Bericht von den Konferenzen

Matthias Schenker

Esri Developer Summit

2018


Esri Developer Summit Europe
Berlin
October 24-26, 2017
ESRI DEVELOPER SUMMIT

ArcGIS | is available as both an online Mapping & Location platform as well as a comprehensive GIS

ArcGIS Enterprise
(Software)

GIS

Mapping & Location

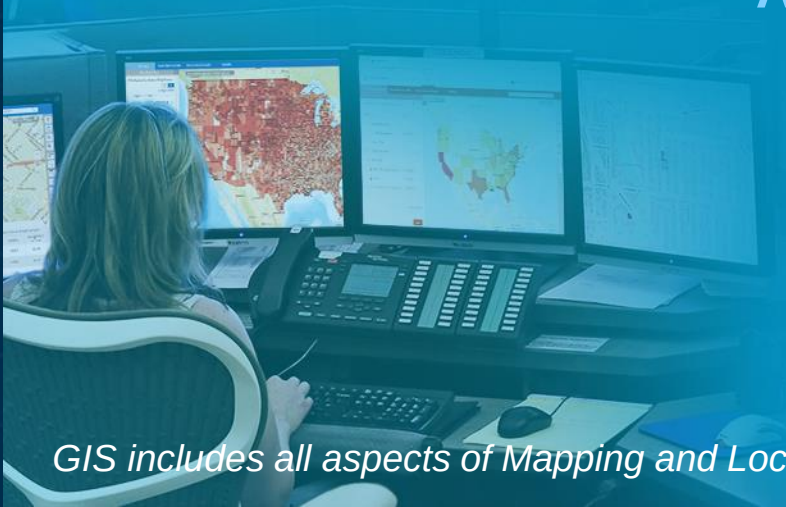
ArcGIS Online
(SaaS)

ArcGIS Pro

Open

Distributed

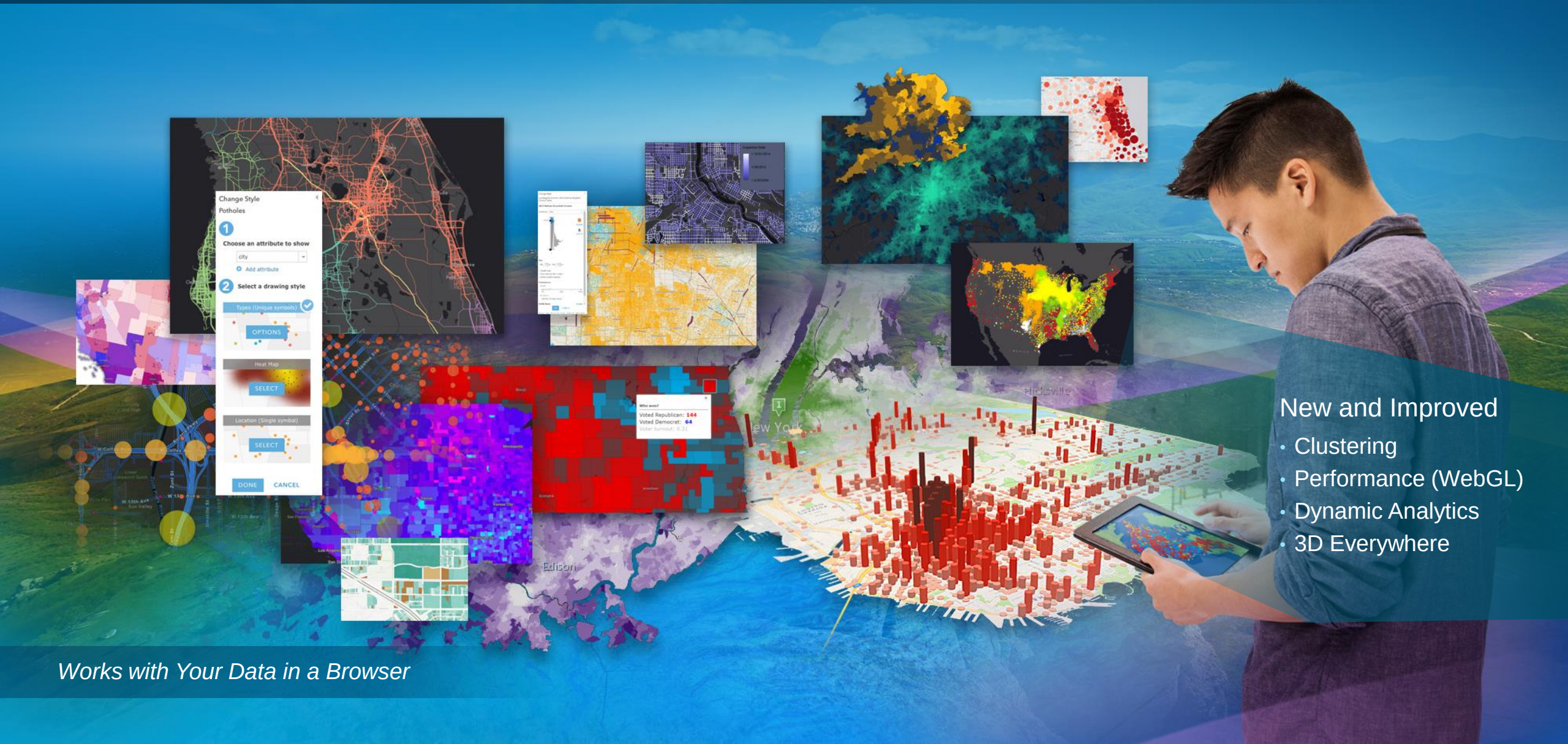
Services Based



GIS includes all aspects of Mapping and Location

Supporting Multiple Types of Users . . .

Mapping (2D & 3D) | Integrating Cartographic Intelligence

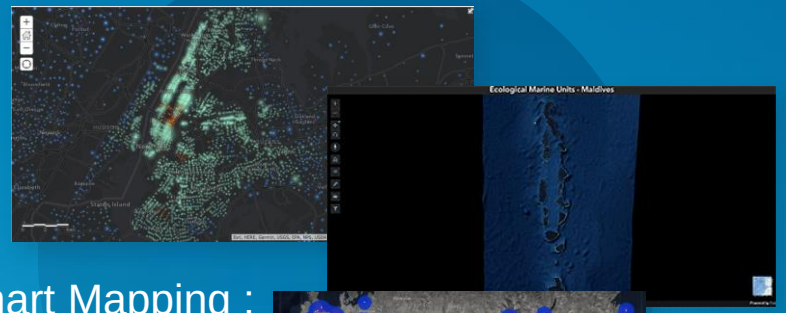


New and Improved

- Clustering
- Performance (WebGL)
- Dynamic Analytics
- 3D Everywhere

Works with Your Data in a Browser

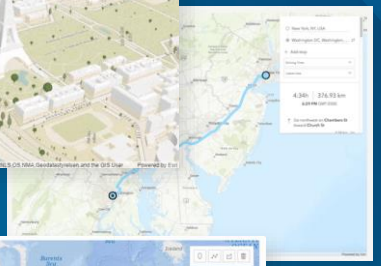
WebGIS | JS API - Built for the Modern Web



Smart Mapping :
Data Driven
Visualization

3D Measurement

Directions

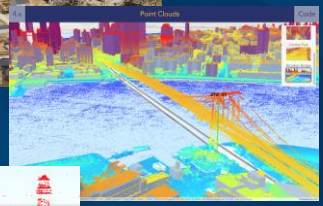


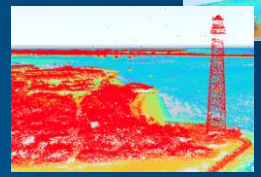
Widgets
and Tools

Drawing Tools

3D Visualization
and Analytics

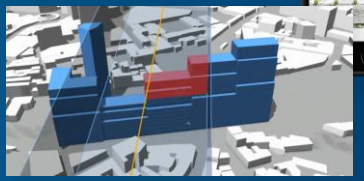
Surfaces, Objects,
& Massive
Point Clouds





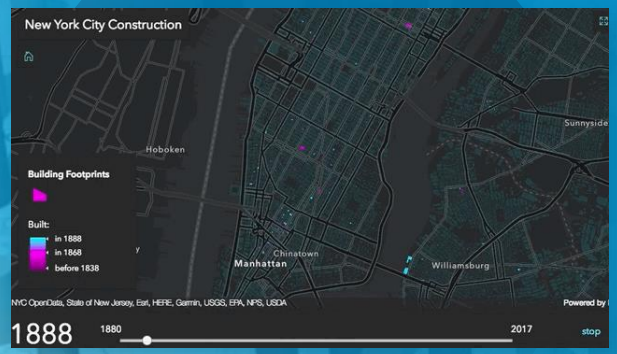
Subsurface

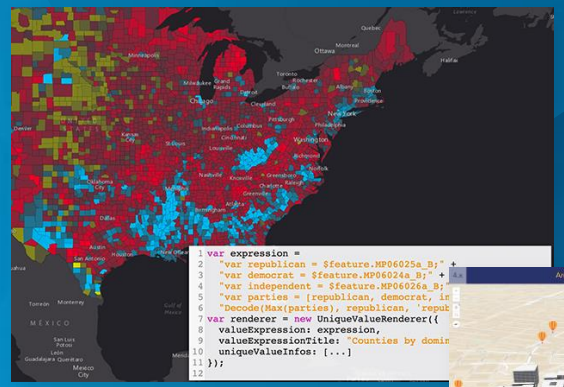
Mobile Web



Interactive Analysis

WebGL Performance





Arcade
Display Language

Powerful Web Map Specification

D

…Immersive, Interactive, and analytic

Demos

- https://developers.arcgis.com/javascript/latest/sample-code/layers-pointcloud-portal/live/index.html
- https://developers.arcgis.com/javascript/latest/sample-code/layers-integratedmeshlayer/live/index.html
- https://developers.arcgis.com/javascript/latest/sample-code/layers-scenelayer-filter-query/live/index.html
- https://developers.arcgis.com/javascript/latest/sample-code/scene-external-renderer/live/index.html
- https://developers.arcgis.com/javascript/latest/sample-code/layers-custom-elevation-thematic/live/index.html
- https://developers.arcgis.com/javascript/latest/sample-code/geoprocessing-viewshed/live/index.html
- https://developers.arcgis.com/javascript/latest/sample-code/visualization-vv-color-animate/live/index.html
- http://coolmaps.esri.com/Dashboards/CrimeTrends/


ulture
agement
…Imagination is More Important than Knowledge…
…Albert Einstein
ETH zürich

Field Mobility | Empowering Mobile Workers

Apps for the Field

- Collecting Data
- Coordinating Work
- Advanced Navigation
- Mapping and Markup

ArcGIS Pro | A complete modern GIS Workstation, an excellent companion to Online & Enterprise

Our Focus

ArcGIS Pro 2.1

Improvements

- Annotation Editing
- MGRS Grids
- Tables in Layouts
- Selection Layers
- Table Statistics

New

- Utility Network Support
- Image Analyst Extension
- Interactive 3D Analysis
- Offline Maps and Layers
- Attribute Rules
- 3D Editing Grid
- If-then-else Model Logic
- SAP HANA

Coming

- Real-Time Streaming
- Autodesk Integration
- Full-Motion Video
- Enhanced Predictive Analysis

Advanced Mapping, Visualization, Editing, and Analysis

ArcGIS Pro – A Comprehensive Desktop GIS

Partnering to Bring Together BIM & GIS

Make Anything with The Science of Where

. . . Imagine, Plan, Design, Build and Manage a Better World

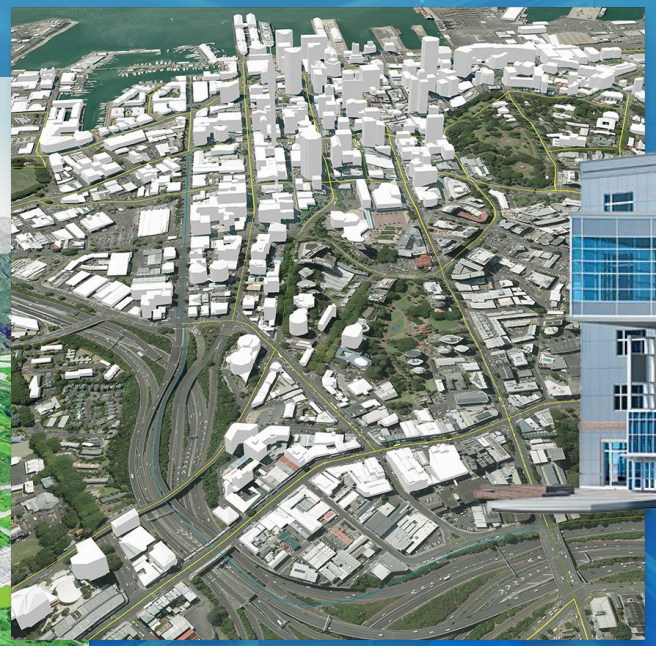
Designing with Nature

Requires an Integrated and Holistic Approach

Context

Content

Landscape Information Models



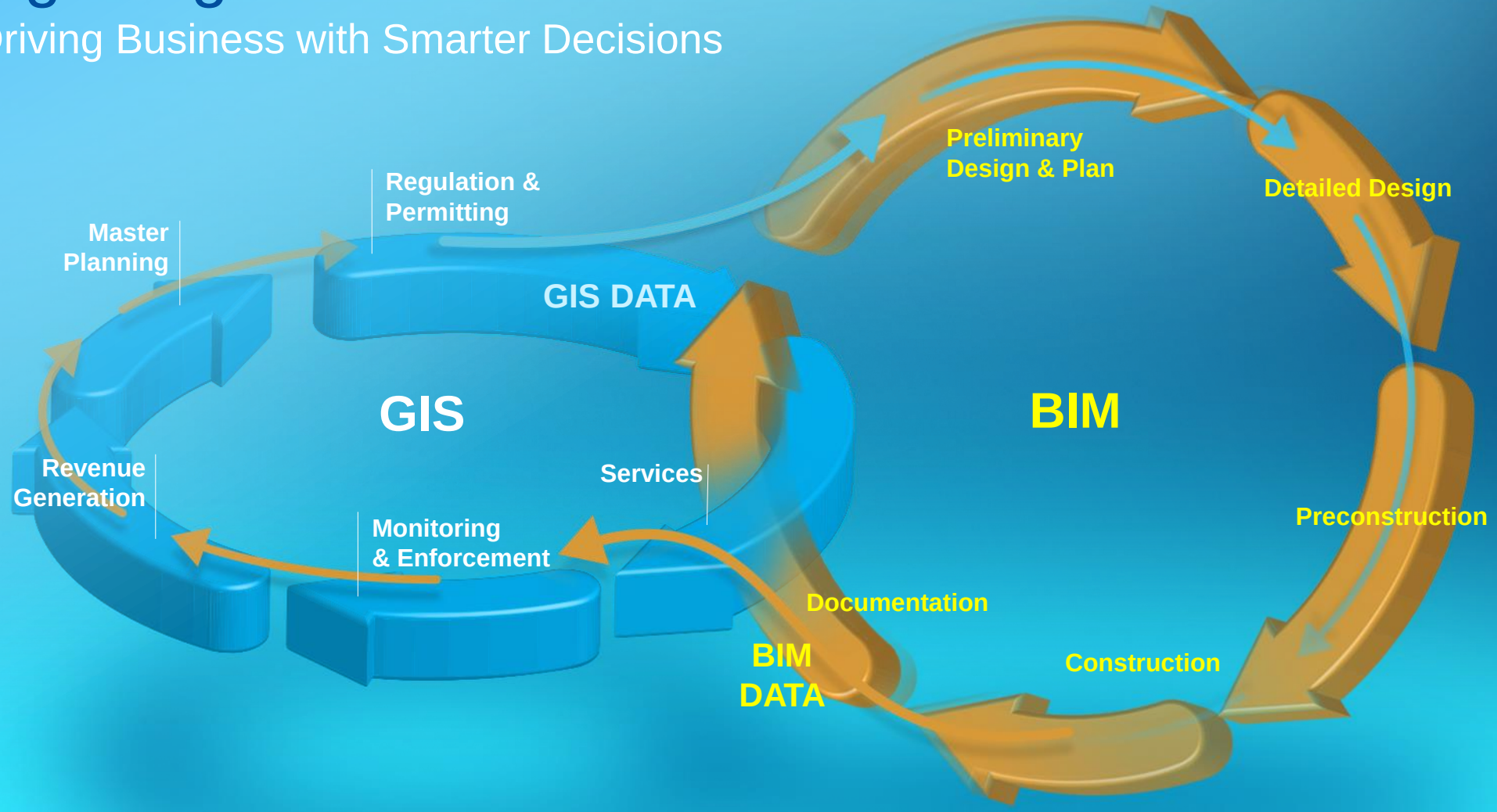
City Information Models

Building Information Models

Geography Provides the Common Language for Collaborating

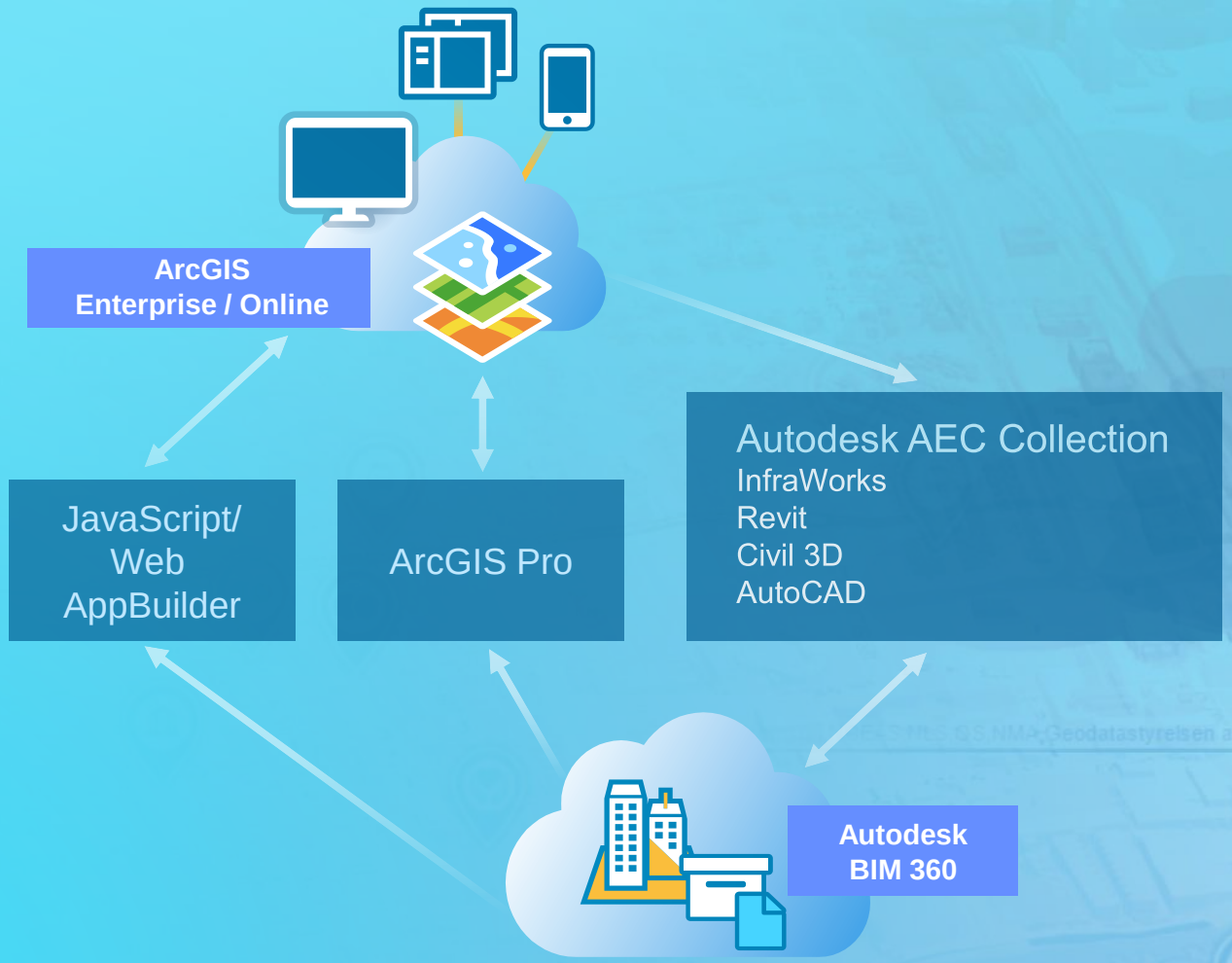
Integrating BIM and GIS Workflows

Driving Business with Smarter Decisions



Esri & Autodesk Vision

Integration



Interoperability

ArcGIS Pro Roadmap

Near-term

- Metadata (Import, Export and Sharing)
- Reports
- Full motion video
- Real time streaming
- Offset printing
- Interactive Slice Tool
- Scene Layer Editing
- Revit File Support
- Attribute Rule enhancements
- Spell Check
- Batch Geoprocessing
- Data Clock Chart

Mid-term

- Parcel Management
- Presentations
- Dynamic Feature Binning and Clustering
- Projects in the Enterprise
- Animated symbols
- Dimensions
- Materials
- 3D Effects
- GPS Support
- Terrain Editing
- Trend Profile Chart
- New Extensions

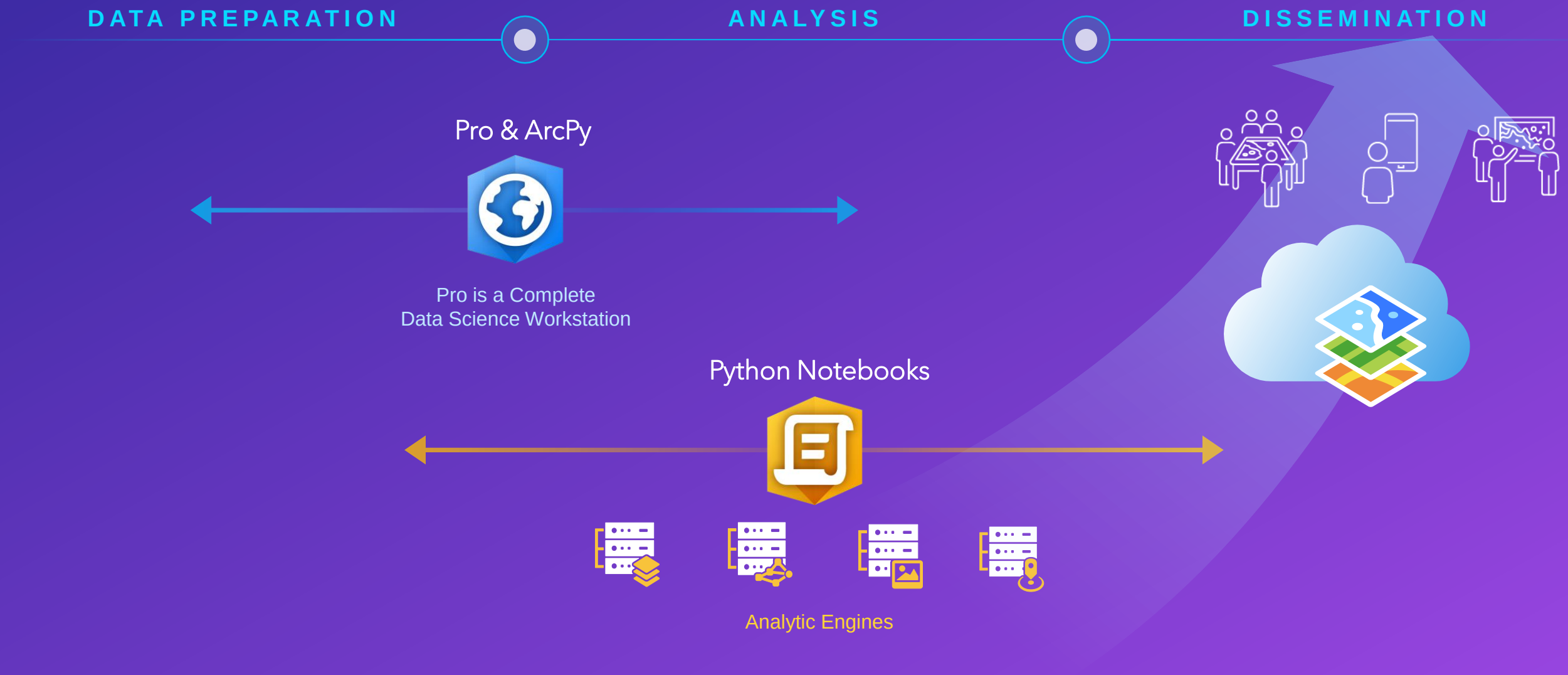
Long-term

- Multidimensional scientific data exploration
- Physically based rendering
- Geoprocessing in the database
- Distributed desktop processing using Spark
- …

March 2018

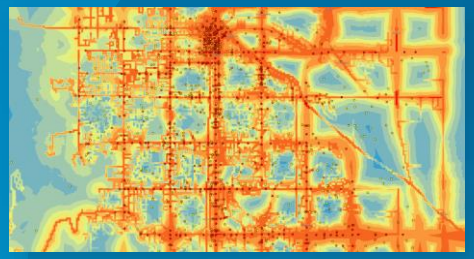
P,D

The 3 Stages of Data Science

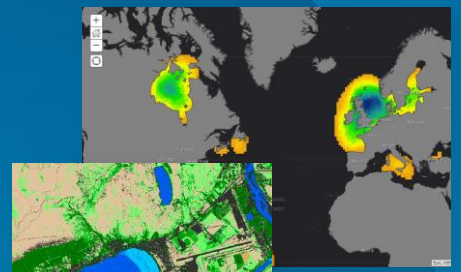


Machine Learning and Spatial Data Science

ArcGIS Machine Learning Tools



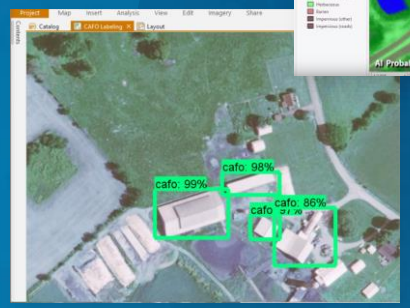
Empirical Bayesian Kriging Regression Prediction



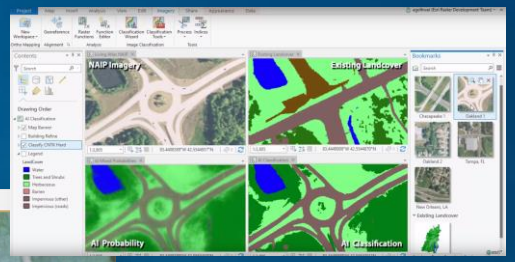
Random Trees

Clustering

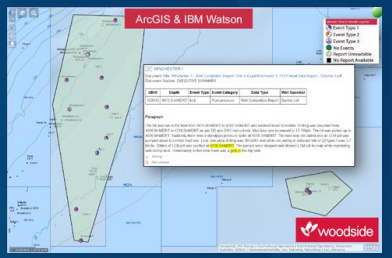
Integration with External Machine Learning Frameworks



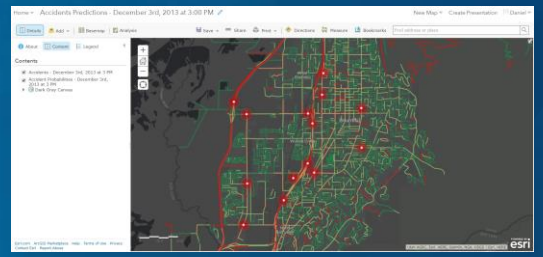
TensorFlow – NAIP Feature Identification



CNTK – NAIP Image Classification



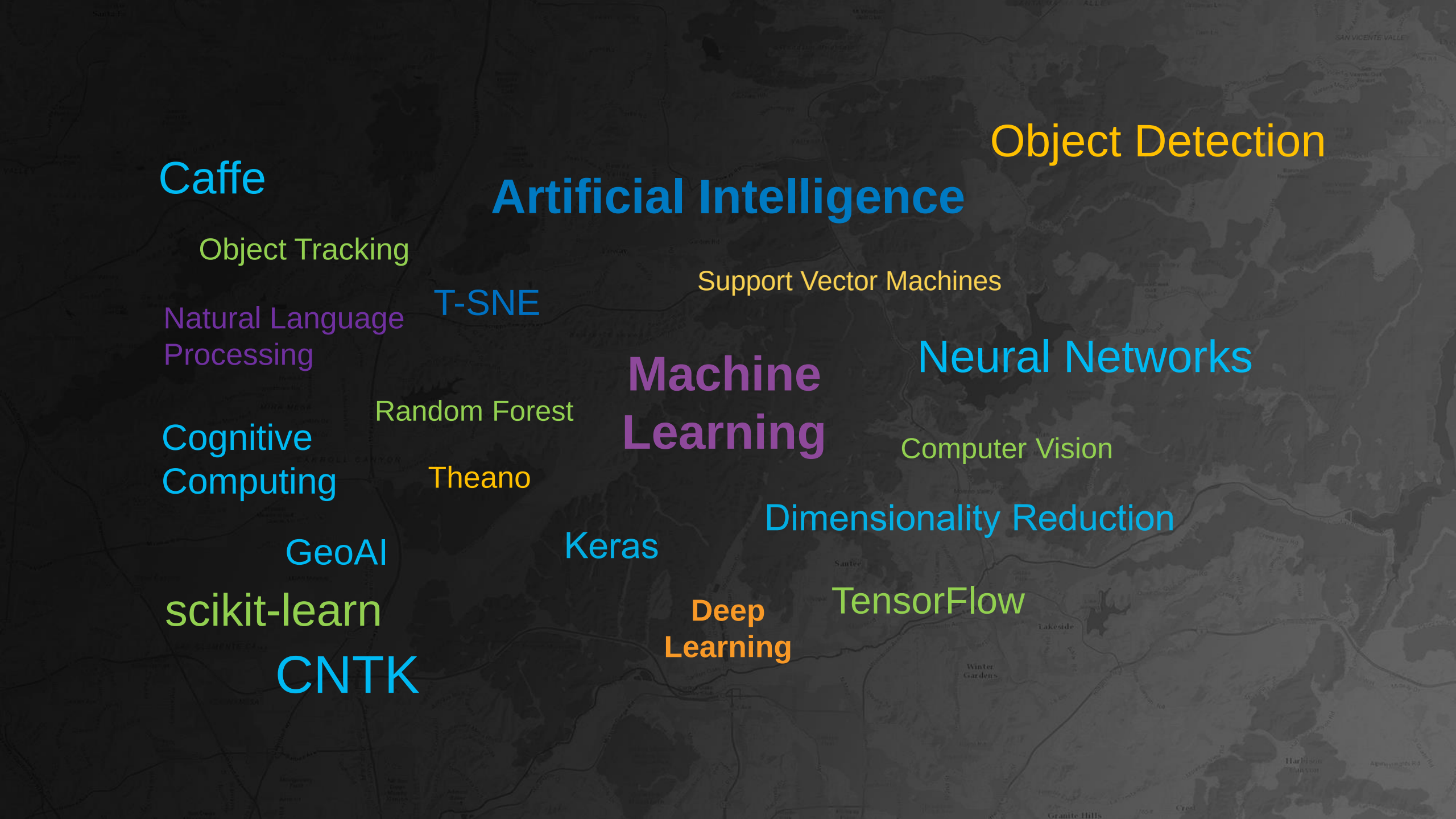
IBM Watson – Woodside Energy, Ltd.



scikit-learn – Traffic Accident Prediction

Providing Rich Geospatial Contextual Information

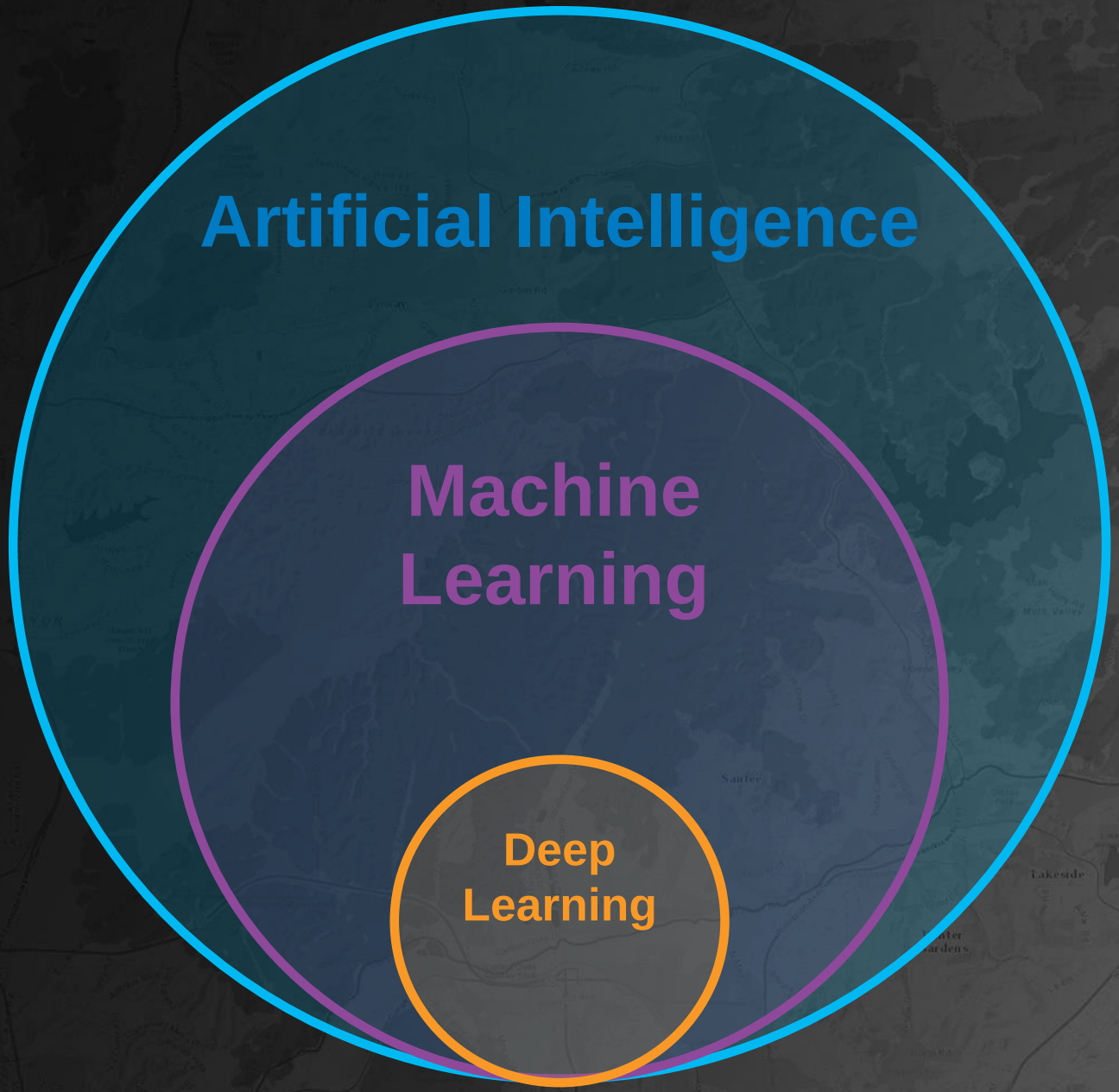
Adding Explanatory Variables to Predictive Analytics

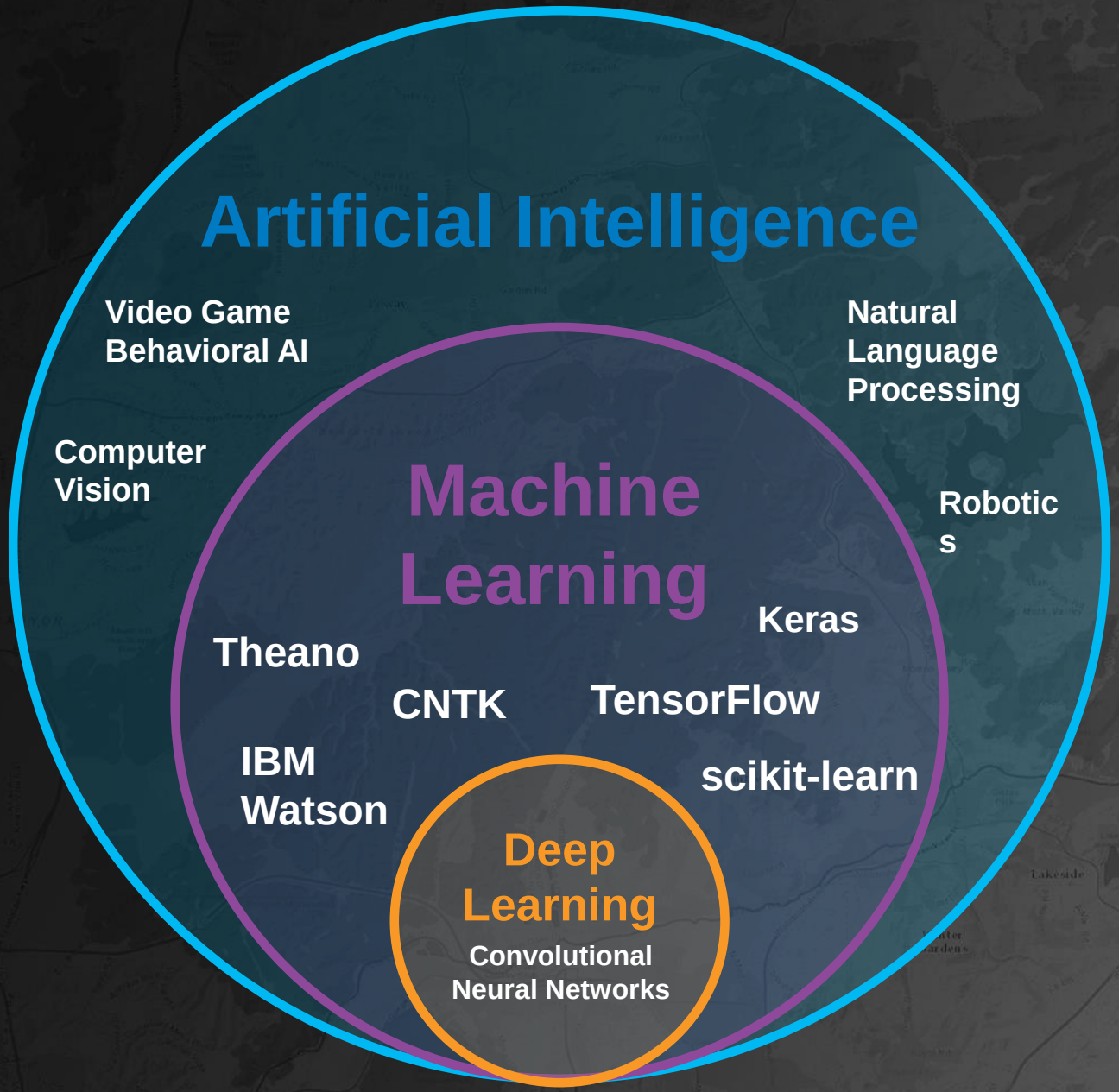

Object Detection
Caffe
Artificial Intelligence
Object Tracking
Support Vector Machines
T-SNE
Natural Language Processing
Neural Networks
Machine Learning
Random Forest
Cognitive Computing
Computer Vision
Theano
Dimensionality Reduction
Keras
GeoAI
TensorFlow
scikit-learn
Deep Learning
CNTK

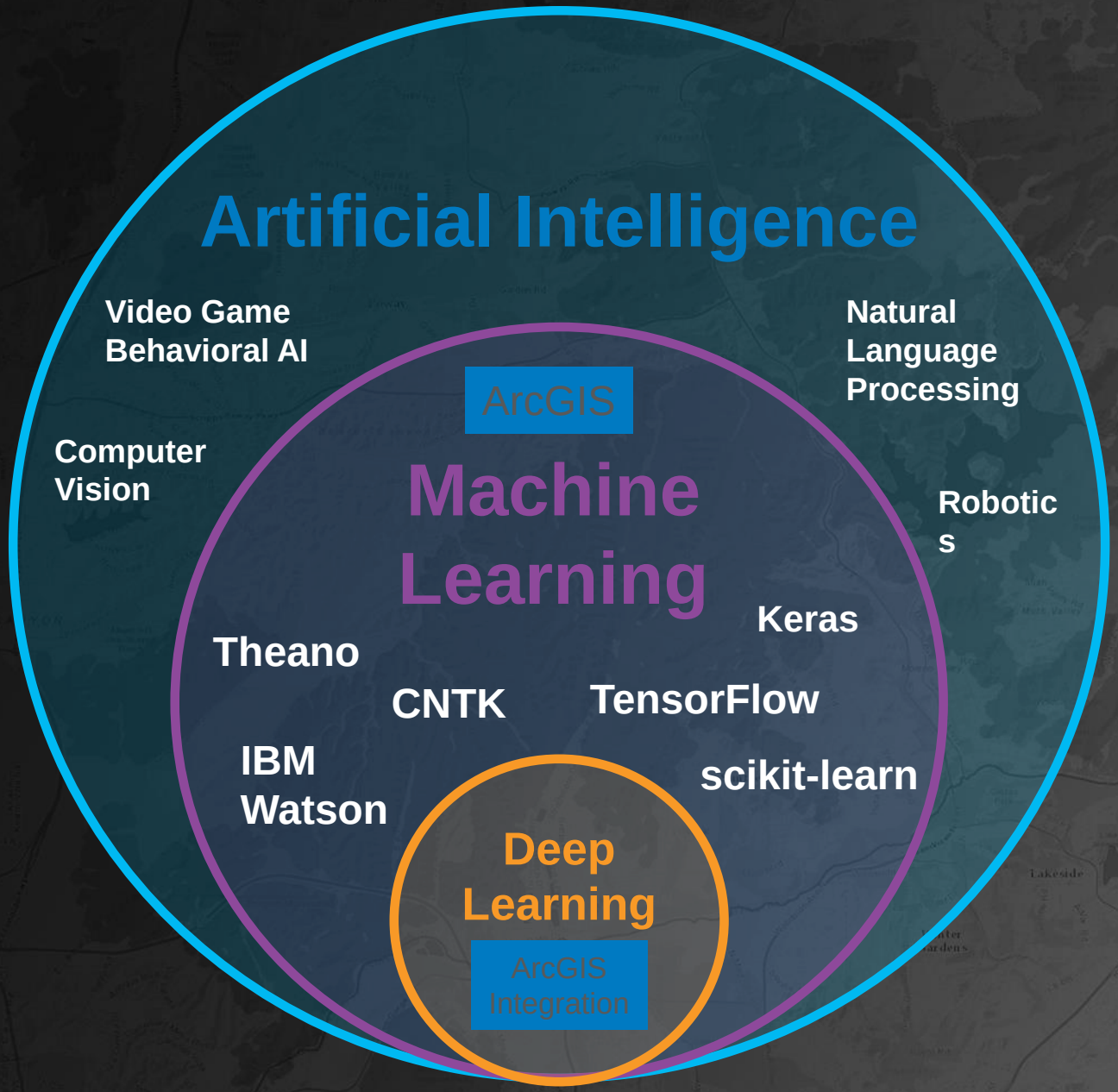
Artificial Intelligence

Machine Learning

Deep Learning


Artificial Intelligence
Machine Learning
Deep Learning


Artificial Intelligence
Video Game
Behavioral AI
Natural
Language
Processing
Computer
Vision
Robotic
s
Machine
Learning
Keras
Theano
CNTK
TensorFlow
IBM
Watson
scikit-learn
Deep
Learning
Convolutional
Neural Networks


Artificial Intelligence
Video Game Behavioral AI
Natural Language Processing
Computer Vision
Robotics
ArcGIS
Machine Learning
Keras
Theano
CNTK
TensorFlow
IBM Watson
scikit-learn
Deep Learning
ArcGIS Integration

Use **ArcGIS** with **Machine Learning** to **Predict** Accident Probability Per Hour per Segment in Utah

What would Cause an Accident?

Temperature
Sun, Mon, Fri..

Wind Speed
Fast, Slow..

Visibility
High/Low

Snow Depth
High/Low

Day of the Week
Sun, Mon, Fri..

Time of the Day
12:45, 23:00

Month
Feb, Dec..

Road Width
20-30 M

Road Alignment
Straight / Curved

Proximity to
Intersections

Speed Limit
120 km/h

Sun Direction
East, West

Daily Traffic
AADT

Proximity to
Billboards

...

10s of Variables

7 Years of Data
400,000 Accidents
500,000 Segments

Impossible to Manually Analyze

Train a Machine to do?

GeoAI Project Lifecycle

Spatial Data Exploration

How is the Data distributed Spatially?

Any Spatial Patterns of interest?

Spatial Data Preparation

Example: Snapping Car Crashes to Road Links, Geo-enrichment

Spatial Feature Extraction

Example: Road Curvature, Number of Lanes, Proximity to Crossroads

Feature Engineering

Exploring Input Feature Correlation with the Output Feature. Feature Selection Techniques

Model Development

Iterating with different Models. Choosing Models per Matric of choice (e.g. RMSE)

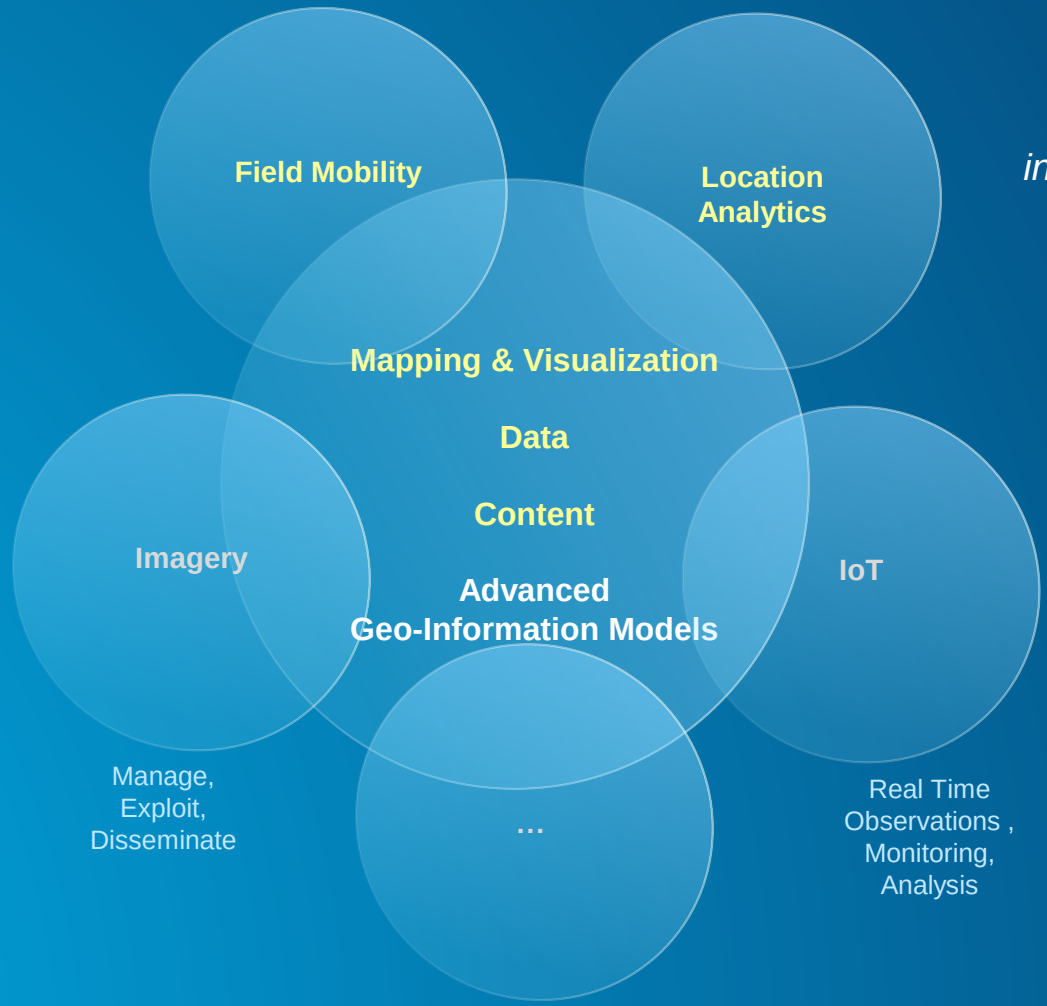
Spatial Action Facilitation

Facilitating Post-Prediction Actions E.g.: Optimizing Ambulance Allocation based on Crash Prediction

ArcGIS | has well defined capabilities that work synergistically together

Experience, Apps, APIs

ArcGIS Enterprise
*includes **all** capabilities*



ArcGIS Online / SaaS
includes capabilities in yellow


esri Suisse
THE SCIENCE OF WHERE™