

Hunting Dinosaurs with Intel Accelerated Technologies

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intel®



NEED CROPPED VIDEO WITH NO BLACK

tion: Dinosaur Adventure!

Video 1 (01ExcitementDiscovery...)



Register And Login Here

Intel DevCloud

Register Using QR Code

Click Jupyter Icon link to sign in

https://devcloud.intel.com/oneapi/get_started/

Connect with Jupyter* Lab



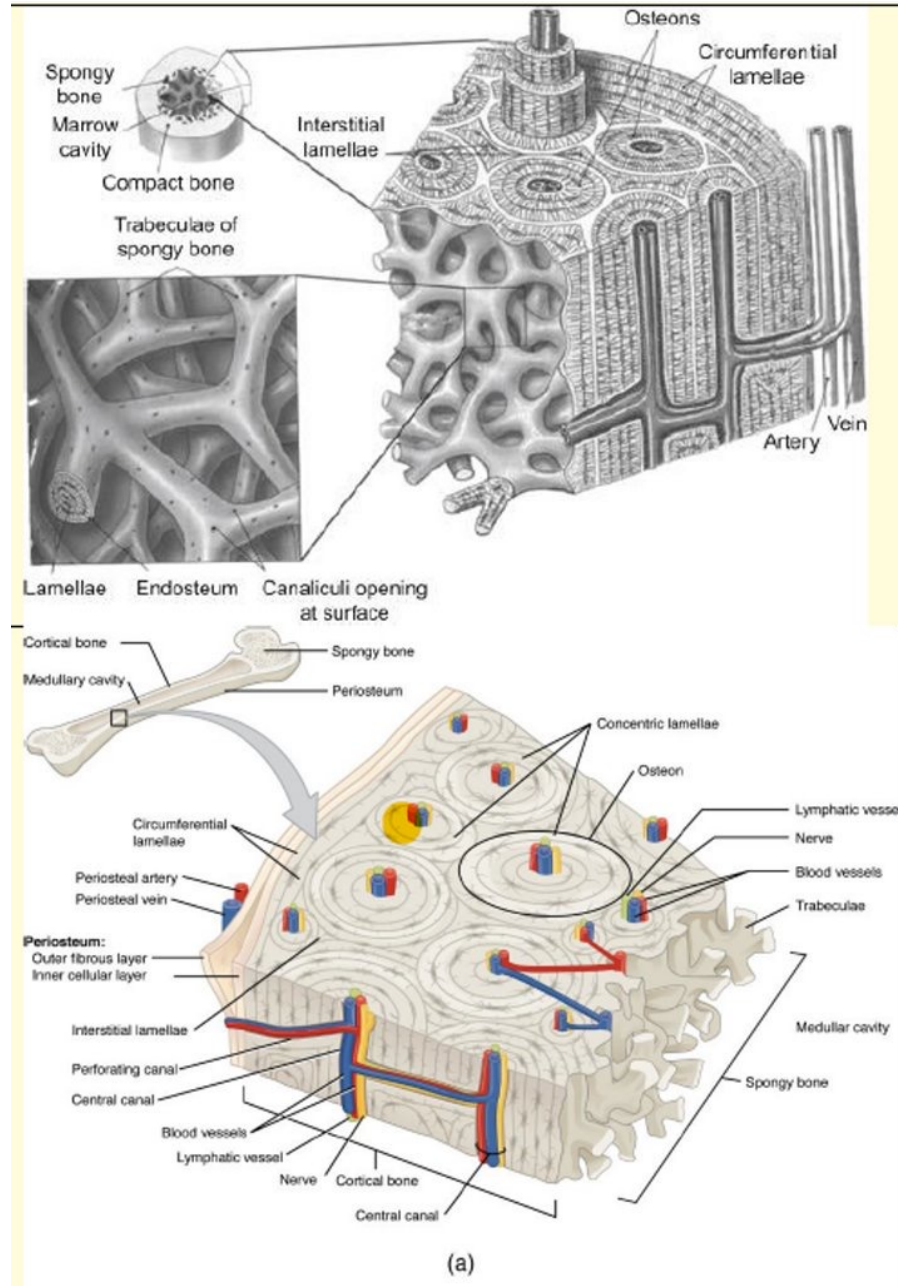
Connect with Jupyter* Notebook

Use Jupyter Notebook to learn about how oneAPI can solve the challenges of programming in a heterogeneous world and understand the Data Parallel C++ (DPC++) language and programming model.

[Sign in to Connect](#)

How Do You Know if It's Dinosaur Bone?

Texture



How Do You Know if It's Dinosaur Bone?

Shape/ Context



Not All Fossils Are Bone



Shark Teeth



Petrified Wood



Crocodilian Skutes

Depositional Environment from the Ground

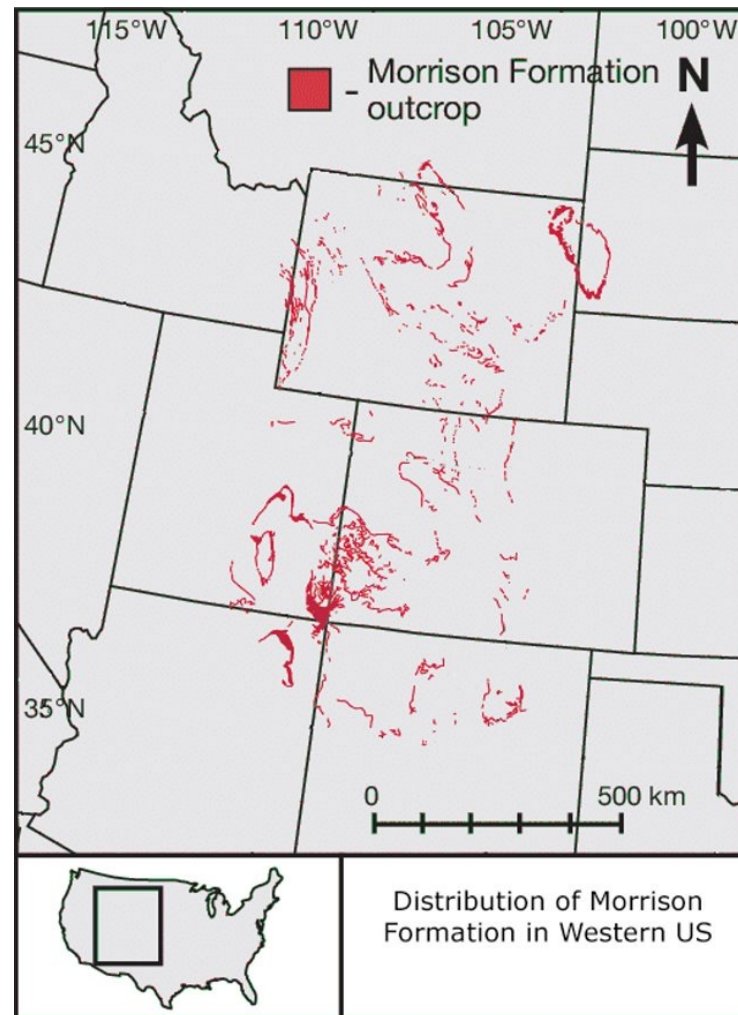


Depositional Environment from the Air

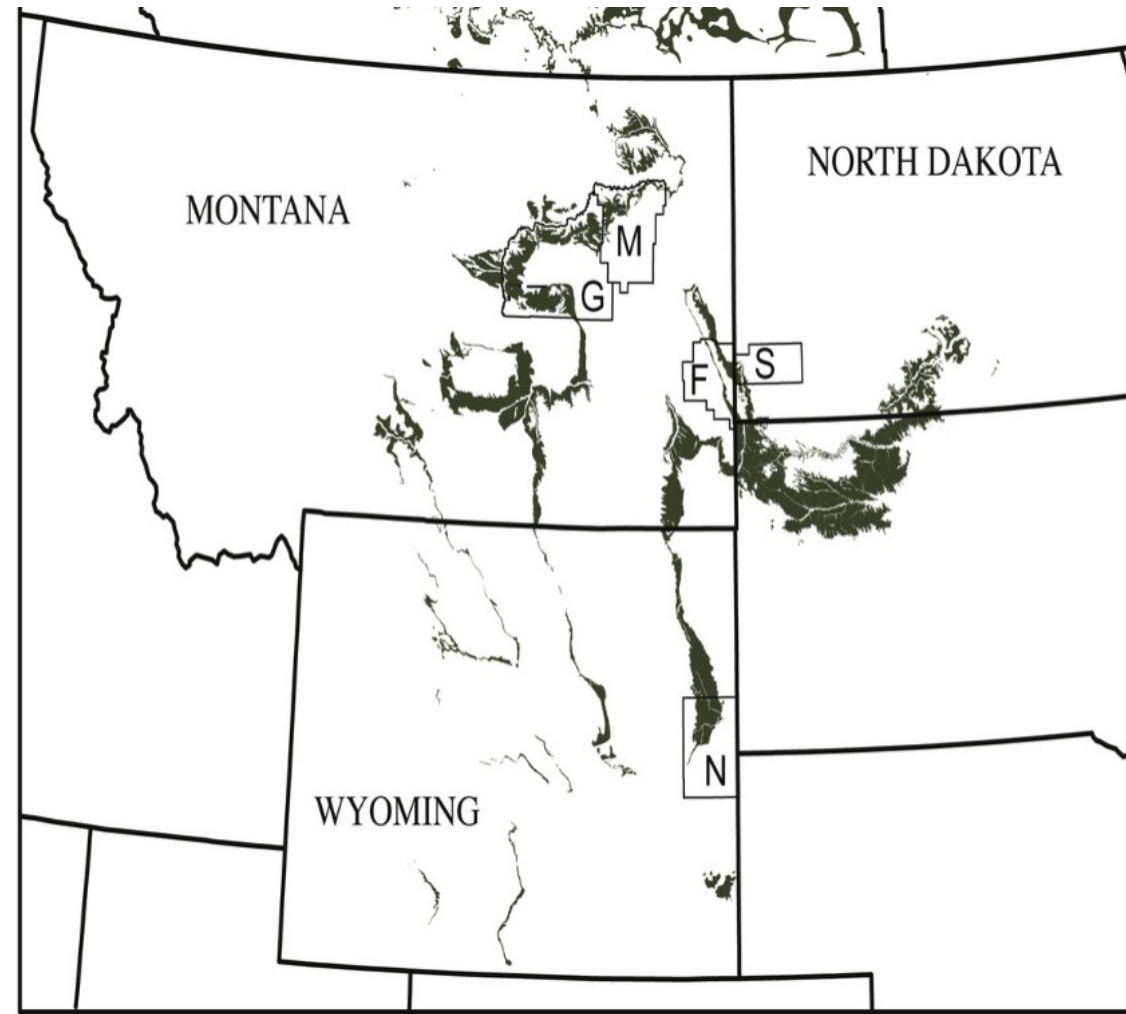


Where Do You Find Dinosaur Bones?

Morrison Formation



Hell Creek Formation



Create a Dinosaur Site Treasure Map

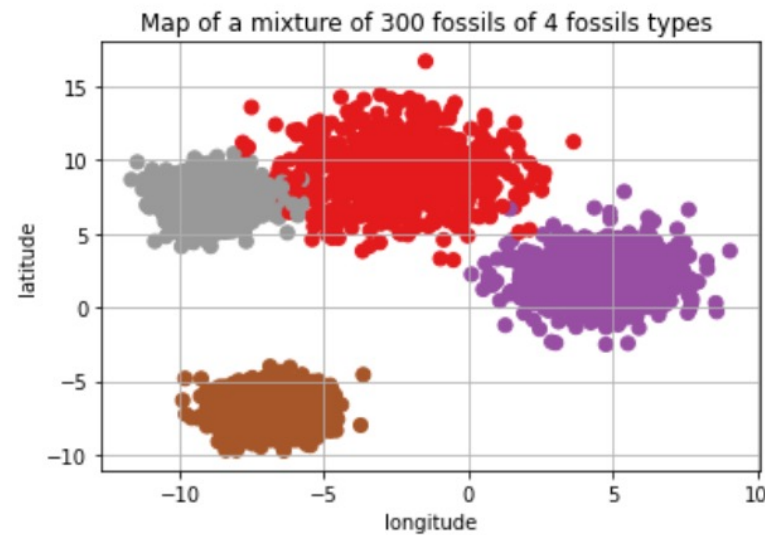
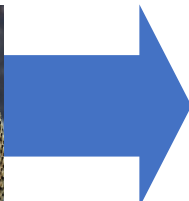


Collect

Create a Dinosaur Site Treasure Map



Collect

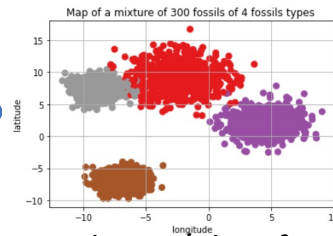


Cluster/Classify
Tabular

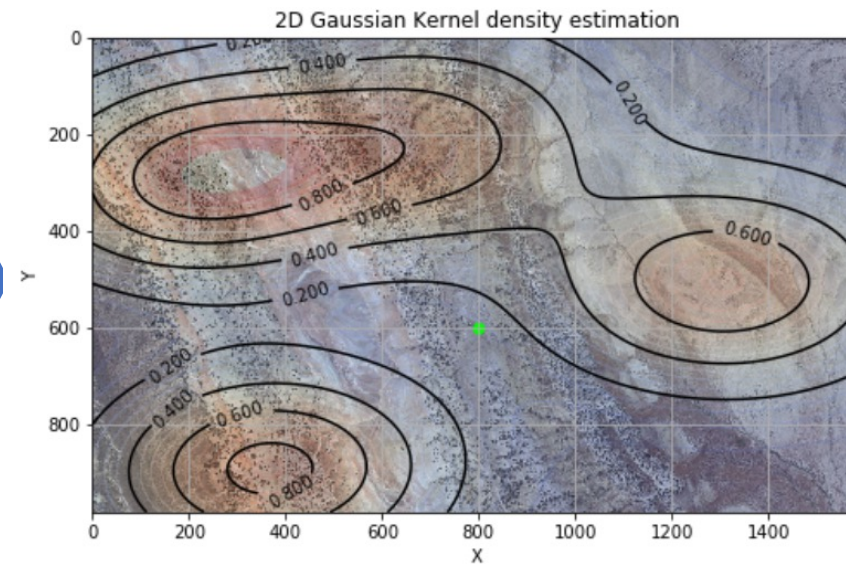
Create a Dinosaur Site Treasure Map



Collect

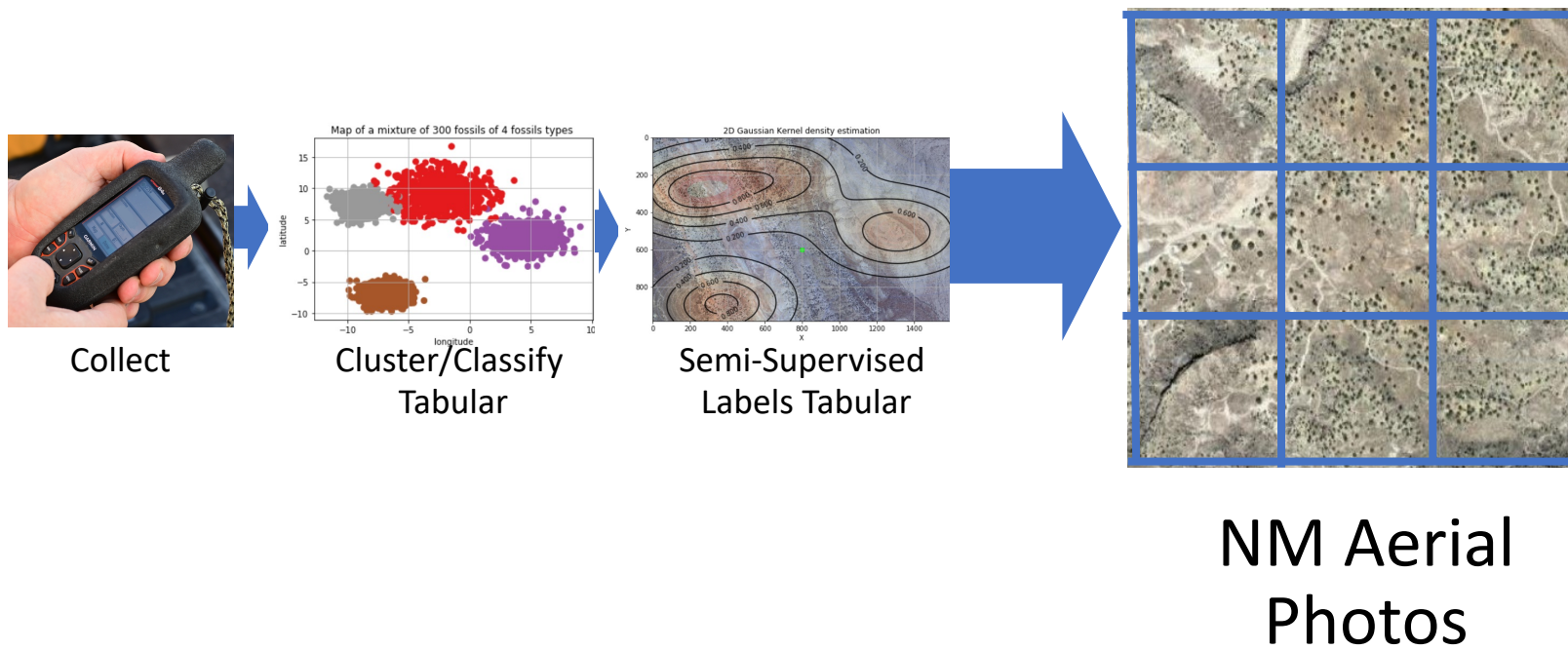


Cluster/Classify
Tabular



Semi-Supervised
Labels Tabular

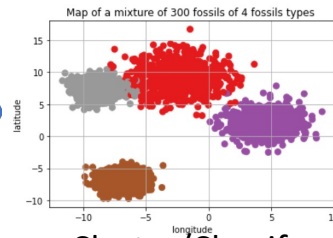
Create a Dinosaur Site Treasure Map



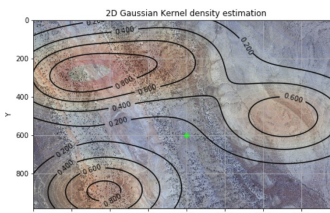
Create a Dinosaur Site Treasure Map



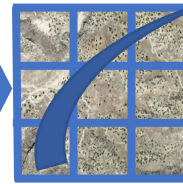
Collect



Cluster/Classify
Tabular



Semi-Supervised
Labels Tabular

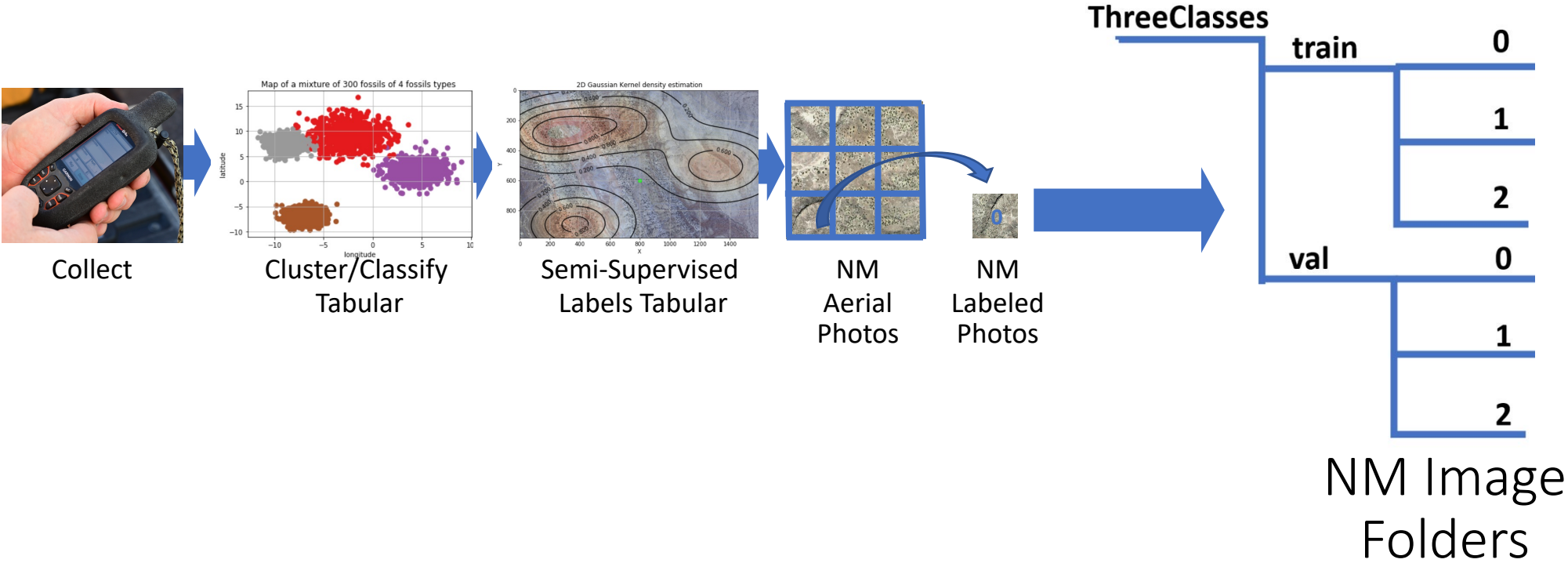


NM
Aerial
Photos



NM
Labeled
Photos

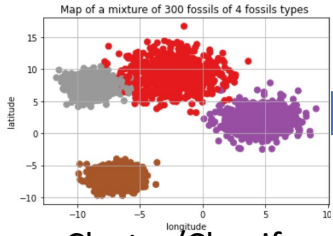
Create a Dinosaur Site Treasure Map



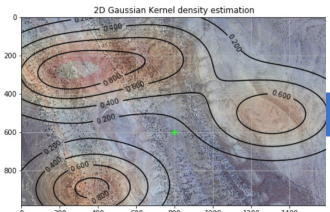
Create a Dinosaur Site Treasure Map



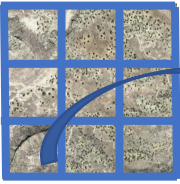
Collect



Cluster/Classify
Tabular



Semi-Supervised
Labels Tabular



NM
Aerial
Photos



NM
Labeled
Photos

ThreeClasses

train	0
	1
	2
val	0
	1
	2

NM
Image
Folders

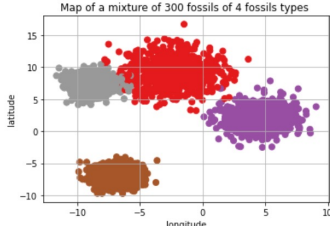
Train Resnet
Model on CPU

NM
Trained
Model

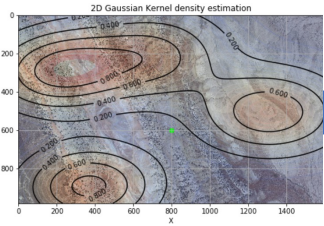
Create a Dinosaur Site Treasure Map



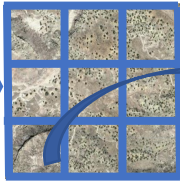
Collect



Cluster/Classify
Tabular



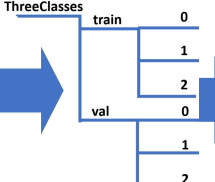
Semi-Supervised
Labels Tabular



NM
Aerial
Photos



NM
Labeled
Photos



NM
Image
Folders

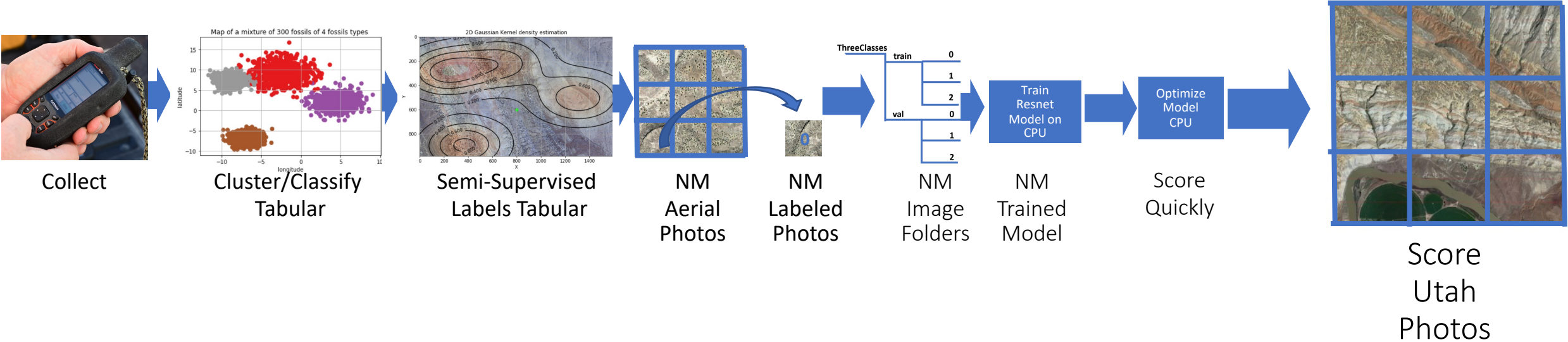
Train Resnet
Model on
CPU

NM
Trained
Model

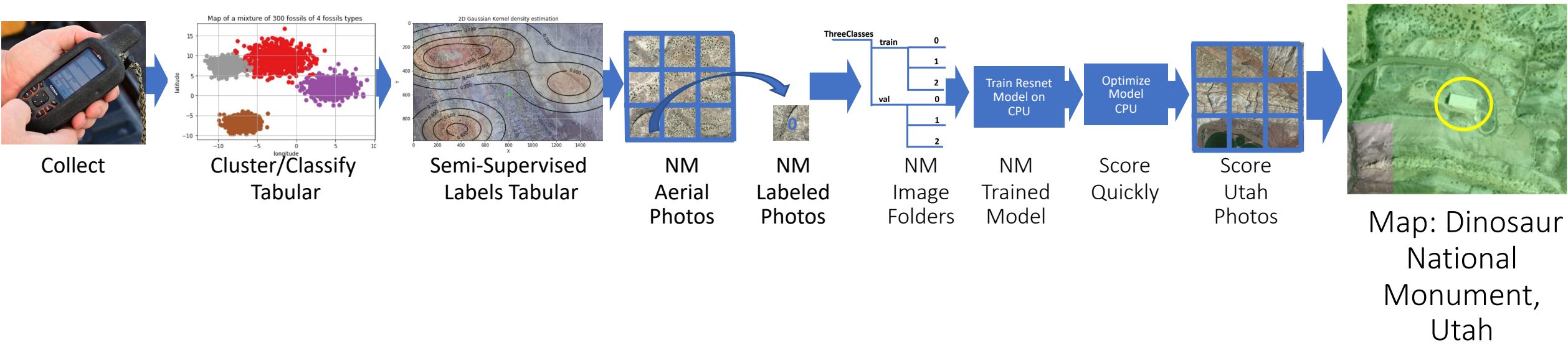
Optimize Model
CPU

Score
Quickly

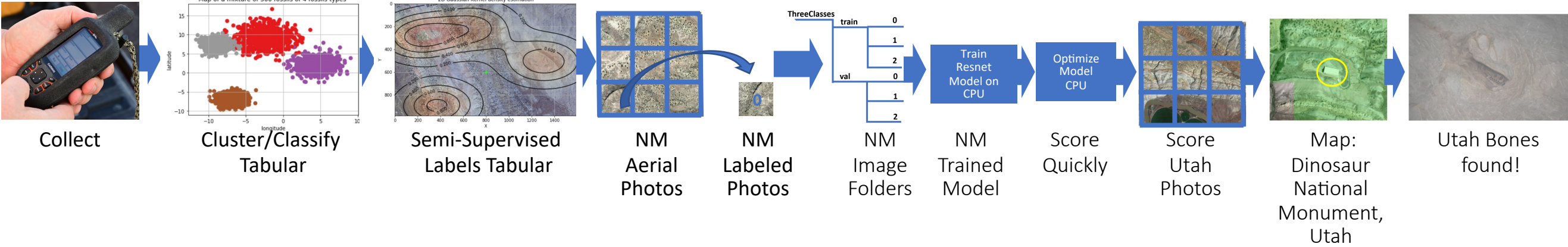
Create a Dinosaur Site Treasure Map



Create a Dinosaur Site Treasure Map



Create a Dinosaur Site Treasure Map



Live Demo

Intel AI Software Portfolio

Ecosystem and Partners

Data



Model



Deploy

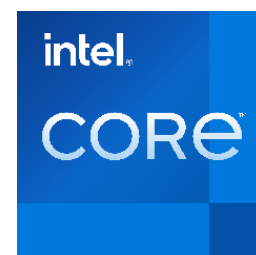


Model Serving

Secure AI



Open, Standards-Based Programming Model and AI Libraries



Intel AI Software Portfolio

Ecosystem and Partners

Data



Model



Deploy

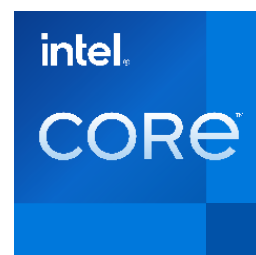


Model Serving

Secure AI



Open, Standards-Based Programming Model and AI Libraries



Acceleration: Intel Extensions for Scikit-Learn

```
from sklearnex import patch_sklearn, unpatch_sklearn
patch_sklearn()

from sklearn.cluster import KMeans
```

PCA

K-Means

DBSCAN

SVC

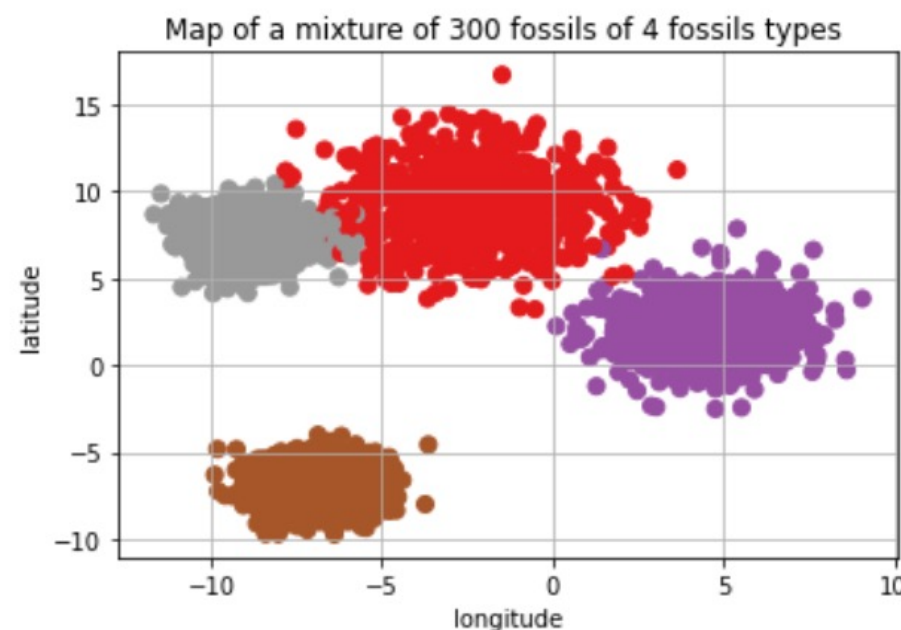
Random Forest

K Nearest Neighbor

Logistic Regression

Linear Regression

Most of the usual suspects!



Training on CPU: Resnet 18 PyTorch

Intel Extension for PyTorch

For this workshop: IPEX channel last applied to the model

```
import intel_extension_for_pytorch as ipex

def _to_ipx(self):
    """convert model and data to IPEX format."""
    self.model.train()
    self.model = self.model.to(memory_format=torch.channels_last)
    self.model, self.optimizer = ipex.optimize(
        self.model, optimizer=self.optimizer, dtype=torch.float32
    )
```

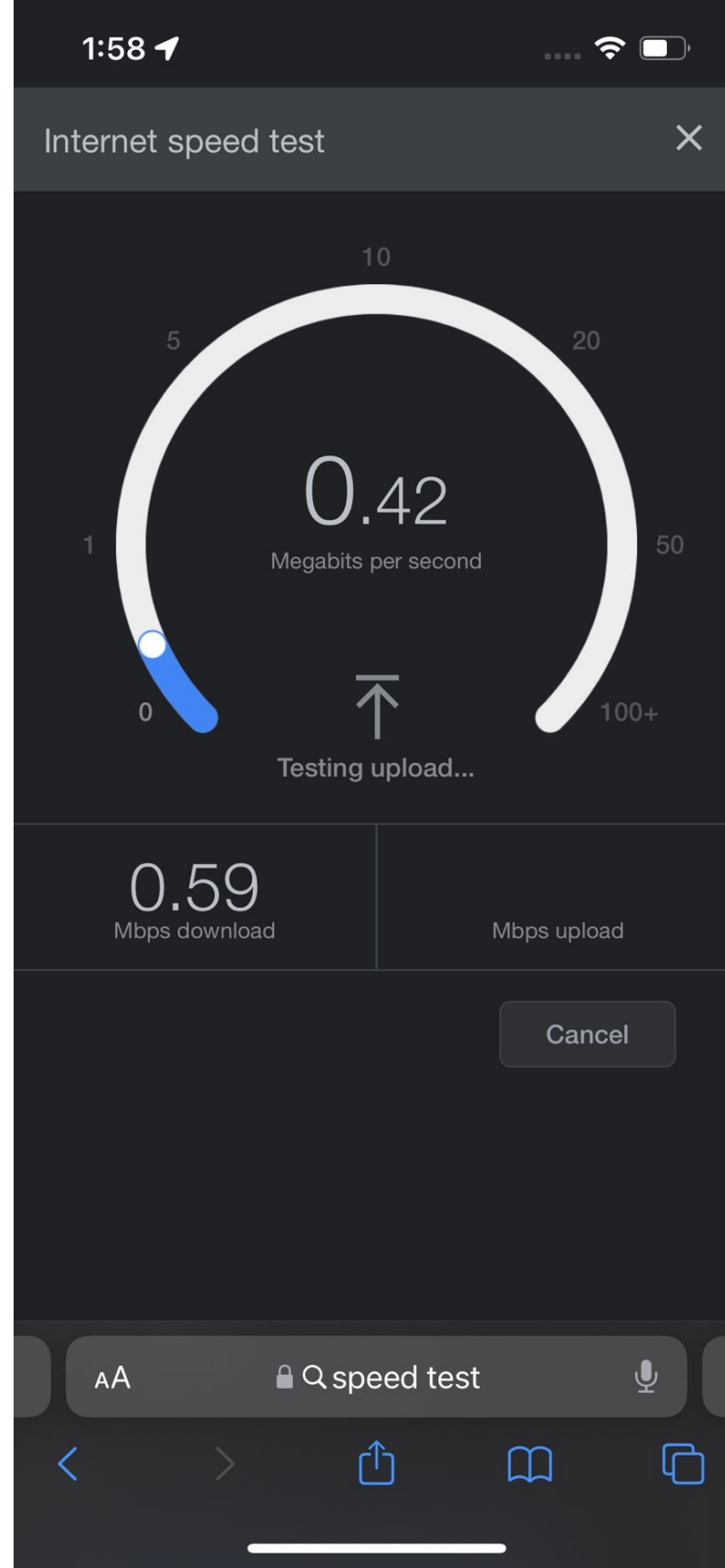
Save our model: resnet18-Gold20220530.pt

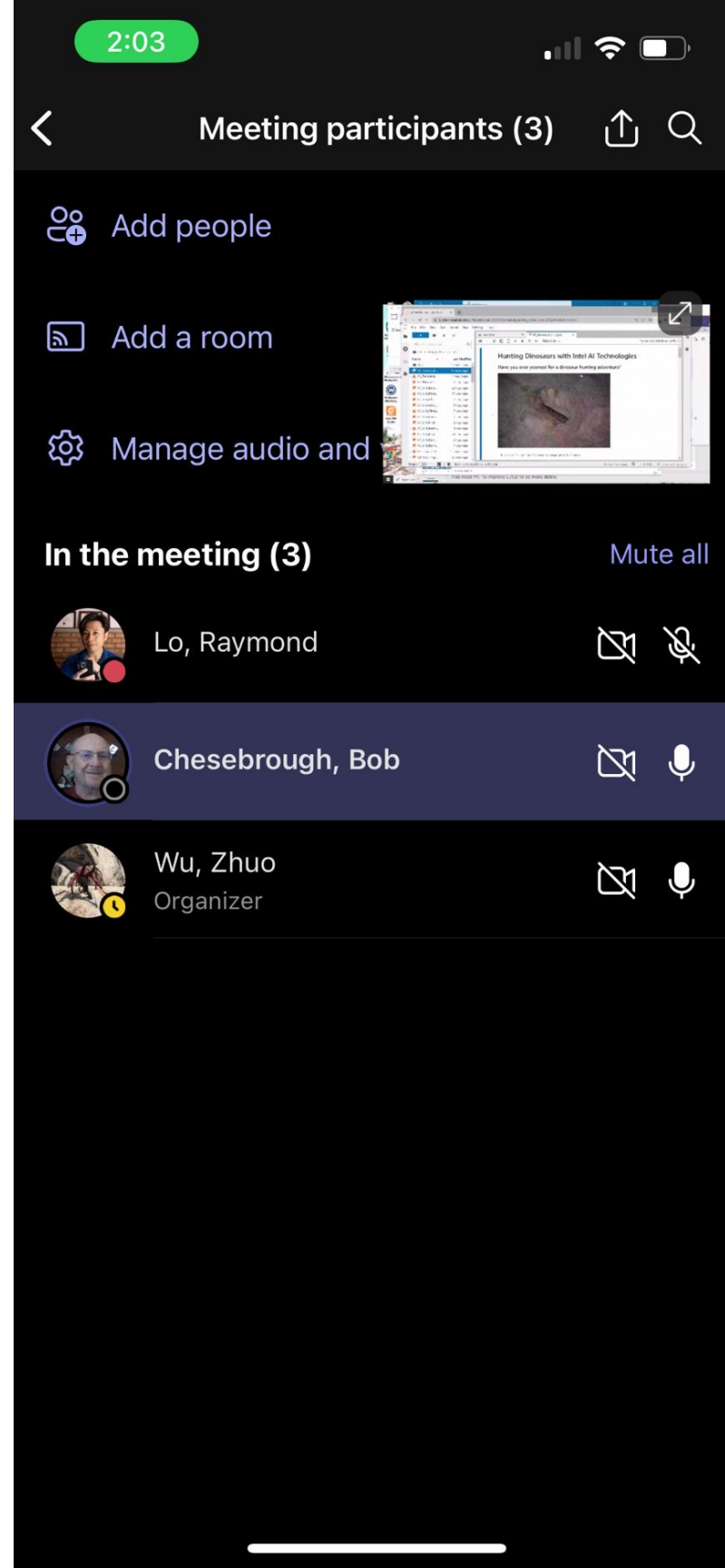




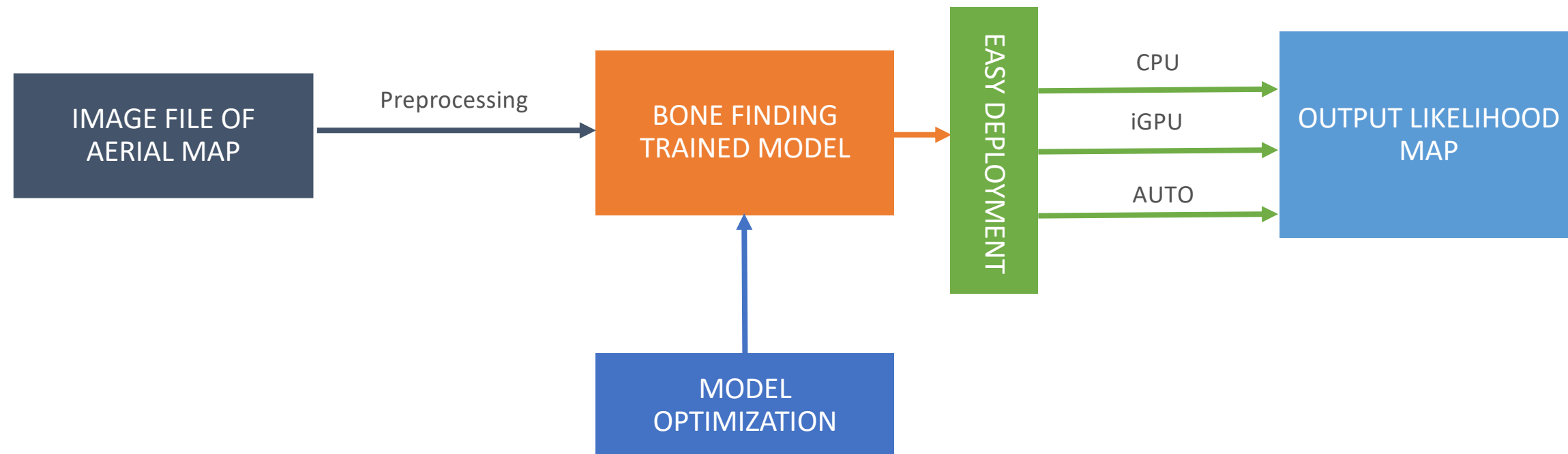








Pipeline of Deep Learning Optimization and Inference Acceleration with OpenVINO



OpenVINO™

Visual
+
NLP, Audio...
and
Neural
Network
Optimization
Inference

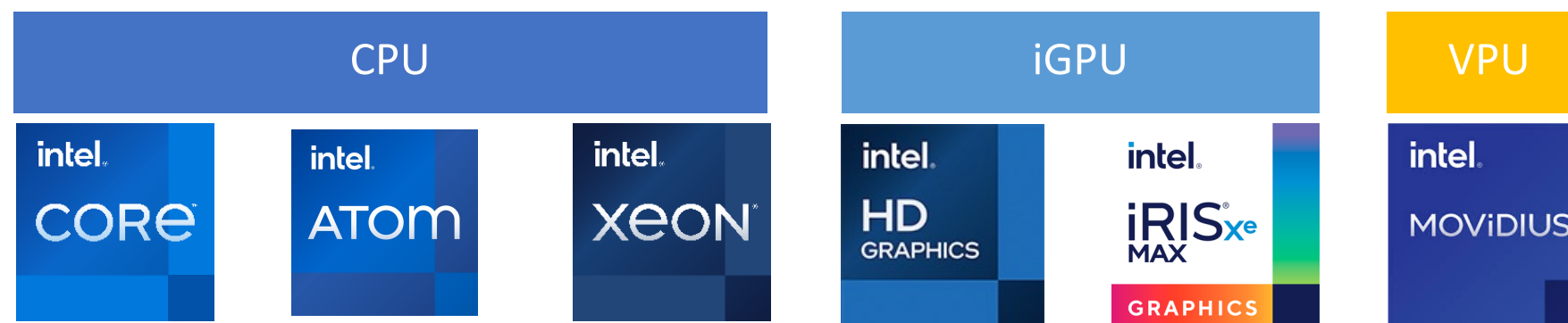


Powered by oneAPI



OpenVINO™

Optimized Performance



Windows

Linux

macOS

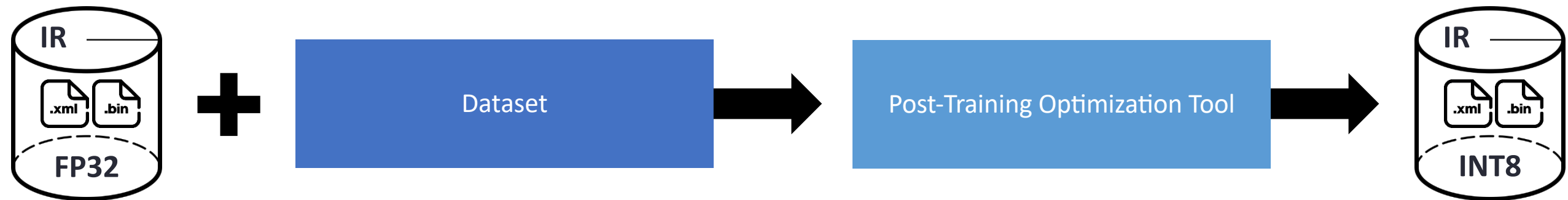
Model Optimizer



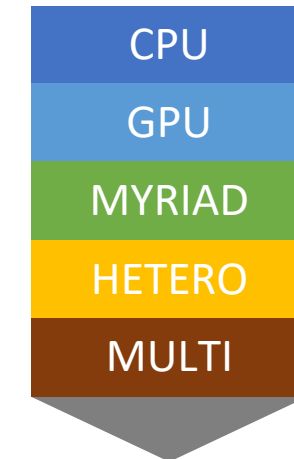
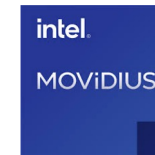
```
$ mo --input_model model.onnx  
    --data_type FP32
```



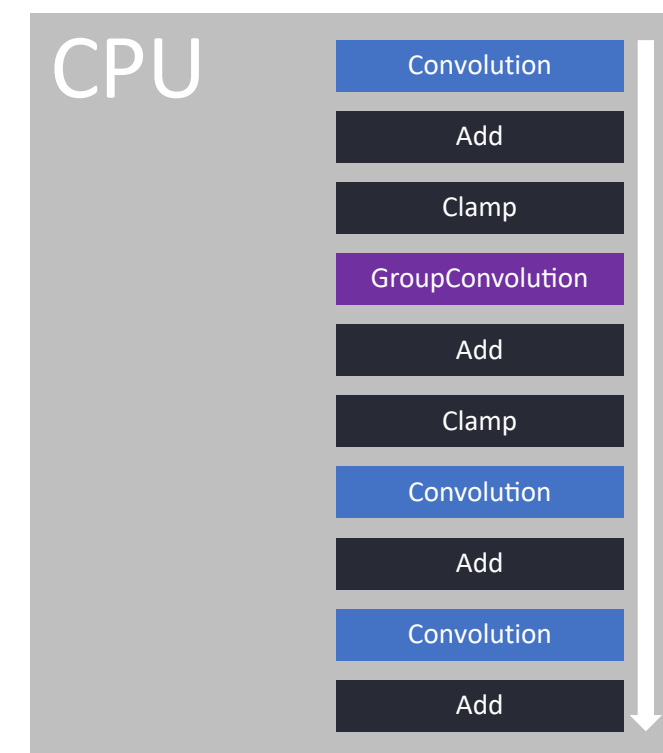
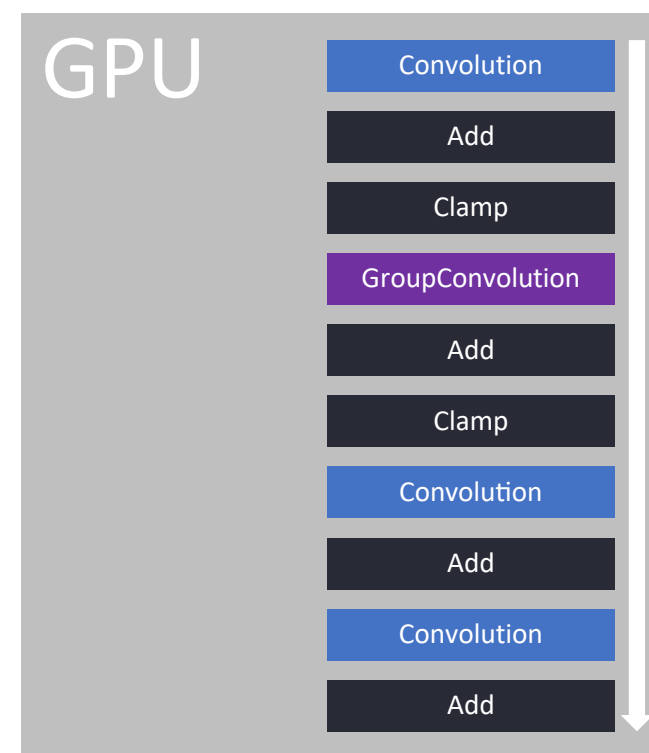
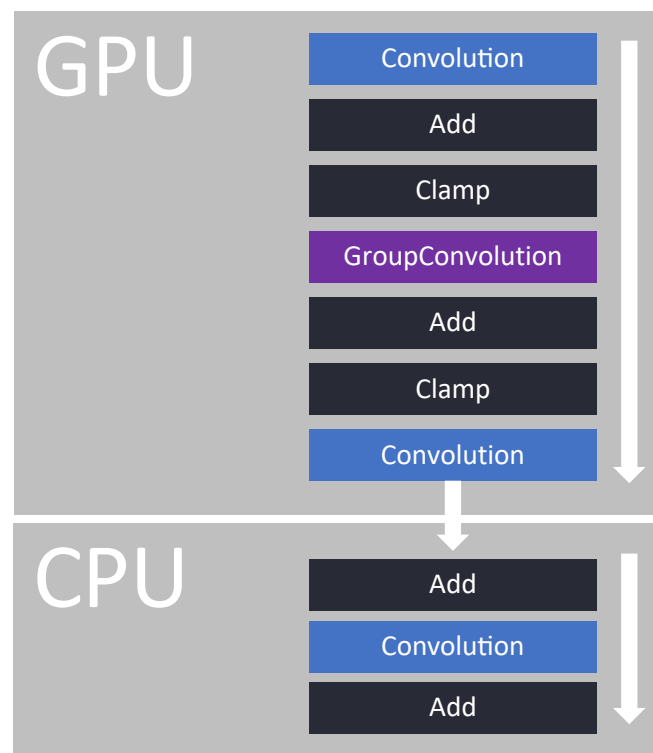
Post-Training Optimization Tool (POT)



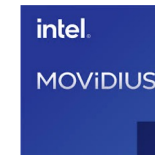
Supported Devices for Easy Deployment



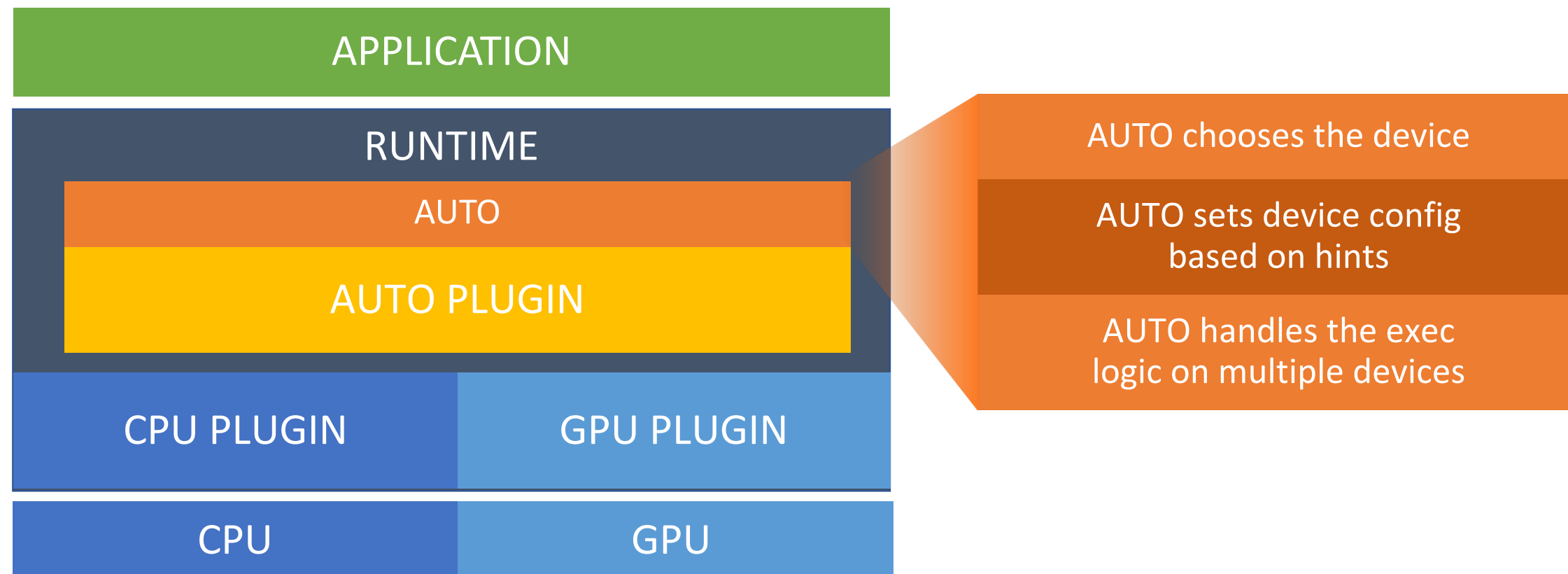
```
compiled_model = core.compile_model(model=model, device_name="CPU")
```



AUTO Device for Easy Deployment



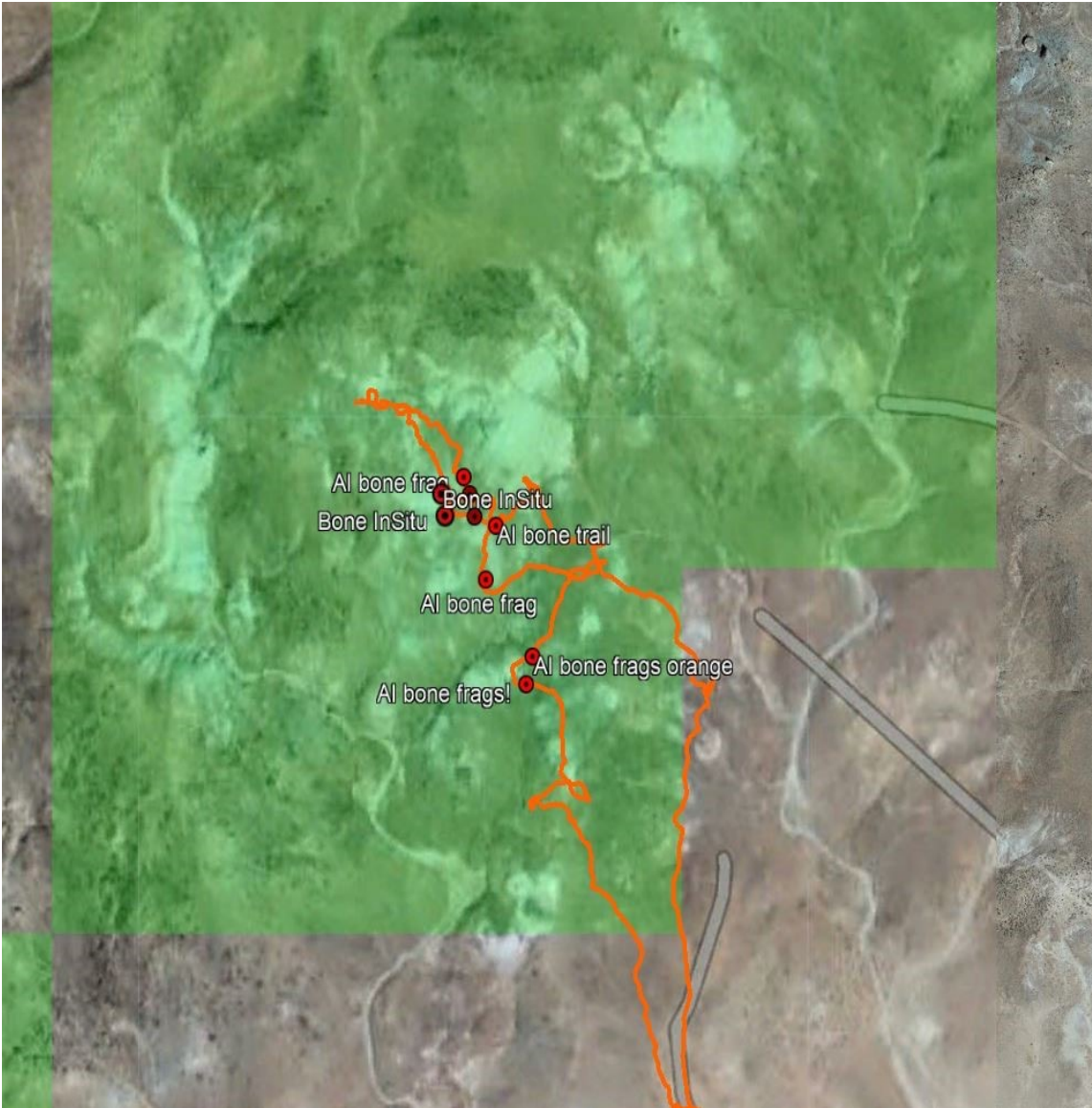
```
compiled_model = core.compile_model(model=model, device_name="AUTO")
```



Live Demo

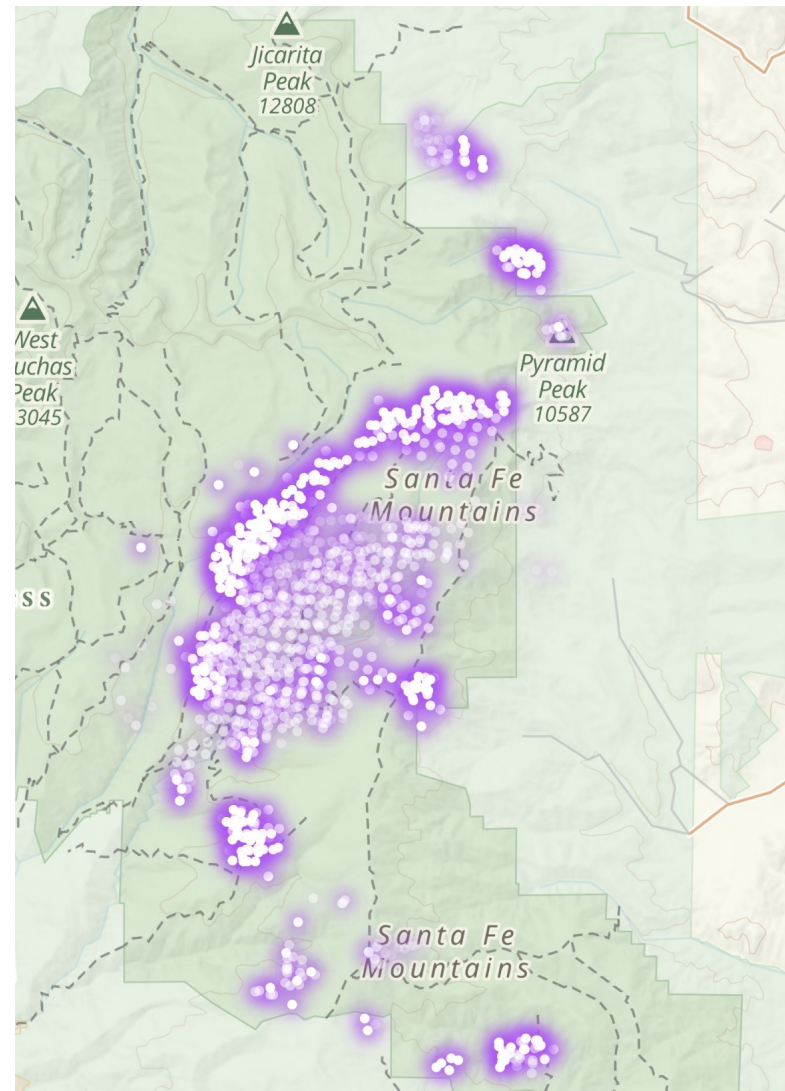
NEED CROPPED VIDEO WITH NO BLACK

and Field Test an AI Map



Other Application Areas

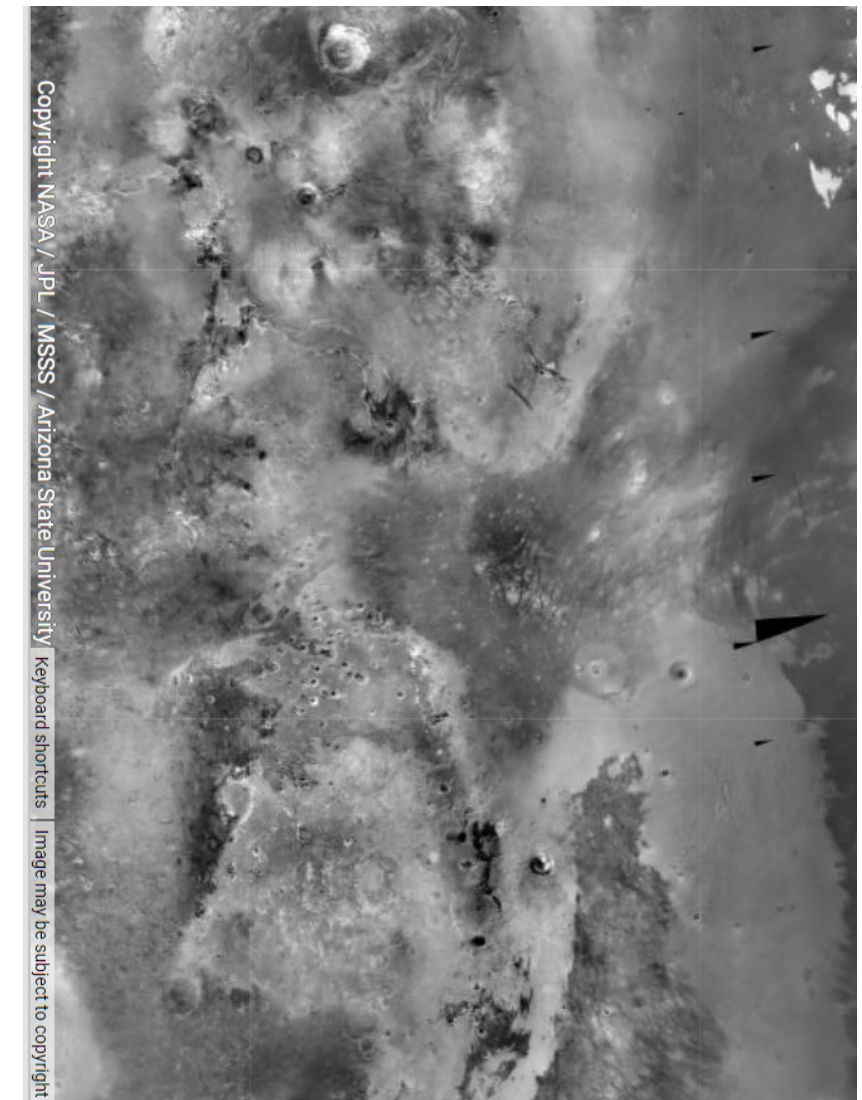
Fire Prevention



Energy Production / Regulatory



Planetary Exploration: Water/ Life



Obey All Laws!

**Collecting vertebrate fossils
from Federal and State or other
public lands is **ILLEGAL** !**

**Collecting fossils from private lands requires
permission of the landowner !**

**If you find suspected vertebrate fossils **DO
NOT TAKE THEM.****

Record their position

Photograph them

Video them to get a sense of
the 3D nature of the sample

Report it to a paleontologist at a
nearby museum or University.

Download and Install the Intel® AI Analytics Toolkit

Intel AI
Analytics Toolkit:



Intel Extensions for
Scikit-Learn specifically



Getting Started Intel
Extensions for Scikit-learn



Intel® AI Analytics Toolkit Notebooks

Get code from Github and data from Dropbox

```
# Step 1: For Laptop: Create the Environment
$ python3 -m venv aianalyticstoolkit_env
$ source aianalyticstoolkit_env/bin/activate

# Step 2: For DevCloud or Laptop: Clone the Repository
$ git clone https://github.com/IntelSoftware/Jurassic.git
$ cd Jurassic

# Step 3: For DevCloud or Laptop: Install requirements
$ python -m pip install --upgrade pip
$ pip install -r requirements.txt

# Step 4: Download data
$ cp /data/oneapi_workshop/big_datasets/jurassic/jurassic.tar.gz .
$ mv jurassic data
```

OpenVINO Notebooks

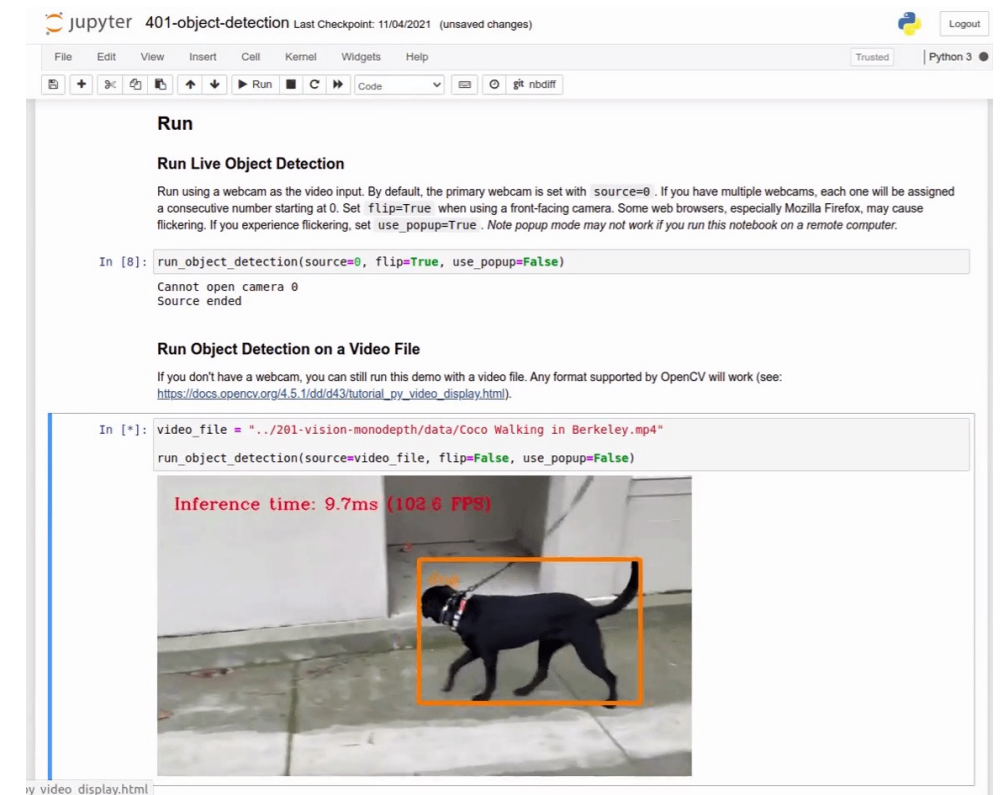


```
# Step 1: Create the Environment
$ python3 -m venv openvino_env
$ source openvino_env/bin/activate

# Step 2: Clone the Repository
$ git clone https://github.com/openvinotoolkit/openvino_notebooks.git
$ cd openvino_notebooks

# Step 3: Install requirements
$ python -m pip install --upgrade pip
$ pip install -r requirements.txt

# Step 4: Launch the Notebooks
$ jupyter lab
```



Call to Action

Accelerate your AI workloads today!

Enroll in Intel DevCloud

Download Intel AI Toolkit
and OpenVINO

Experiment with this AI approach:



Try it Yourself



github.com/openvinotoolkit/openvino_notebooks

A high-angle photograph of three paleontologists in a desert environment, working on a large fossilized skeleton embedded in the sand. The skeleton, which appears to be a large theropod, is partially excavated, showing the ribcage, spine, and a large, clawed foot. One person on the left, wearing a wide-brimmed hat and white gloves, is using a small tool to clear sand from the foot. Another person on the right is using a brush to clean the ribcage area. A third person is visible at the top, also working on the skeleton. Various excavation tools, including a trowel, a brush, and a small clear container with rocks, are scattered around the site. Small blue and white flags are used to mark specific points on the fossil. The scene is brightly lit, casting shadows on the sand.

Thank You