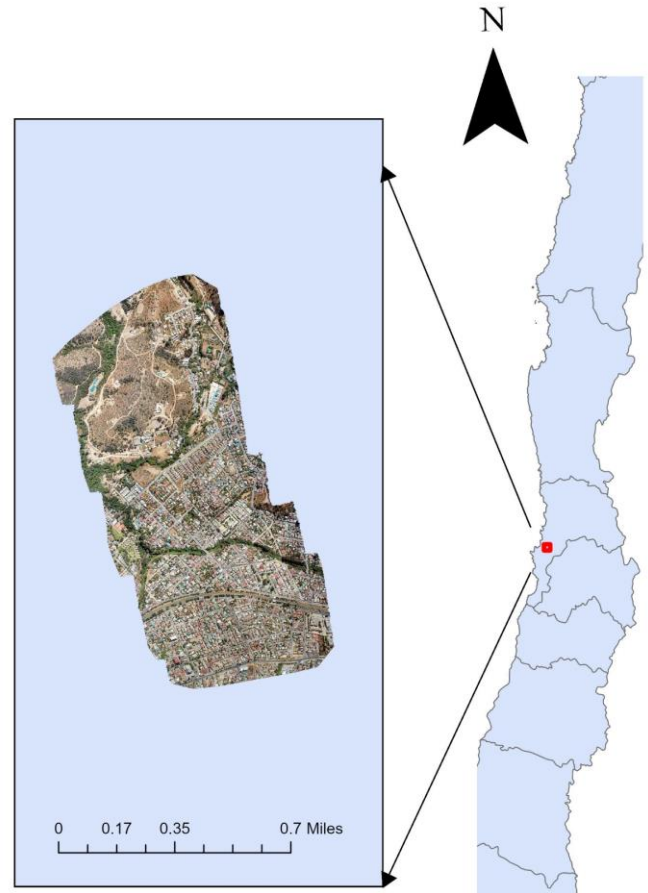
Swimming Pool Detection using Deep Learning

Yeamin Faria Chowdhury

Introduction

- Adding a swimming pool to a property increases the taxes that must be paid to the government.
- Government has to keep track with the recent land use developments, such as the addition of swimming pools to a property and the use of high-resolution drone imagery can be beneficial.
- In order to automate the process of swimming pool identification from drone imagery object identification using deep learning technique can be used.
- Object detection using deep learning is a fast and accurate means of detecting the location of objects in an image.
- Deep learning is a powerful machine learning technique in which object detector learns the required image features for completing the task.
- The objective of my study is to evaluate the automation process of swimming pool detection in drone-based image using the Deep Learning tools in ArcGIS Pro.

Study Site



Legend

Drone_Image.tif

RGB

Red: red

Green: green

Blue: blue

Chile Boundary

Data Collection

- I used open-source drone image from ‘Open Aerial Map’ website. The image is collected on 3rd March, 2023 and has a resolution of 13 cm.

- For pretrained data, I have used USA pool detection dataset from the ArcGIS Living Atlas of the World. It consists 8-bit, 3-band high resolution (5-30 centimeters) imagery and the model used the FasterRCNN model architecture

Creating Training Samples

Creating image chips

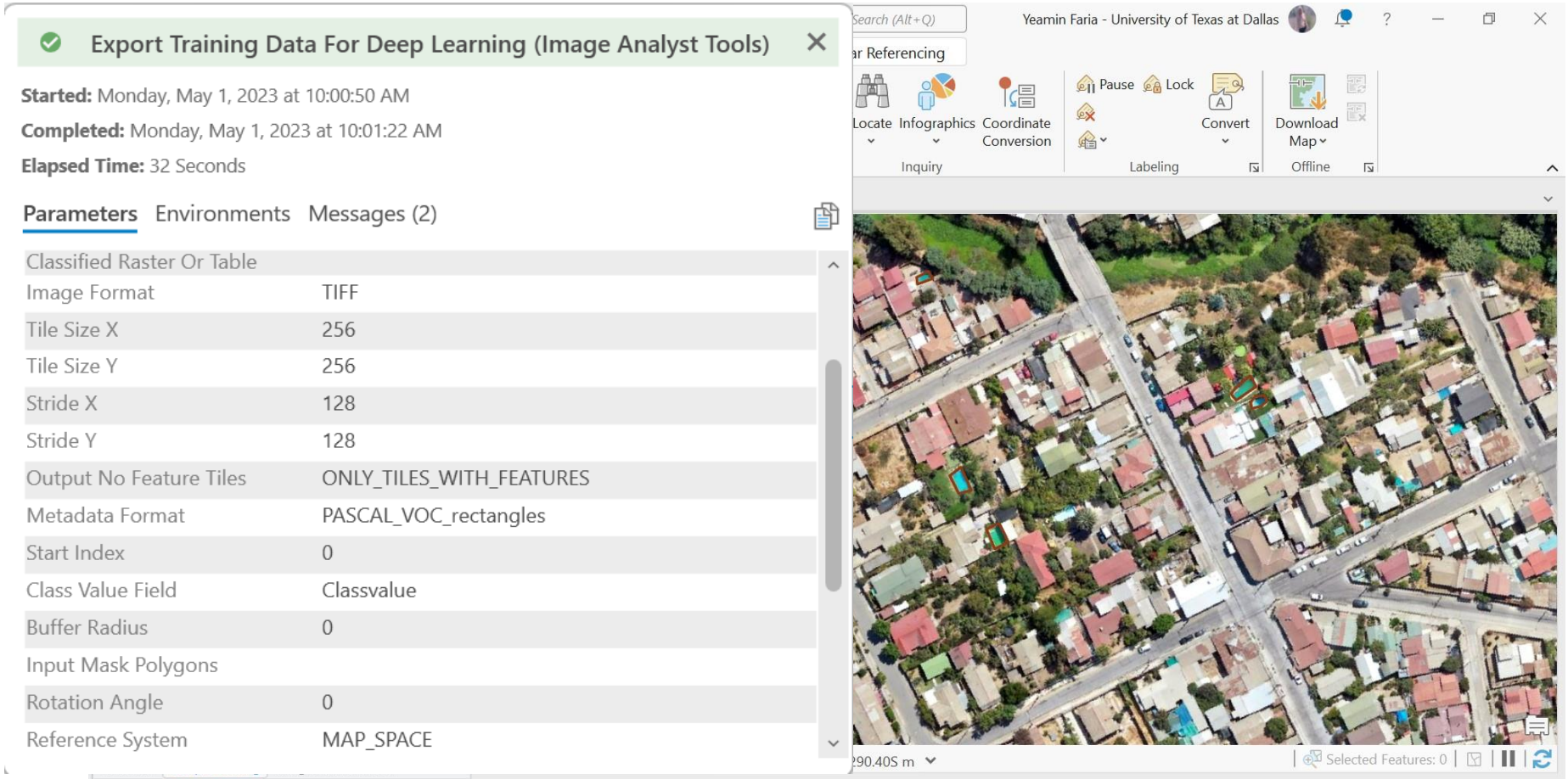
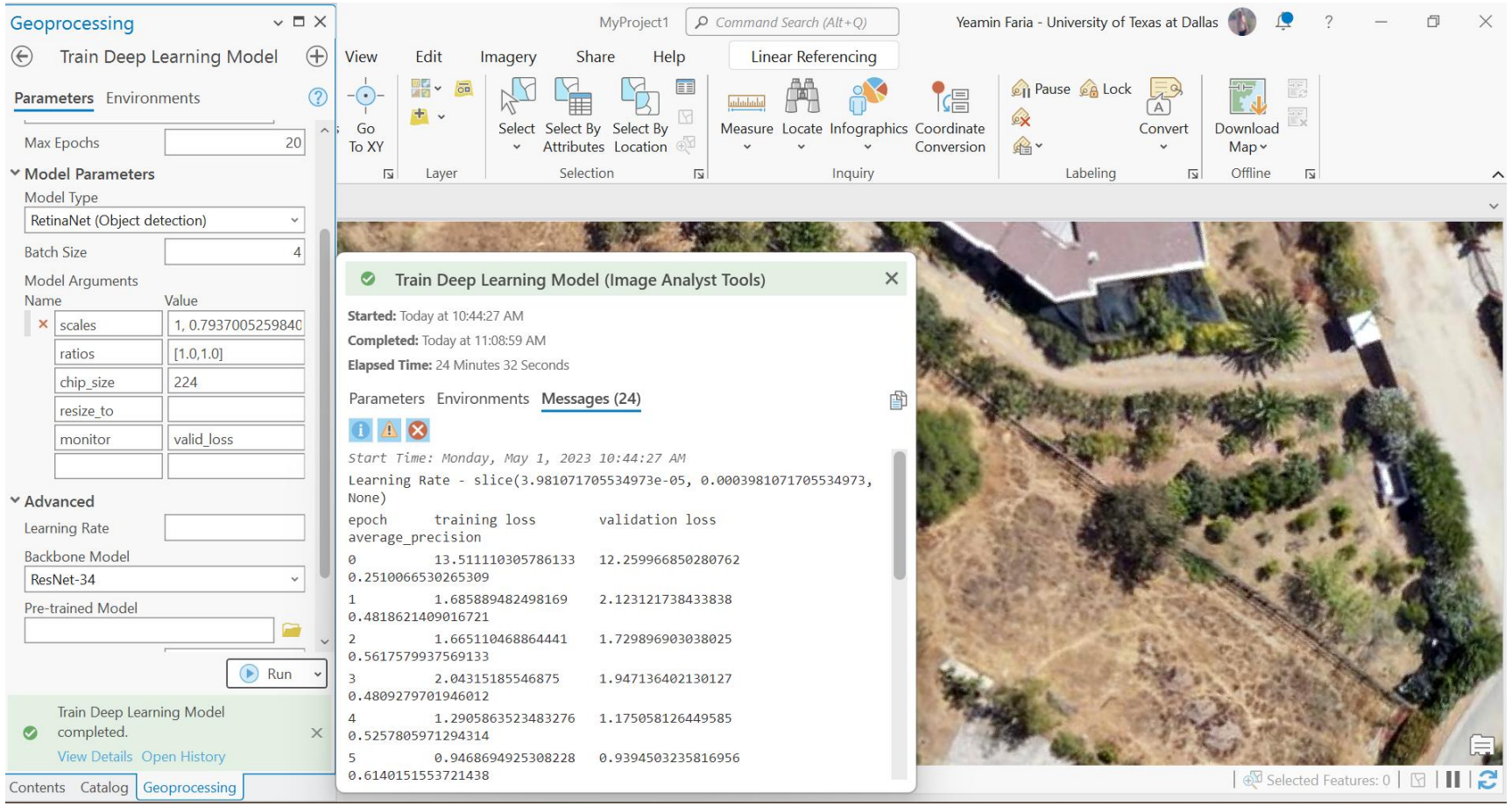
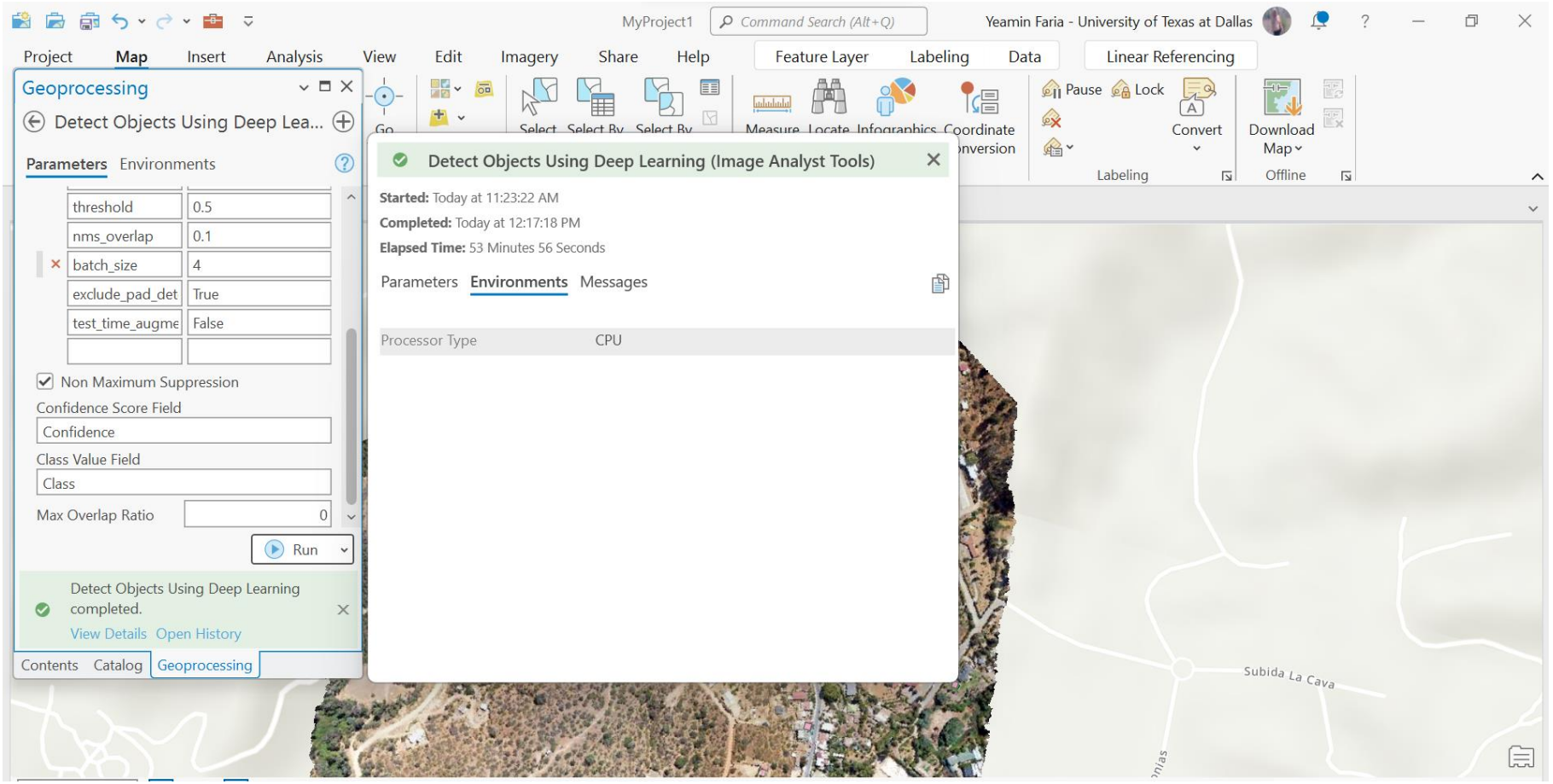


Image Chips

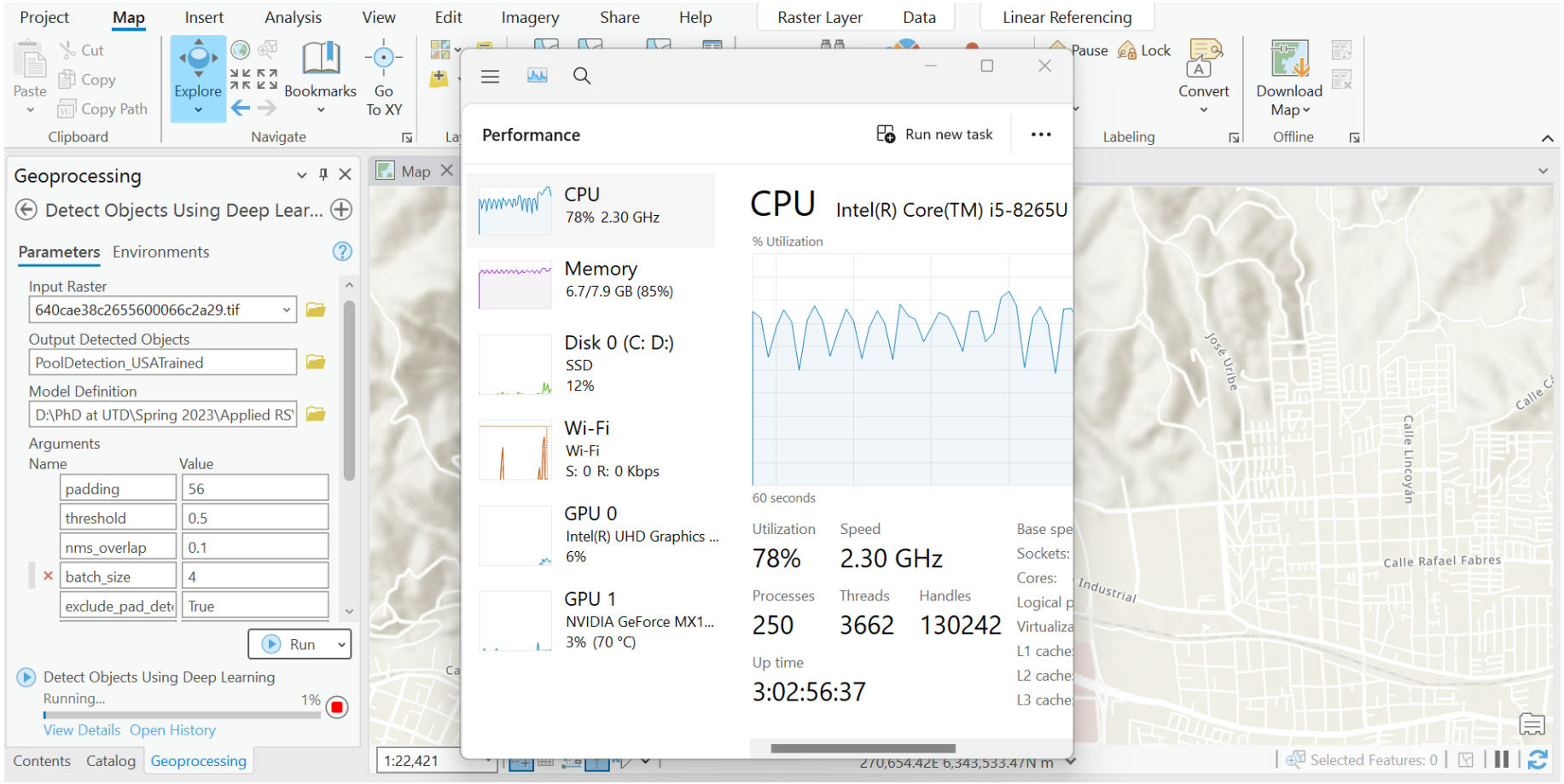
Training the model



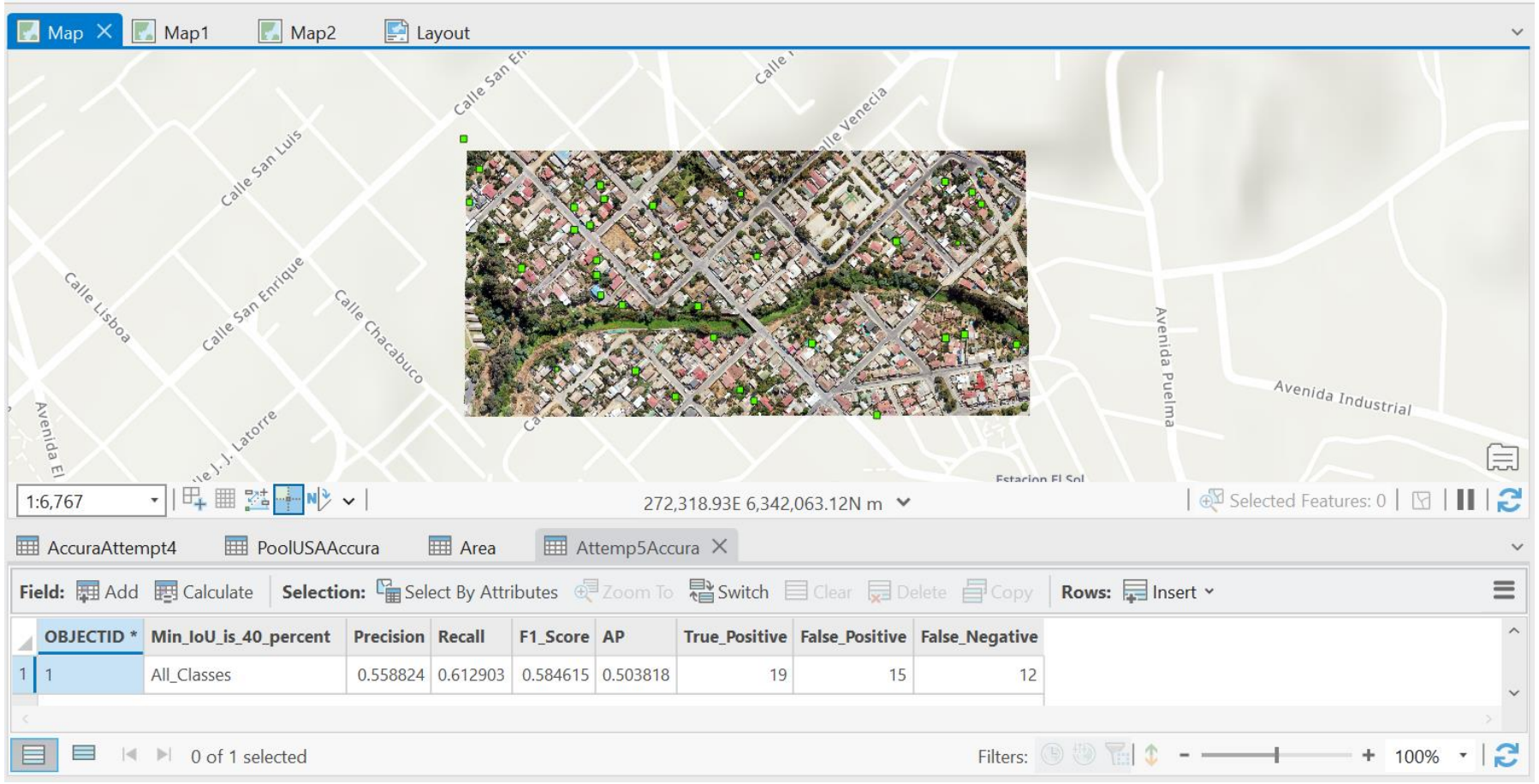
Detect objects



Detect objects with Pretrained Model



Results


Map
Map1
Map2
Layout
Calle San Luis
Calle Lisboa
Calle San Enrique
Calle Chacabuco
Avenida Puelma
Avenida Industrial
1:6,767
272,318.93E 6,342,063.12N m
Selected Features: 0
AccuraAttempt4
PoolUSAAccura
Area
Attemp5Accura
Field: Add Calculate
Selection: Select By Attributes Zoom To Switch Clear Delete Copy
Rows: Insert
OBJECTID * | Min_IoU_is_40_percent | Precision | Recall | F1_Score | AP | True_Positive | False_Positive | False_Negative
1 | 1 | All_Classes | 0.558824 | 0.612903 | 0.584615 | 0.503818 | 19 | 15 | 12
0 of 1 selected
Filters:
100%

Thank you