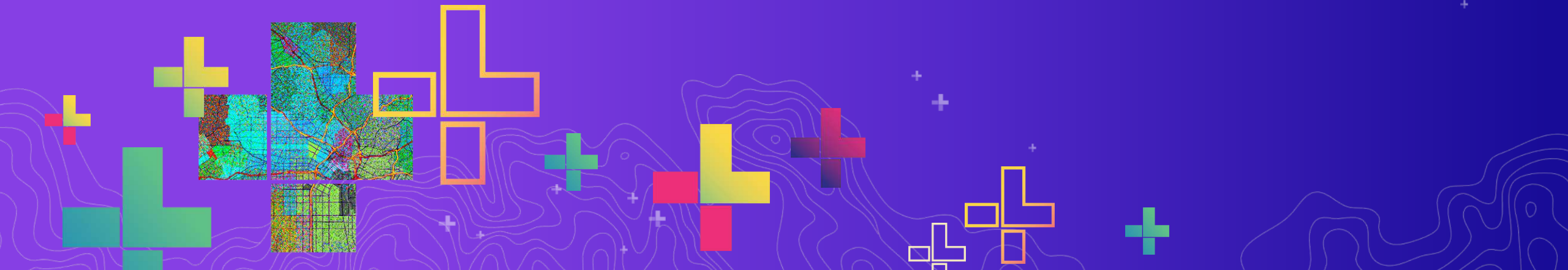


ArcGIS Technology Overview

Pauline Okeyo
Solution Engineer



ArcGIS Vision

A Comprehensive Geospatial Platform – Supporting Multiple Communities

Mapping &
Location Services

Geo-Enabled
Systems

GIS

Location
Analytics

Open and Developer
Friendly

ArcGIS

Software, SaaS and PaaS



AI & Machine Learning
Content

Spatial Analysis & Data Science

3D Visualization & Analytics

Data Management

Field Operations BIM Integration

Imagery & Remote Sensing

Location Analytics Application Development
& Customization

Real-Time Visualization & Analytics

Mapping

ArcGIS Capabilities Are Advancing

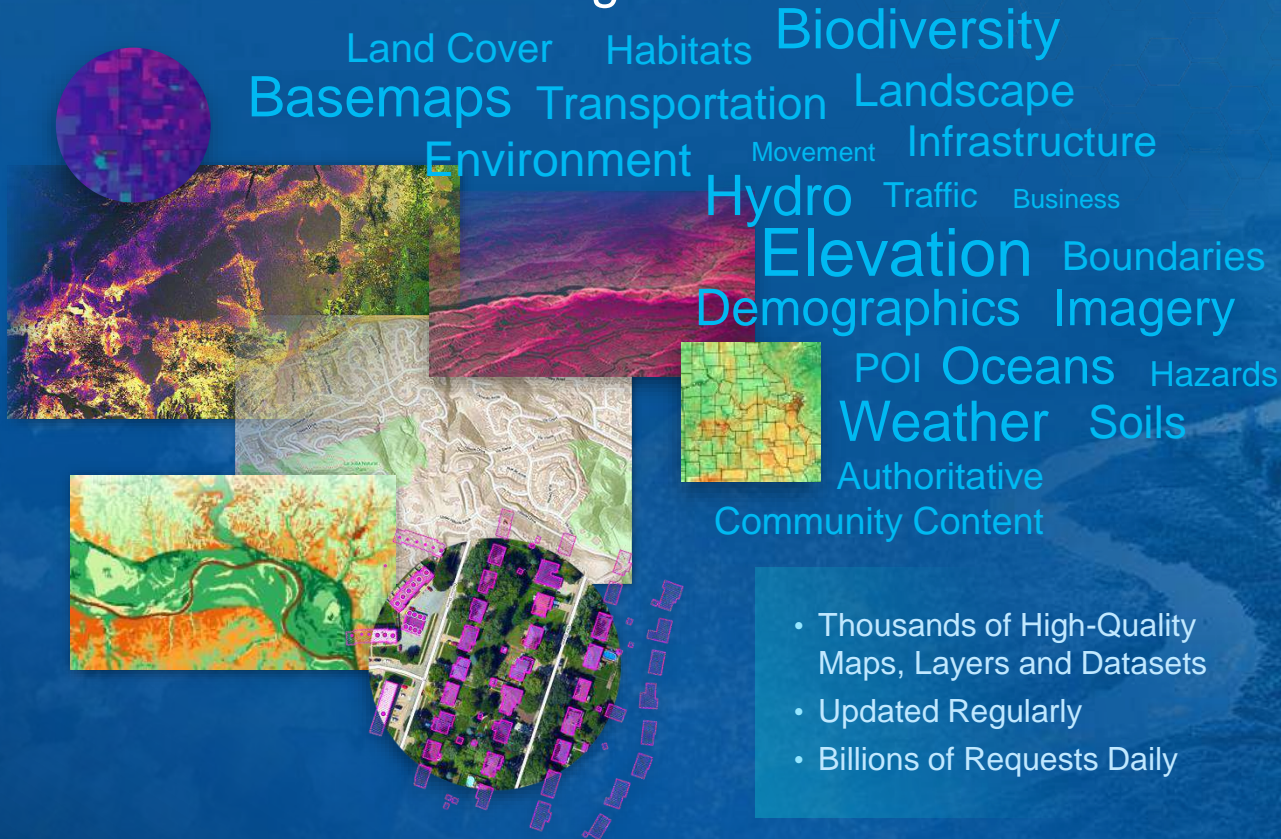
MANY NEW INNOVATIONS



ArcGIS Includes Ready-to-Use Content

Petabytes of Basemaps, Imagery, Demographics and Thematic Content . . .

ArcGIS Living Atlas



Real-Time
Observations

Monthly Unemployment
Statistics (BLS)



OpenStreetMap
Layers

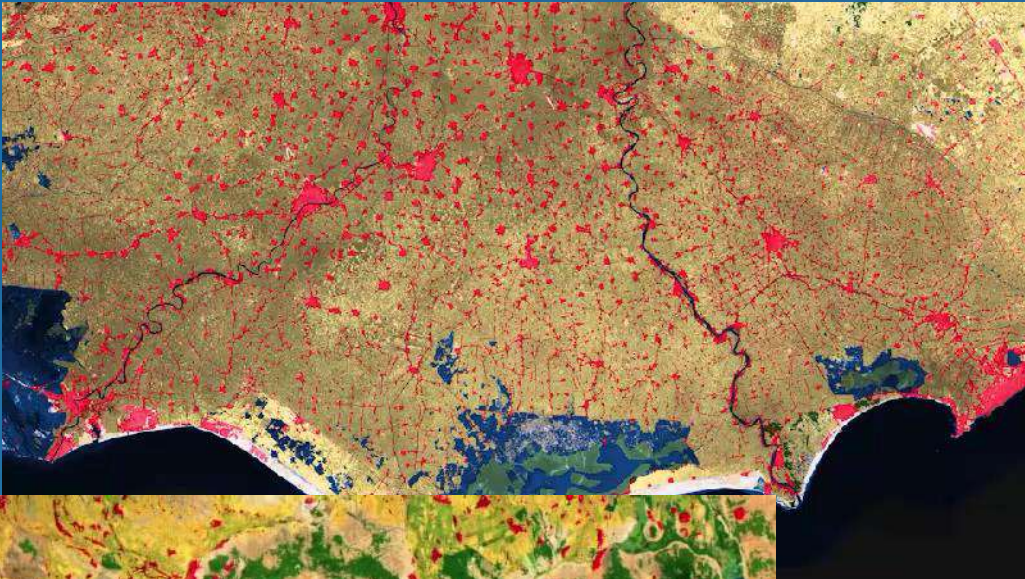
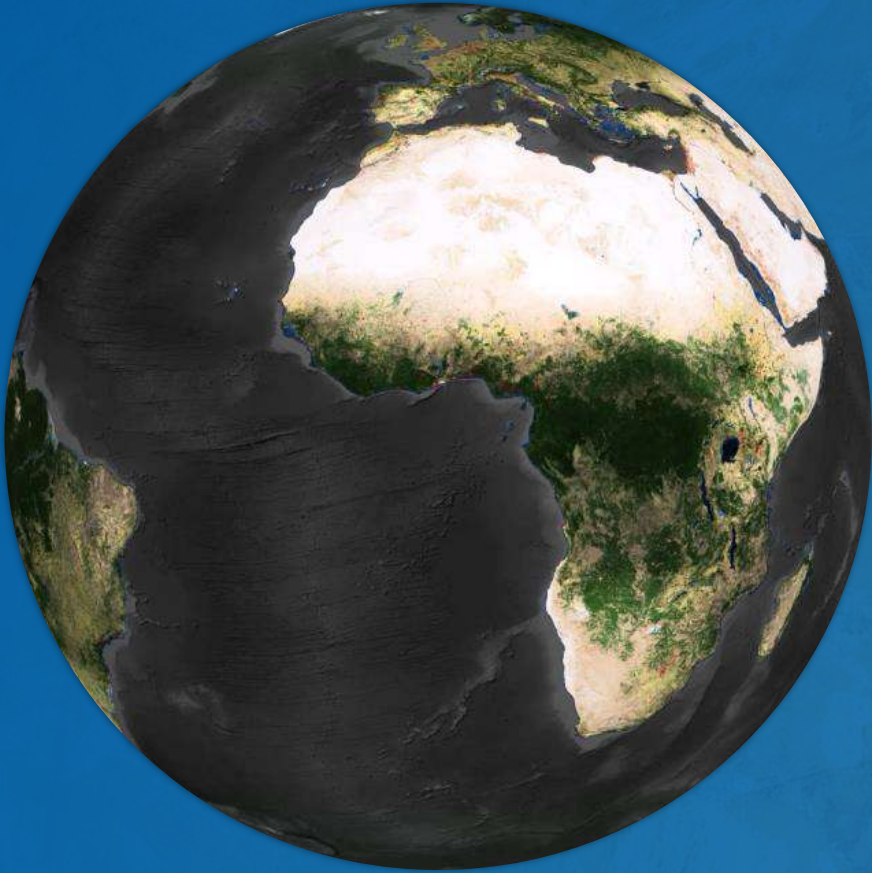
New & Improved

- Analysis-Ready Imagery
- Global Demographics
- Enhanced OSM Layers
- New Content
 - 2020 Land Cover
 - 2050 Land Cover Projections
 - Biodiversity
 - Air Quality
 - Global River Flow
 - Wildfire Risk
 - . . . and Many More

- Thousands of High-Quality Maps, Layers and Datasets
- Updated Regularly
- Billions of Requests Daily

*Global & Local Geographic Content . . .
About Everything*

High Resolution Global Land Cover 2020



Nile Delta
Egypt



Mt. Kilimanjaro
Tanzania

Collaborators

- National Geographic
- Impact Observatory
- Microsoft

Digital Earth Africa



Digital Earth Africa
DigitalEarthAfrica

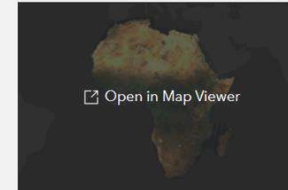
Bio

Digital Earth Africa exists to improve the lives of people across the African continent by translating Earth observations into insights that will support sustainable development.

Item gallery

View all

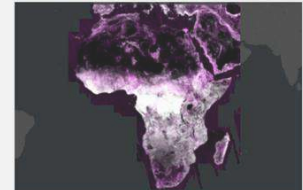
Top items based on relevance.



Digital Earth Africa Sentinel-2 Geo...
Imagery Layer



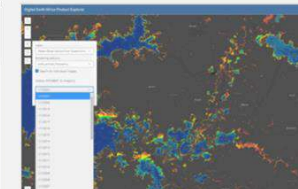
Water Observations from Space An...
Imagery Layer



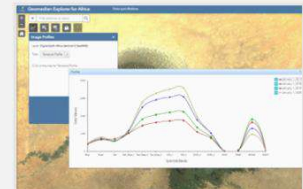
ALOS_PULSAR annual mosaics for ...
Imagery Layer



Cropland extent in Western, Easter...
Imagery Layer



Digital Earth Africa Image Renderer
Web Mapping Application



Geomedian Explorer for Africa
Web Mapping Application

DE Africa GeoMAD Mask



The Africa GeoPortal

GeoPortal Data Tools Learn Map Events

The Africa GeoPortal

Inspiring communities through geography

COVID-19 Data for Africa
[COVID-19 Response Data](#)

FAO Desert Locust Data
[Find the Data Trends](#)

Weather from NASA
[Learn More About Climate](#)

Learn from the community of local GIS Professionals
[Show Me More](#)

Africa Agriculture GeoPortal - powered by Esri

Search Sign In Segments

Agriculture in Africa

Integrate Earth observations, imagery, field data, agribusiness and real-time data streams to develop sustainable agricultural practices and improve understanding of the food balance sheet. Make better decisions faster. Monitor and forecast production to sustainably feed Africa's growing population.

Datasets

Four dataset thumbnails: 1. A dark map of Africa with green highlights. 2. Aerial view of a river and surrounding landscape. 3. A map of West Africa showing borders and major cities. 4. Aerial view of a forested area with a red marker.

Spatial Analysis & Data Science Solving Problems and Advancing Science

Many New Tools & Capabilities

Terrain Modeling

Multidimensional

Apportionment

Predictive Modeling

GeoAI

Object Classification

Point Cloud Classification

Spatiotemporal Outliers

Spatial Statistics

Data Engineering

Visualization & Exploration

Interactive Charts

Voxels

Modeling & Scripting

Jupyter Notebooks

Big Data Analytics

New & Improved

- 90+ New Tools and Algorithms
- Predictive Modeling
- Improved Terrain Analysis
- Multidimensional Analysis
- Data Engineering Experience
- Deep Learning Geoprocessing Tools
- Analytics Scheduling
- Big Data Integration
- Quality, Performance and Productivity

Machine Learning, Deep Learning & AI

Embedding GeoAI Across the ArcGIS System

New & Improved

- Deep Learning
- Pre-Trained Models
- Geoprocessing Tools
- Machine Learning
- AutoML
- Spatiotemporal
- Outlier and Anomaly Detection

ArcGIS Enterprise

ArcGIS Online

ArcGIS Pro

GeoAI

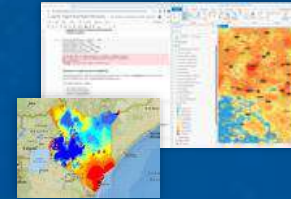
- Classification
- Clustering
- Interpolation
- Forecasting
- Regression

Notebooks,
Python & R

Integrated with the Open
Science Ecosystem



Spatial Machine Learning



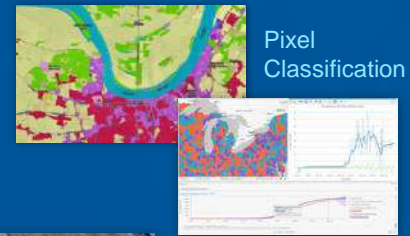
Natural Language Processing



3D Object Classification



Pixel Classification



Change Detection



Spatiotemporal Outliers



Time-Series Forecasting



Object Tracking



Feature Extractions

Building Footprints

Automating Processes & Making GIS Smarter



Examples for enabled Imagery AI Workflows

Object Detection, Instance Segmentation, Land Cover, Change Detection..

Damaged Structures



Building Footprints



Land Cover



Pipeline Encroachment



Roads



Oil Pads



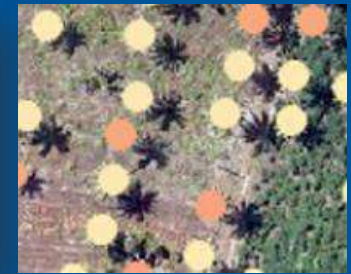
Road Cracks



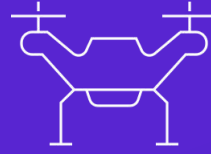
Cars



Palm Trees



End-to-End Geospatial AI Lifecycle



ArcGIS



Data Access



Data Labelling



Data Prep



Model Training



Deploy Models to Production



Consume Models



Run Inferencing at Scale




Take Action



Pretrained Deep Learning Models

Building Footprint Extraction - Africa

Overview



Deep learning model to extract building footprints in Africa from high-resolution aerial or satellite imagery.

Deep Learning Package from Esri
Managed by esri_analytics

Created: 28 May 2021 Updated: 21 Oct 2021 Number of Downloads: 994

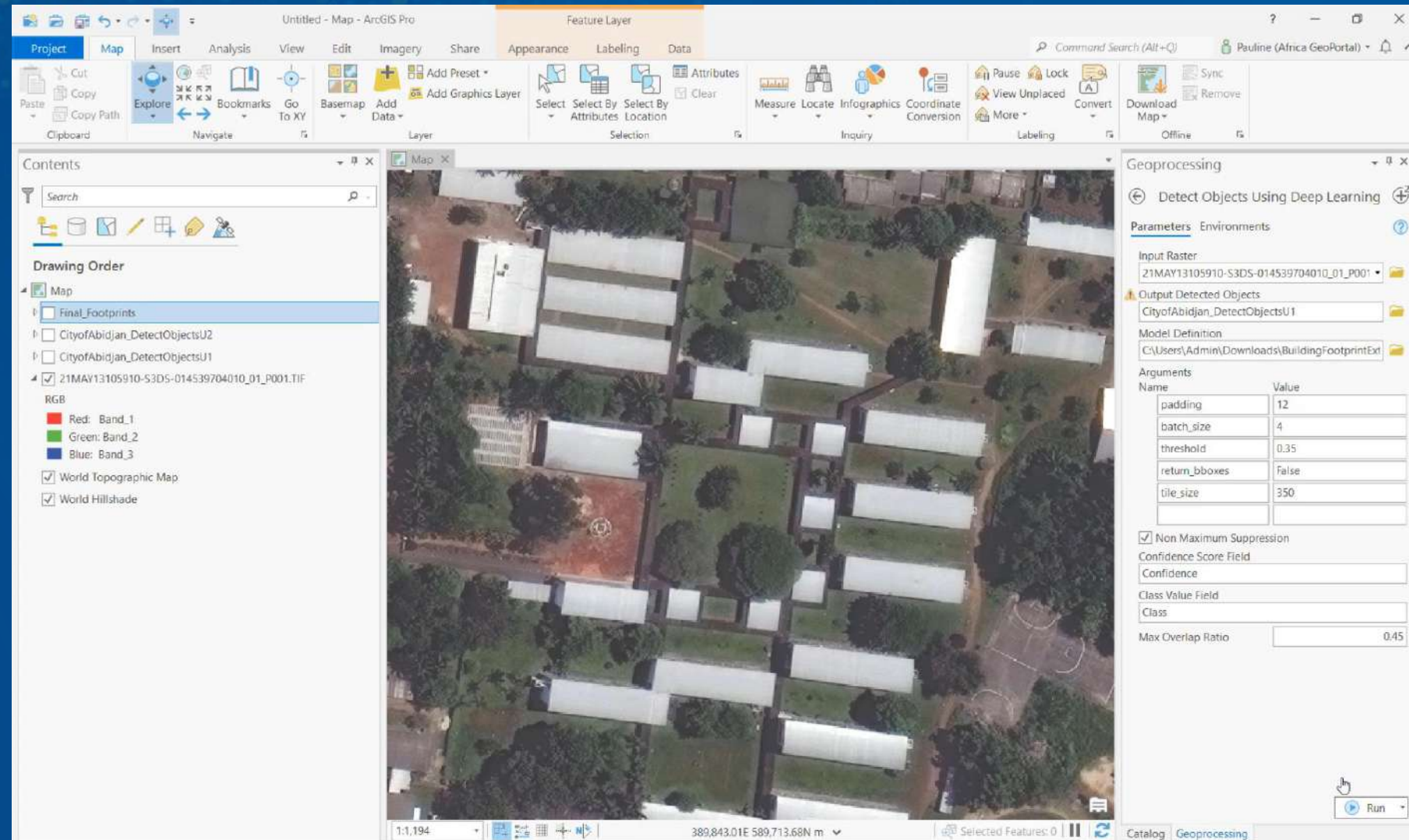
Authenticative Living Atlas

Download

Description

This deep learning model is used to extract building footprints from high-resolution (10-40 cm) imagery. Building footprint layers are useful in preparing base maps and analysis workflows for urban planning and development, insurance, taxation, change detection, infrastructure planning, and a variety of other applications.

Digitizing building footprints from imagery is a time-consuming task and is commonly done by digitizing features manually. Deep learning models have a high capacity to learn these complex workflow semantics and can produce superior results. Use this deep learning model to automate this process and reduce the time and effort required for acquiring building footprints.



Untitled - Map - ArcGIS Pro

Feature Layer

Project Map Insert Analysis View Edit Imagery Share Appearance Labeling Data

Clipboard Navigate Layer Selection Inquiry Labeling Offline

Contents

Search

Drawing Order

- Map
 - Final_Footprints
 - CityofAbidjan_DetectObjectsU2
 - CityofAbidjan_DetectObjectsU1
 - 21MAY13105910-S3D5-014539704010_01_P001.TIF
 - RGB
 - Red: Band_1
 - Green: Band_2
 - Blue: Band_3
 - World Topographic Map
 - World Hillshade

Geoprocessing

Detect Objects Using Deep Learning

Parameters Environments

Input Raster: 21MAY13105910-S3D5-014539704010_01_P001

Output Detected Objects: CityofAbidjan_DetectObjectsU1

Model Definition: C:\Users\Admin\Downloads\BuildingFootprintExt

Arguments

Name	Value
padding	12
batch_size	4
threshold	0.35
return_bboxes	false
tile_size	350

Non Maximum Suppression

Confidence Score Field: Confidence

Class Value Field: Class

Max Overlap Ratio: 0.45

Run

Field Operations & Data Collection

Location-Enabling All Aspects of Field Work

Specialized Data Collection

Geocentric Data Collection

Field Work Management

Operational Awareness

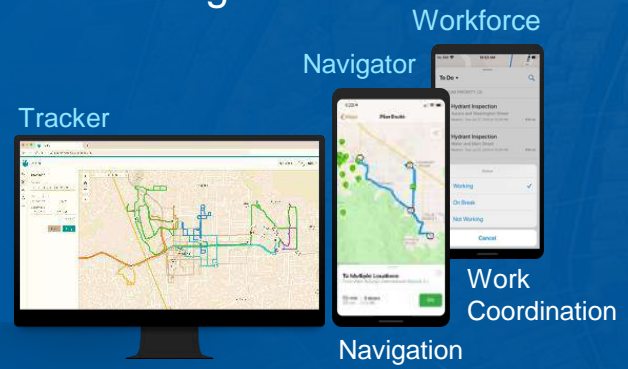
Tracker

Navigator

Workforce

Work Coordination

Navigation



Form-Centric Collection

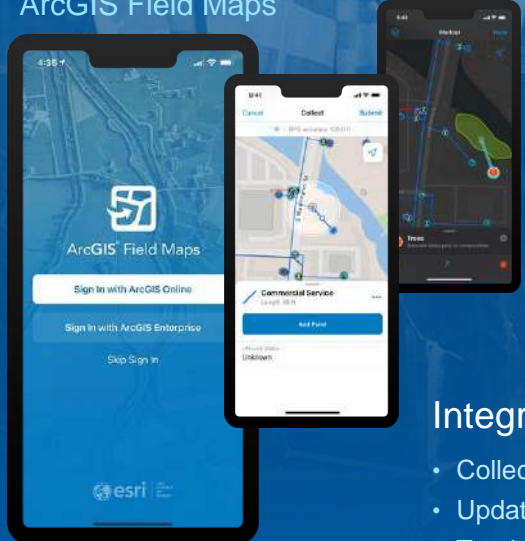
Survey123

QuickCapture

Fast Observation Collection



ArcGIS Field Maps



Comprehensive Field App

Integrates

- Collecting
- Updating
- Tracking
- Viewing
- Markup

Dashboard



Connecting & Transforming Mobile Workflows

Field Operations & Data Collection

Location-Enabling All Aspects of Field Work

Specialized Data Collection

Geocentric Data Collection

Field Work Management

Operational Awareness

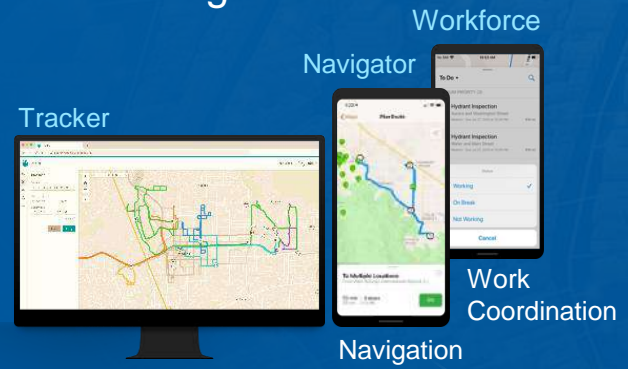
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ArcGIS Field Maps



Comprehensive Field App

Integrates

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- Tracking
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- Markup

Dashboard



Connecting & Transforming Mobile Workflows

Thank you

africageoportal@esri.com





esri

THE
SCIENCE
OF
WHERE