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Volunteering for the future – Geospatial excellence for a better living

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Automating National Mapping & Cadastre with GeoAI

Nick Land, Esri Inc

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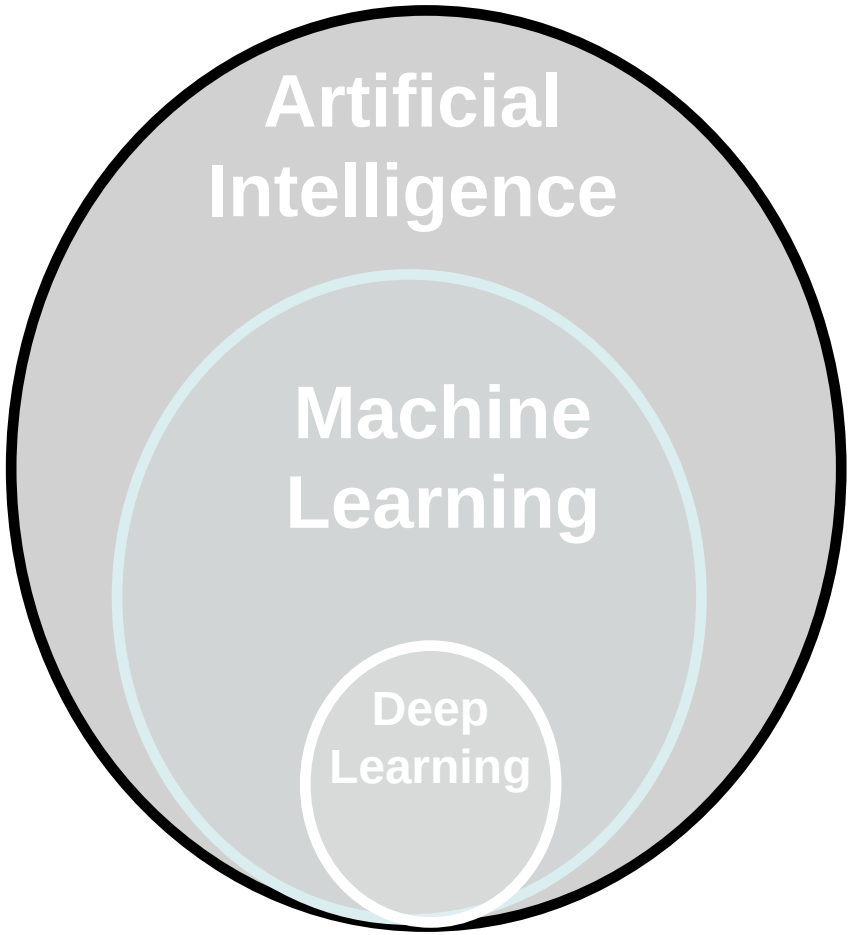
AI – Hype or "State of the Art"?

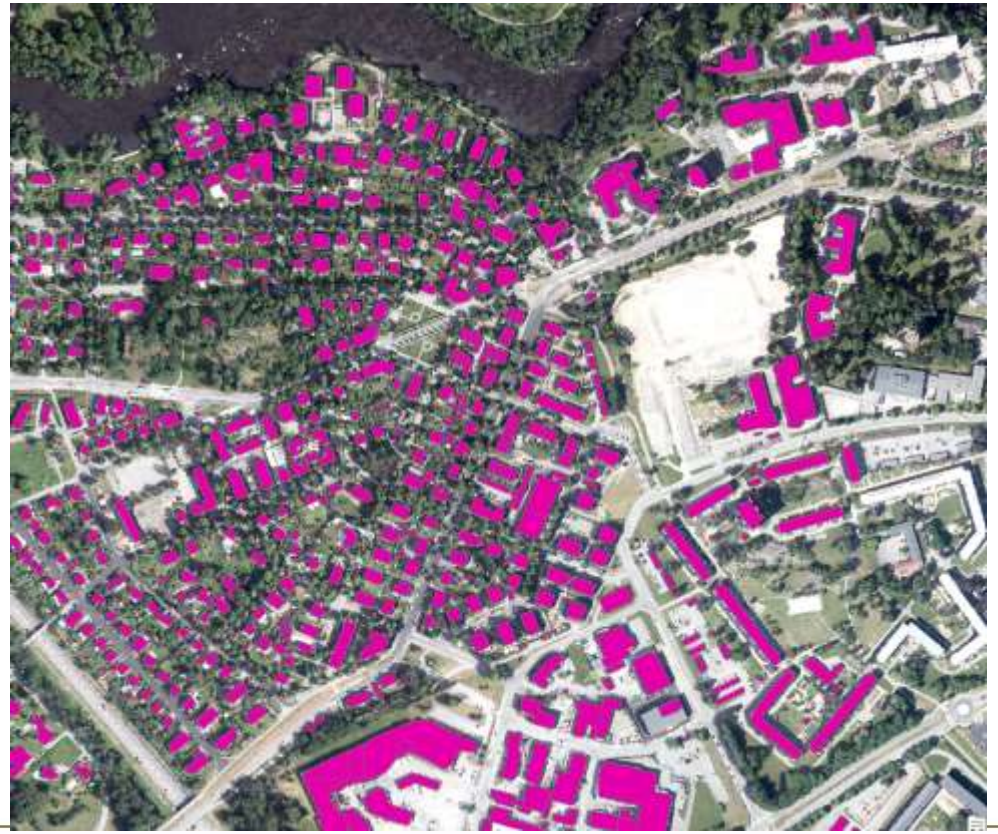
- Advances in AI
- Compute power (cloud)
- Availability of big (labelled) data
- Accessible
- Relevant
- Automation of workflows



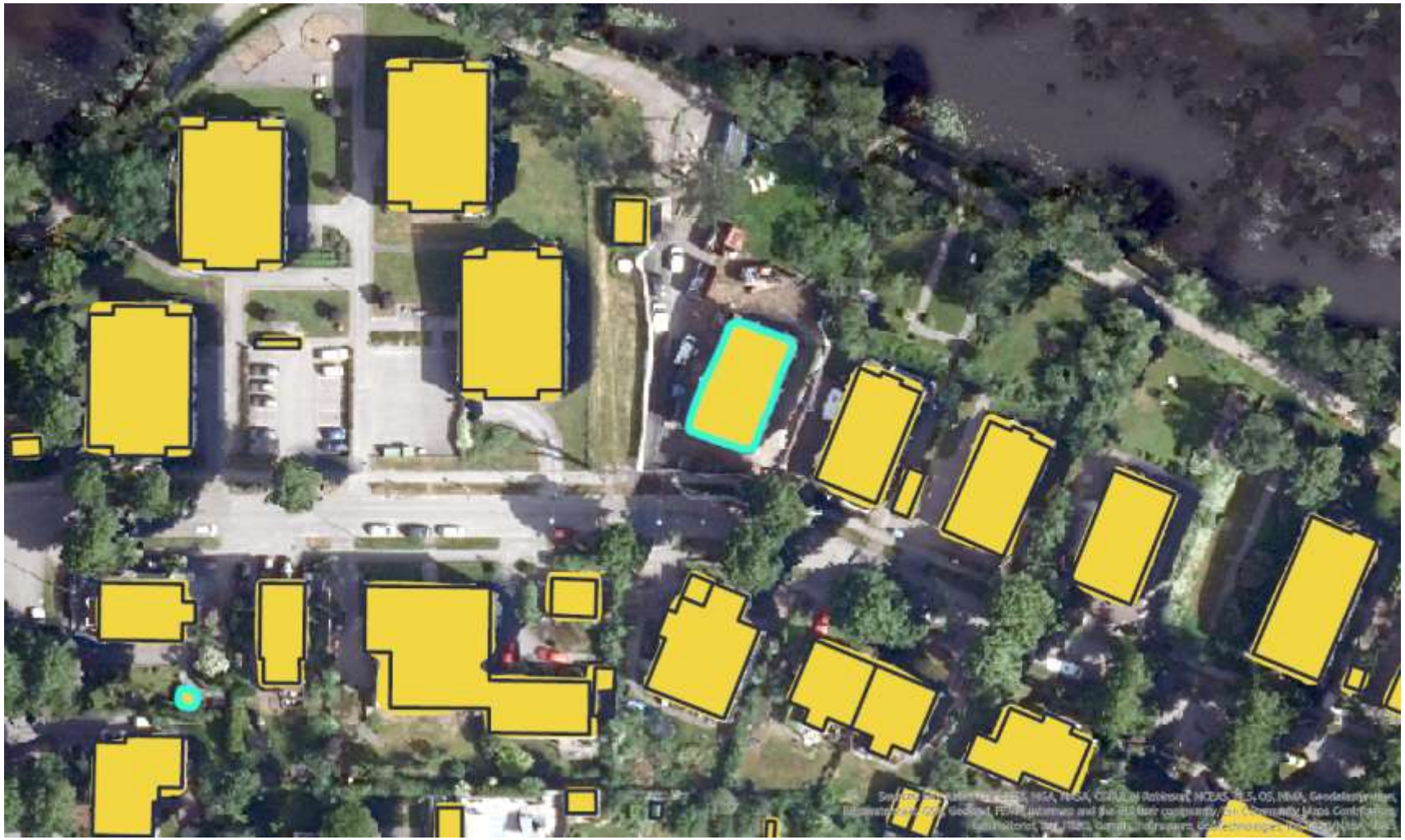
Use Case – Base Map Update

Buildings Layer

DL Buildings



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMCA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, Lantmäteriet, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS



Existing Building Footprints

DL Detected Buildings*

Green = Existing
*Red & Orange = New

Use Case – Cadastre Update

- Buildings detected, 90%+ identified
- Less than 5% false positives
- DLS evaluating results

Use Case - Taxation

Undeclared pools in France uncovered by AI technology

29 August

The discovery of thousands of undeclared private swimming pools in France has provided an unexpected windfall for French tax authorities.

Following an experiment using artificial intelligence (AI), more than 20,000 hidden pools were discovered.

They have amassed some €10m (£8.5m) in revenue, French media is reporting.

Deep Learning Workflow

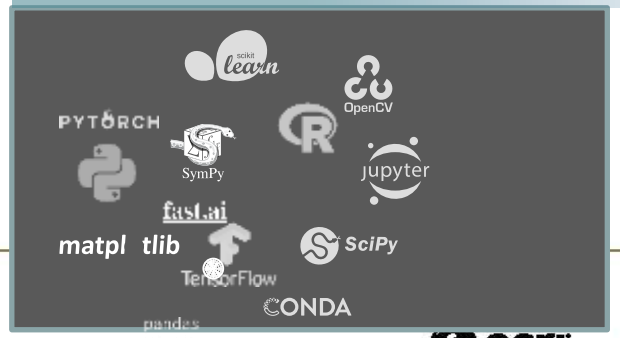
For Wide Range of Data Types

- Aerial
- Satellite
- Radar
- Lidar
- Motion imagery
- Bathymetry
- Point cloud
- Drone

Implementing Many Tasks

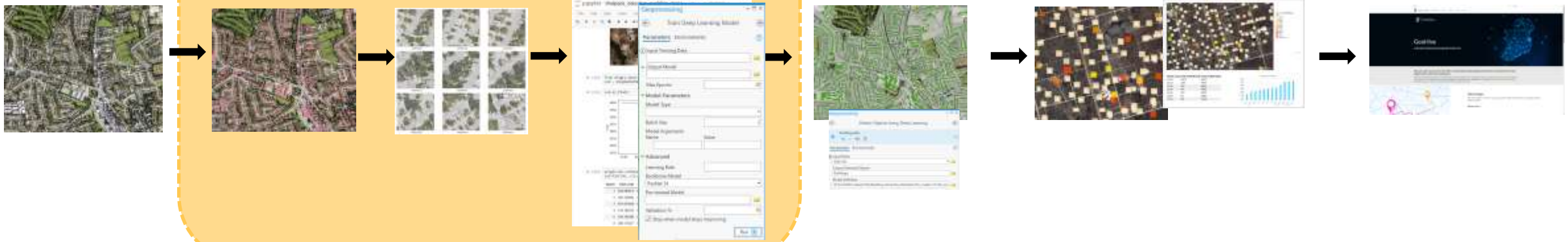
- Object classification
- Object detection
- Pixel classification
- Image translation
- Object tracking
- Scanned maps

Integration with DL Libraries



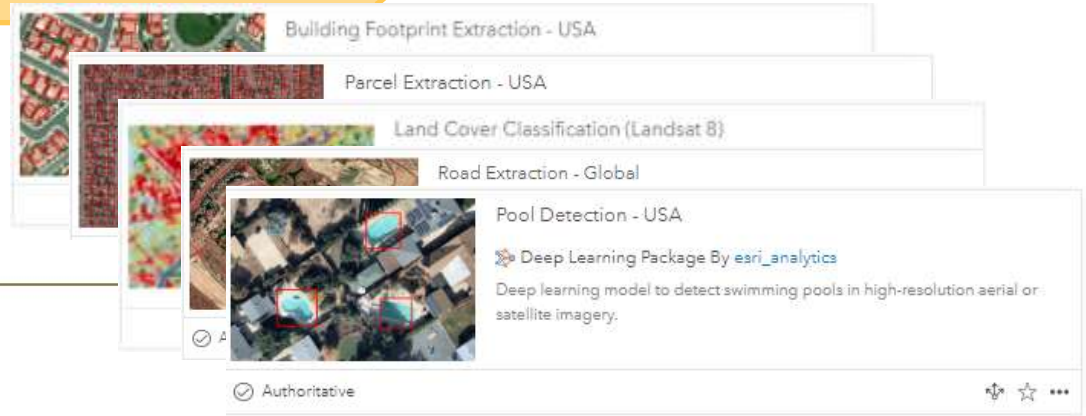
Deep Learning Workflow with Pre-trained Models

Image Management → Labelling → Data Prep → Model Training → Inferencing → Post Processing → Sharing



Eliminates:

- Imagery requirements for model training
- Labelling requirements
- Training AI models
- Massive compute requirements



In Conclusion

- GeoAI benefits Topographic Mapping; Cadastre; Taxation
  - Change Detection; Creation; Update
- Iterative, incremental approach – use case dependent: What's "good enough"?
- Training data is key
- GeoAI is one tool in the GIS toolbox