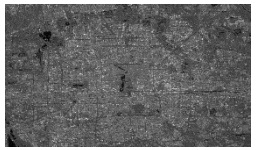
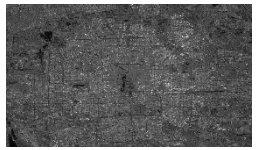
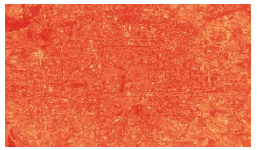
Sentinel Imagery on Google Earth Engine


Sentinel-1-VV


Sentinel-1-VH


Sentinel-2-RGB


Sentinel-2-NIR

1.1 Data export

ee.batch.Export.table.toCloudStorage (fileFormat= "TFRecord")

TFrecords on Google AI Platform

```
dataset = tf.data.TFRecordDataset(exportedFilePath)
featuresDict = {
  'B2': tf.io.FixedLenFeature(shape=[1], dtype=tf.float32),
  'B3': tf.io.FixedLenFeature(shape=[1], dtype=tf.float32),
  'B4': tf.io.FixedLenFeature(shape=[1], dtype=tf.float32),
  'B5': tf.io.FixedLenFeature(shape=[1], dtype=tf.float32),
  'B6': tf.io.FixedLenFeature(shape=[1], dtype=tf.float32),
  'B7': tf.io.FixedLenFeature(shape=[1], dtype=tf.float32),
  'landcover': tf.io.FixedLenFeature(shape=[1], dtype=tf.float32)
}
parsedDataset = dataset.map(lambda example: tf.io.parse_single_example(example, featuresDict))
```

2.2 Model Loading

ee.Model.fromAiPlatformPredictor

- projectName
- modelName
- version
- **inputTileSize**
- **inputOverlapSize**
- **proj, fixInputProj**
- outputBands

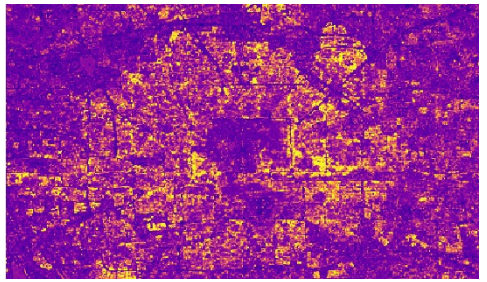
Multiple Input
Multiple Output
?

2.3 Prediction

ee.Model.predictImage(ee.Image)

Predicted results on Google Earth Engine


average building footprint


average building height

2.1 EEification

earthengine model prepare

GEE	AI Platform
Input name	Input array
Output name	Output band

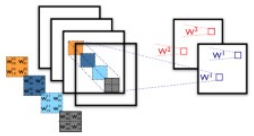
1.2 Training

tensorflow.keras.Model.fit()

ML models on Google AI Platform


Random Forest

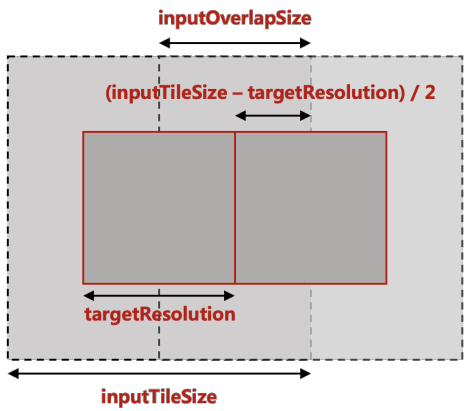
eXtreme Gradient Boosting


Convolutional Neural Networks (CNN)

Prediction with pretrained CNN models from SHAFTS on Google Cloud Infrastructures

1. **Google Earth Engine**
   a. Sentinel-1/2 image
   b. SRTM data

image patching



2. **Google Cloud Storage**
   a. patched TFRecord datasets

dataset

loading

3.1 **Google Cloud Storage**
   a. saved Tensorflow models

3.2 **Local machine**
   a. saved Tensorflow models

model loading

4. **Compute Engine**
   a. Tensorflow model instances

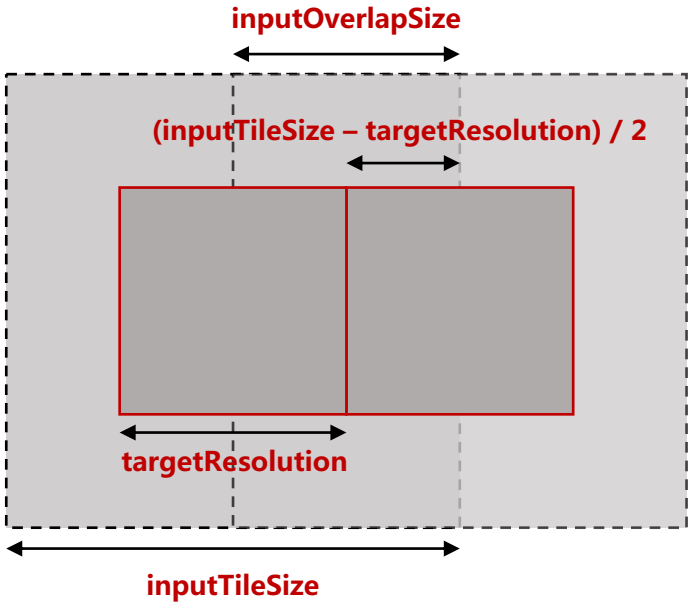
Note: The `Compute Engine` here can be a Google Virtual Machine, a Google Colab notebook or a local machine.

model

predicting

5. **Compute Engine**
   a. Predicted building height and footprint images

Prediction with pretrained CNN models from SHAFTS on Google Cloud Infrastructures


inputOverlapSize
(inputTileSize – targetResolution) / 2
targetResolution
inputTileSize

Resources