

Pre-training a YOLOv8 model to detect and measure the lengths of elephants from aerial images

Rapid Elephant Population Assessment using Pre-Trained Pose Estimation Model YOLOv8s-pose

INTRO

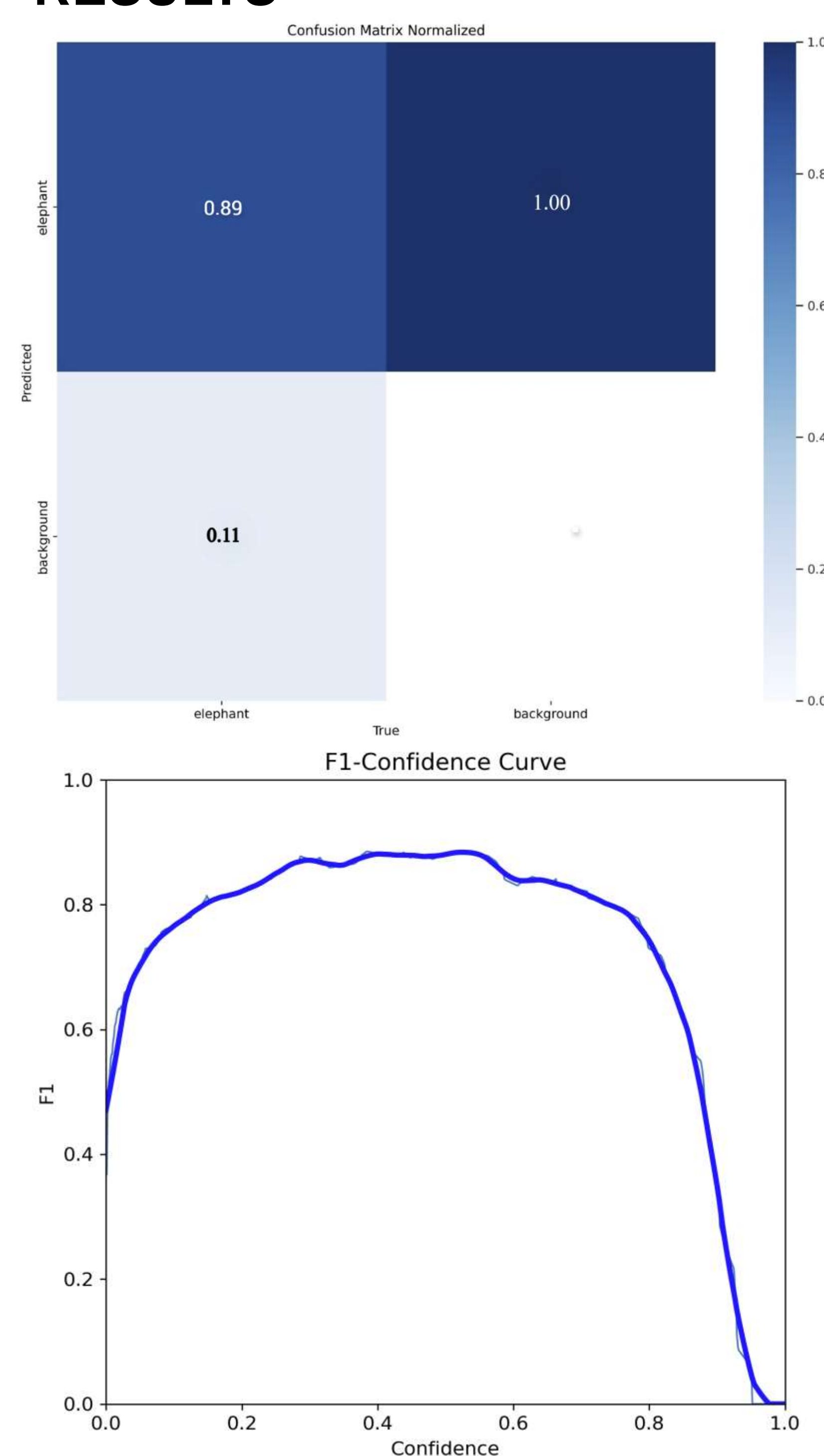
- Automated Rapid Elephant Population Assessment (REPA) refers to the development of computational tools and algorithms designed to streamline the process of estimating key population parameters of African Savannah Elephants to aid in conservation efforts.
- This project focused on detecting and estimating elephant back lengths from aerial images using the pre-trained pose detection model yolo8s-pose

METHODS

- The model was trained on a dataset of 23 images
- Images annotated with bounding boxes and keypoints
- Other models (Fast R-CNN, yolo8s, yolo8s-seg) were also evaluated before choosing yolo8s-pose as the best model for the project
- A web-based app was developed to streamline the elephant measurement process

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RESULTS



DISCUSSION

- Elephant detection accuracy : **86%**
- Elephant back length estimation (key points) accuracy : **88%**
- Improvement areas: Accuracy of detecting baby elephants needs to be improved by training with more images of baby elephants missed detections.

Streamlit App

Rapid Elephant Population Assessment

Elephant Back Length Measurement

Upload an aerial image of elephants to get measurements of the back lengths of the elephants in the image!

Upload Image

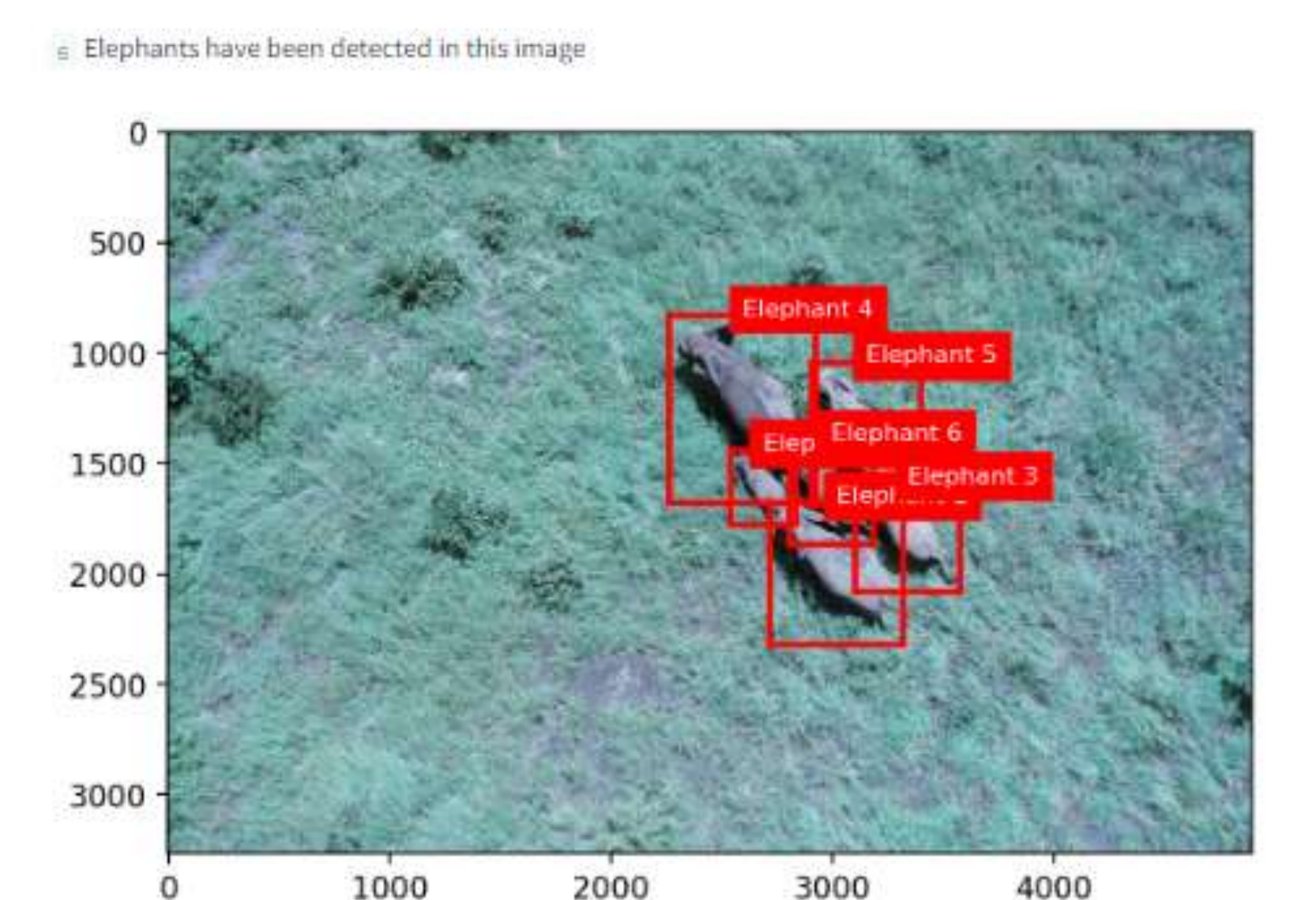
Drag and drop file here
Limit 200MB per file • PNG, JPG, JPEG

_UDI8234.JPG 15.3MB

Customize Model Accuracy (Optional)

Confidence: 0.45

IOU: 0.45



Elephant back length	Bounding Box	tbbox_conf	Keypoint1
0	550 3016.5 2000 563 648	0.9296	2890.2314453125 1715.35607911
1	247 3085 1608.5 256 337	0.9272	2594.455678125 1523.718363781
2	366 3341 1833 474 492	0.9066	3213.742431640625 1674.756958
3	618 2292 1257 662 846	0.891	2447.55263671875 978.81164595
4	515 3151 1367.5 464 649	0.8538	2909.43895484375 1160.3284612
5	281 2995.5 1632.5 377 473	0.8519	2904.021240214315 1526.198852



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Capstone Project - MIT 808

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