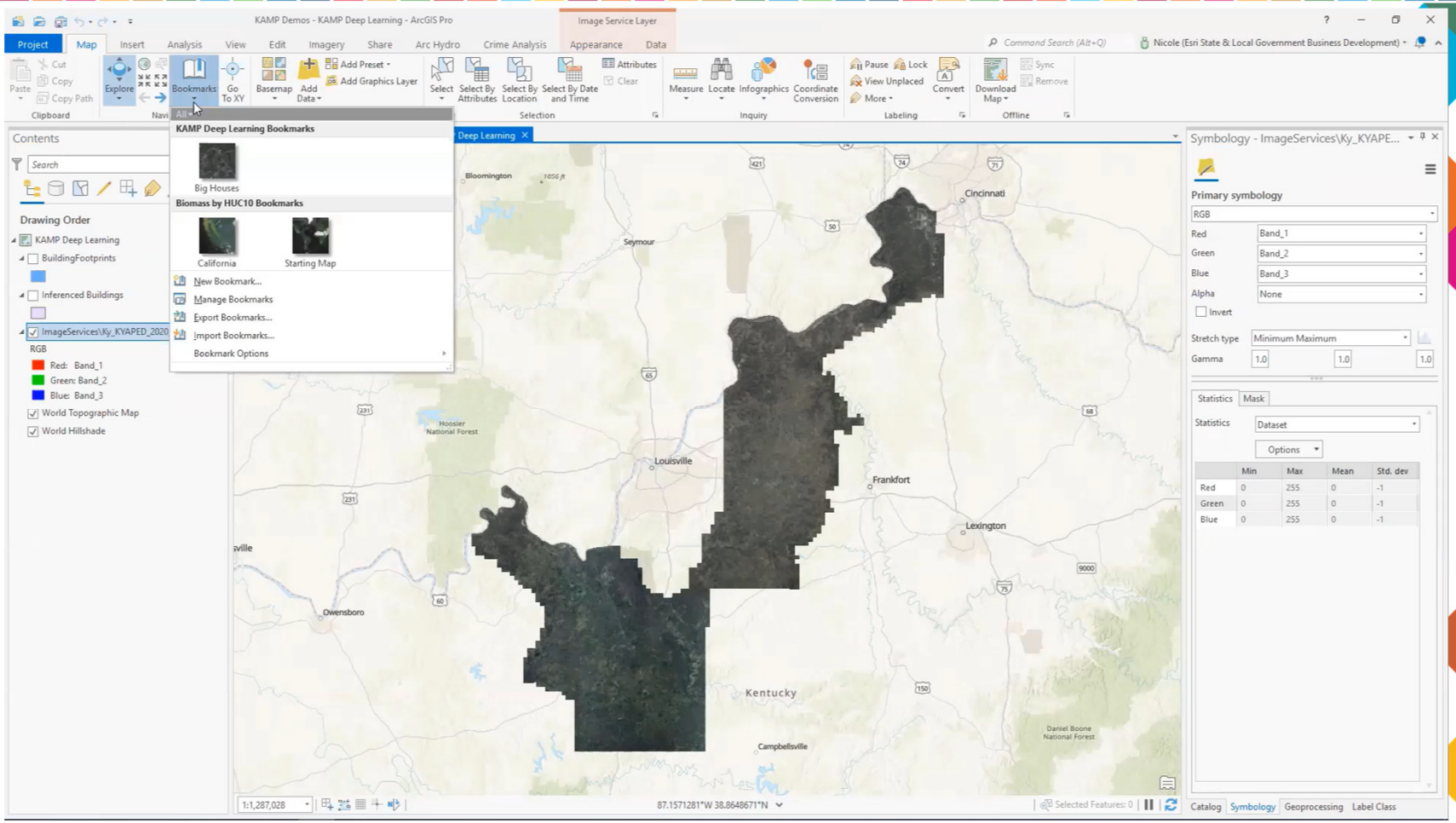
Change Detection & Building Feature Extraction

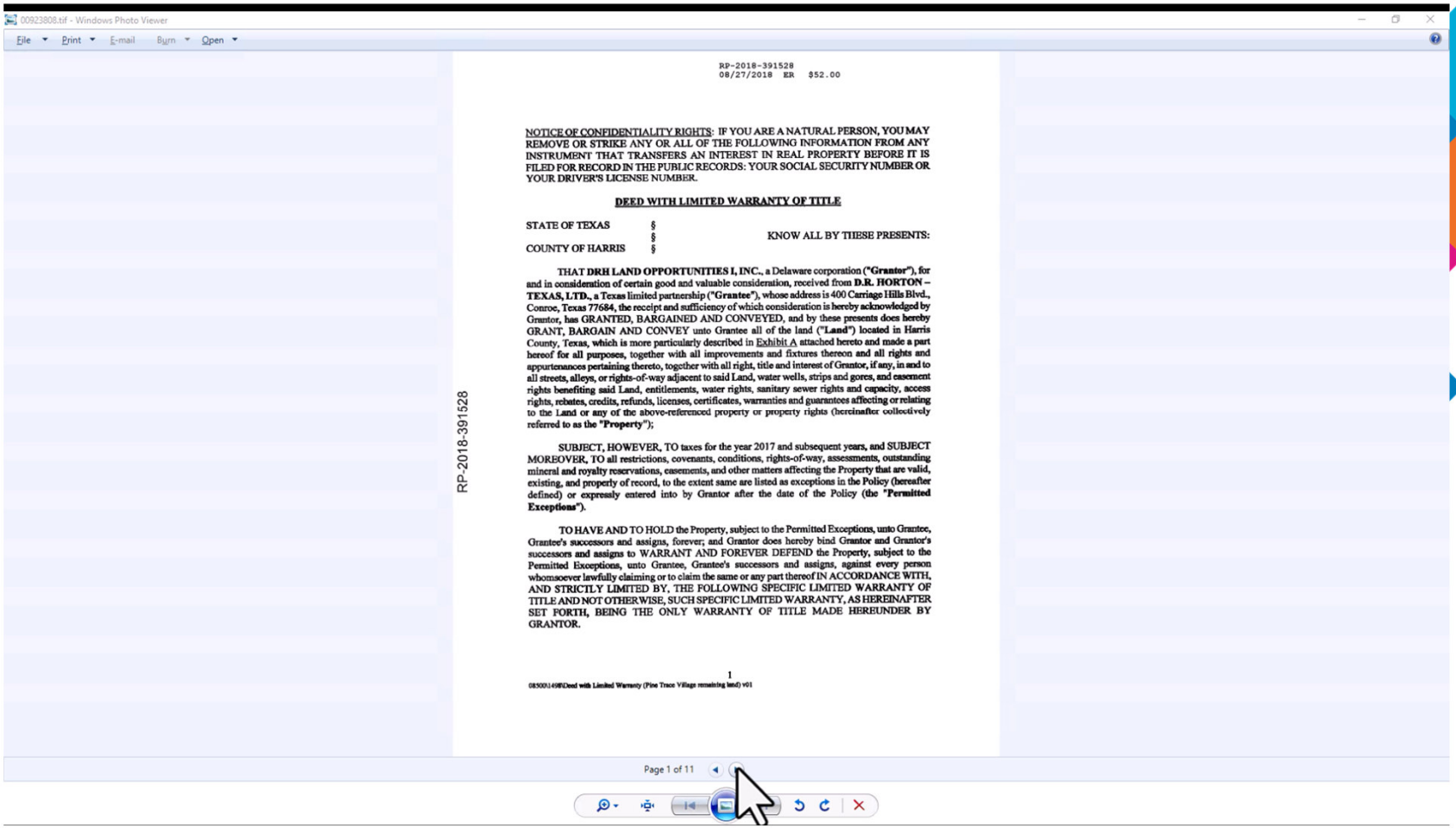
Lands Ireland

Building Extraction

City of Cape Town

- Informal Settlement
- Drone Imagery


KAMP Demos - KAMP Deep Learning - ArcGIS Pro
Image Service Layer
Project
Map
Insert
Analysis
View
Edit
Imagery
Share
Arc Hydro
Crime Analysis
Appearance
Data
Bookmarks
KAMP Deep Learning Bookmarks
Big Houses
Biomass by HUC10 Bookmarks
California
Starting Map
New Bookmark...
Manage Bookmarks
Export Bookmarks...
Import Bookmarks...
Bookmark Options
Contents
Drawing Order
KAMP Deep Learning
BuildingFootprints
Inferenced Buildings
ImageServices\Ky_KYAPED_2020
RGB
Red: Band_1
Green: Band_2
Blue: Band_3
World Topographic Map
World Hillshade
Deep Learning
Bloomington
Cincinnati
Seymour
Louisville
Frankfort
Lexington
Owensboro
Kentucky
Campbellsville
Hoosier National Forest
Daniel Boone National Forest
Symbology - ImageServices\Ky_KYAPE...
Primary symbology
RGB
Red Band_1
Green Band_2
Blue Band_3
Alpha None
Invert
Stretch type Minimum Maximum
Gamma
Statistics
Mask
Statistics Dataset
Options
Min Max Mean Std. dev
Red 0 255 0 -1
Green 0 255 0 -1
Blue 0 255 0 -1
Catalog
Symbology
Geoprocessing
Label Class



00923808.tif - Windows Photo Viewer

File Print E-mail Burn Open

RP-2018-391528
08/27/2018 ER $52.00

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

DEED WITH LIMITED WARRANTY OF TITLE

STATE OF TEXAS §
§ KNOW ALL BY THESE PRESENTS:
COUNTY OF HARRIS §

THAT **DRH LAND OPPORTUNITIES I, INC.**, a Delaware corporation (**"Grantor"**), for and in consideration of certain good and valuable consideration, received from **D.R. HORTON – TEXAS, LTD.**, a Texas limited partnership (**"Grantee"**), whose address is 400 Carriage Hills Blvd., Conroe, Texas 77684, the receipt and sufficiency of which consideration is hereby acknowledged by Grantor, has GRANTED, BARGAINED AND CONVEYED, and by these presents does hereby GRANT, BARGAIN AND CONVEY unto Grantee all of the land (**"Land"**) located in Harris County, Texas, which is more particularly described in Exhibit A attached hereto and made a part hereof for all purposes, together with all improvements and fixtures thereon and all rights and appurtenances pertaining thereto, together with all right, title and interest of Grantor, if any, in and to all streets, alleys, or rights-of-way adjacent to said Land, water wells, strips and gores, and easement rights benefiting said Land, entitlements, water rights, sanitary sewer rights and capacity, access rights, rebates, credits, refunds, licenses, certificates, warranties and guarantees affecting or relating to the Land or any of the above-referenced property or property rights (hereinafter collectively referred to as the **"Property"**);

SUBJECT, HOWEVER, TO taxes for the year 2017 and subsequent years, and SUBJECT MOREOVER, TO all restrictions, covenants, conditions, rights-of-way, assessments, outstanding mineral and royalty reservations, easements, and other matters affecting the Property that are valid, existing, and properly of record, to the extent same are listed as exceptions in the Policy (hereafter defined) or expressly entered into by Grantor after the date of the Policy (the **"Permitted Exceptions"**).

TO HAVE AND TO HOLD the Property, subject to the Permitted Exceptions, unto Grantee, Grantee's successors and assigns, forever; and Grantor does hereby bind Grantor and Grantor's successors and assigns to WARRANT AND FOREVER DEFEND the Property, subject to the Permitted Exceptions, unto Grantee, Grantee's successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof IN ACCORDANCE WITH, AND STRICTLY LIMITED BY, THE FOLLOWING SPECIFIC LIMITED WARRANTY OF TITLE AND NOT OTHERWISE, SUCH SPECIFIC LIMITED WARRANTY, AS HEREINAFTER SET FORTH, BEING THE ONLY WARRANTY OF TITLE MADE HEREUNDER BY GRANTOR.

RP-2018-391528

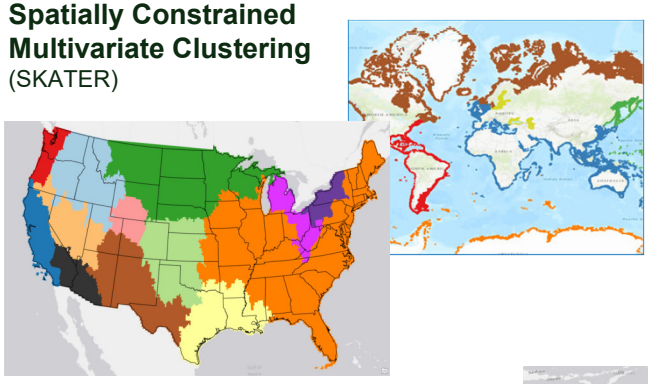
1
085001459\Deed with Limited Warranty (Pine Trace Village remaining land) v01

Page 1 of 11

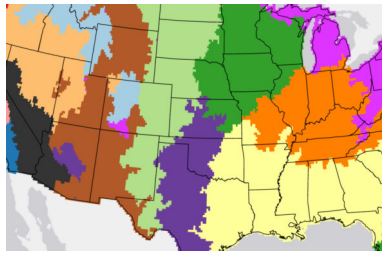
Analyzing Spatial Data

Detecting Clusters & Making Predictions

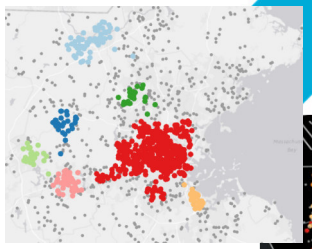
Spatially Constrained Multivariate Clustering
(SKATER)

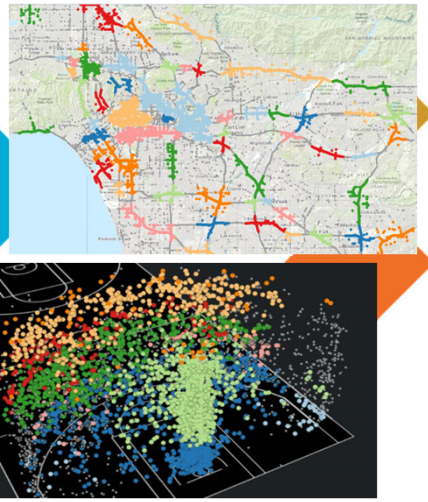


Multivariate Clustering
(K-means)

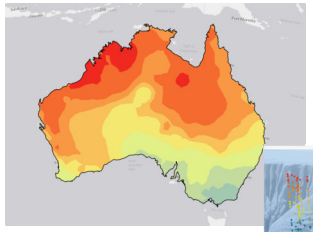


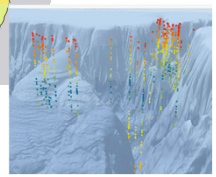
Density-Based Clustering
(DBSCAN, HDBSCAN, OPTICS)



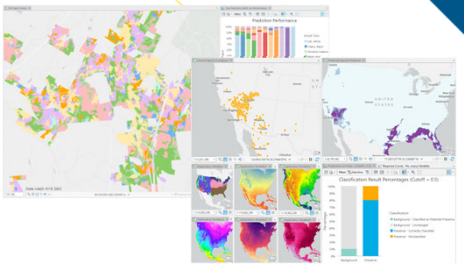


Interpolation
(Empirical Bayesian Kriging)



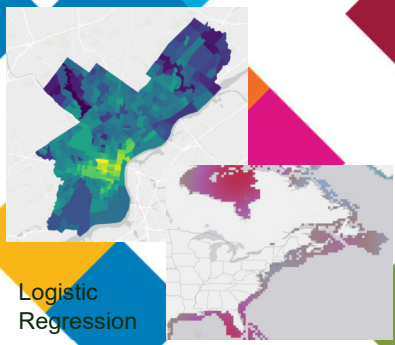


Forest-based & XGBoost



Presence-only Prediction (MaxEnt)

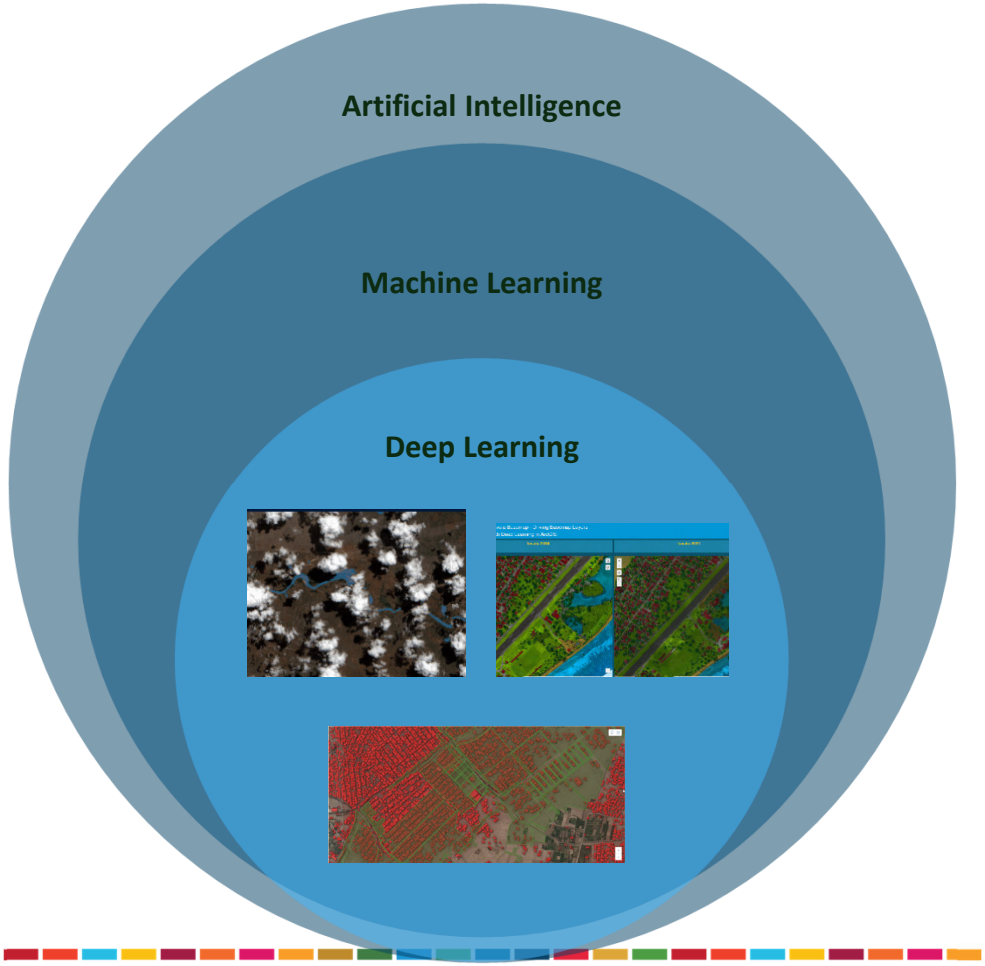
Linear Regression

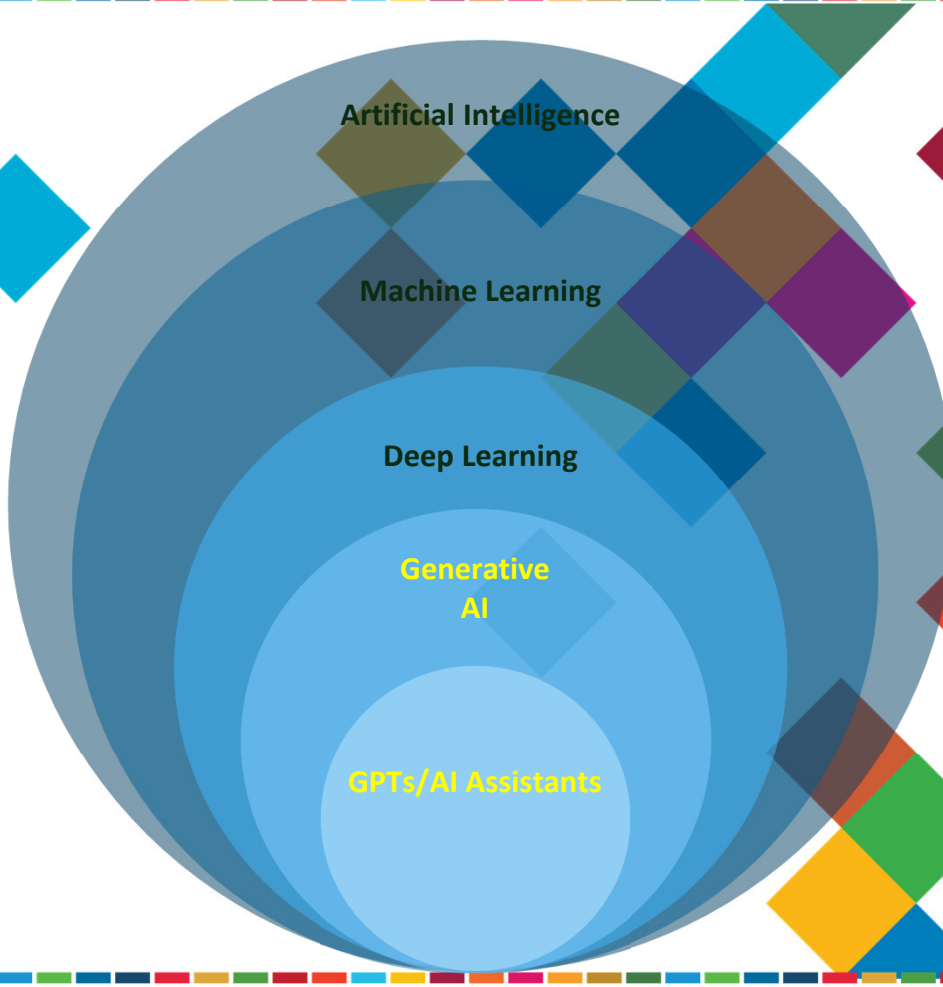


Logistic Regression

GWR / MGWR

Regression & Classification


Artificial Intelligence
Machine Learning
Deep Learning


Artificial Intelligence
Machine Learning
Deep Learning
Generative AI
GPTs/AI Assistants

GeoAI

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

AI Assistants

Creating more natural and intuitive ***Experiences of ArcGIS***, using intelligent *AI assistants and agents*, to empower GIS users and boost productivity.

Scope and Personas for AI Assistants

Standalone AI Assistants

A completely new user experience for non-GIS experts to explore, visualize and analyze geospatial content through natural language

GIS

Content

Mapping

Analysis

. . .

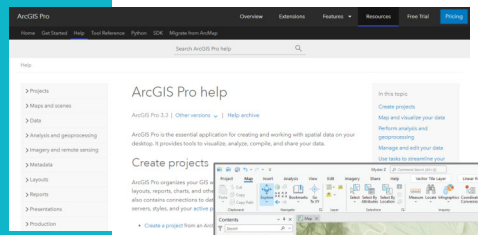
AI Assistants

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

Assistants for..

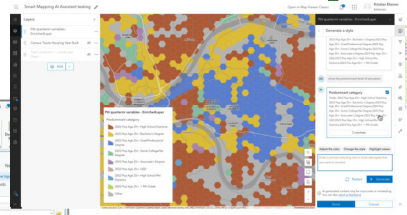
- Mapping
- Analysis
- App creation
- Data management
- Administration
- Search
- Learning
- …

Documentation

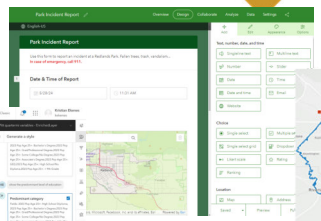


Pro

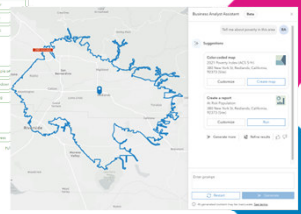
Smart Mapping



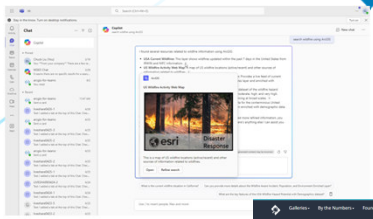
Survey123



Business Analyst



Microsoft Teams

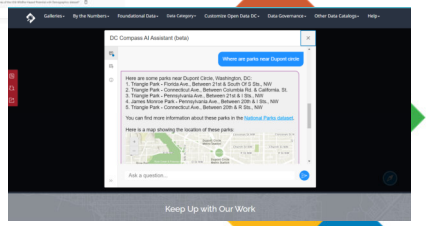


GIS

Boosting productivity

ng GIS easier

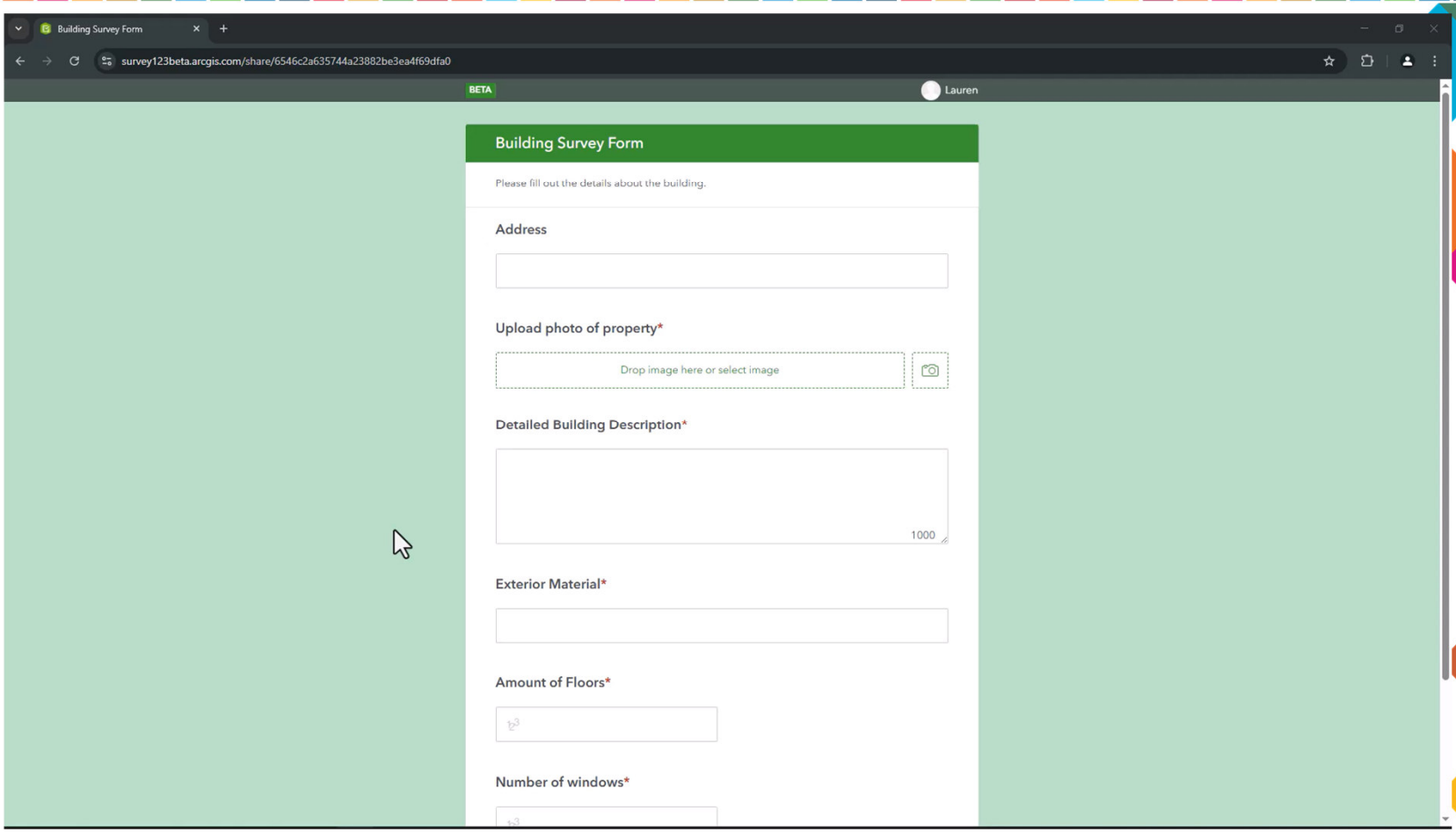
Configurable Assistant Apps



Also in the works…

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

In Beta now, coming into ArcGIS in 2025


Building Survey Form
survey123beta.arcgis.com/share/6546c2a635744a23882be3ea4f69dfa0
BETA
Lauren
Building Survey Form
Please fill out the details about the building.
Address
Upload photo of property*
Drop image here or select image
Detailed Building Description*
1000
Exterior Material*
Amount of Floors*
Number of windows*

GIS is being infused with even more AI Technologies

Enhancing the user experience, becoming a more intelligent GIS platform for organizations

Intelligent
Application Experiences

Expedited
Decision Making

Improving User Productivity, Providing Valuable and Faster Insights

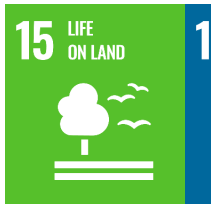
The most relevant SDGs related to the presentation and theme of this session

1st relevant SDG

2nd relevant SDG

3rd relevant SDG

SUSTAINABLE DEVELOPMENT GOALS

International Federation of Surveyors supports the Sustainable Development Goals

STEP 1: SELECT HERE THE THREE MOST RELEVANT SDGs
STEP 2: COPY THE SDG INTO PREVIOUS SLIDE