Empowering **conservation** efforts with ML **detection** of endangered species like **Baobab** from **remote sensing** data.

Detection and counting of Baobab trees using remote sensing and ML in the far-northern part of Limpopo.

INTRO

- Biodiversity loss translate to loss of critical ecosystems, which in turn can affect multiple species.
- Conservation efforts tend to oppose economic expansion.
- Faster and more accurate impact studies can quantify the potential impact of development.
- We sought to use ML to identify tree species from satellite imagery.
- Instead, due to a lack of data and the need to generate more, this project focused on training a model capable of analyse NGI aerial images and logging the GPS coordinates of Baobab trees.

METHODS

Create annotated dataset

1. Utilise Spot6 and NGI images
2. Use GPS coordinates from confirmed tree locations

Train classification model

1. Used Resnet and Alexnet with transfer learning to train classifier
2. Trained YOLO8 model to detect and classify trees in images.

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RESULTS

- Resnet and Alexnet models performed poorly on test and validation datasets.
- YOLO8 model performed significantly better and can be used to estimate the presence of Baobab trees.
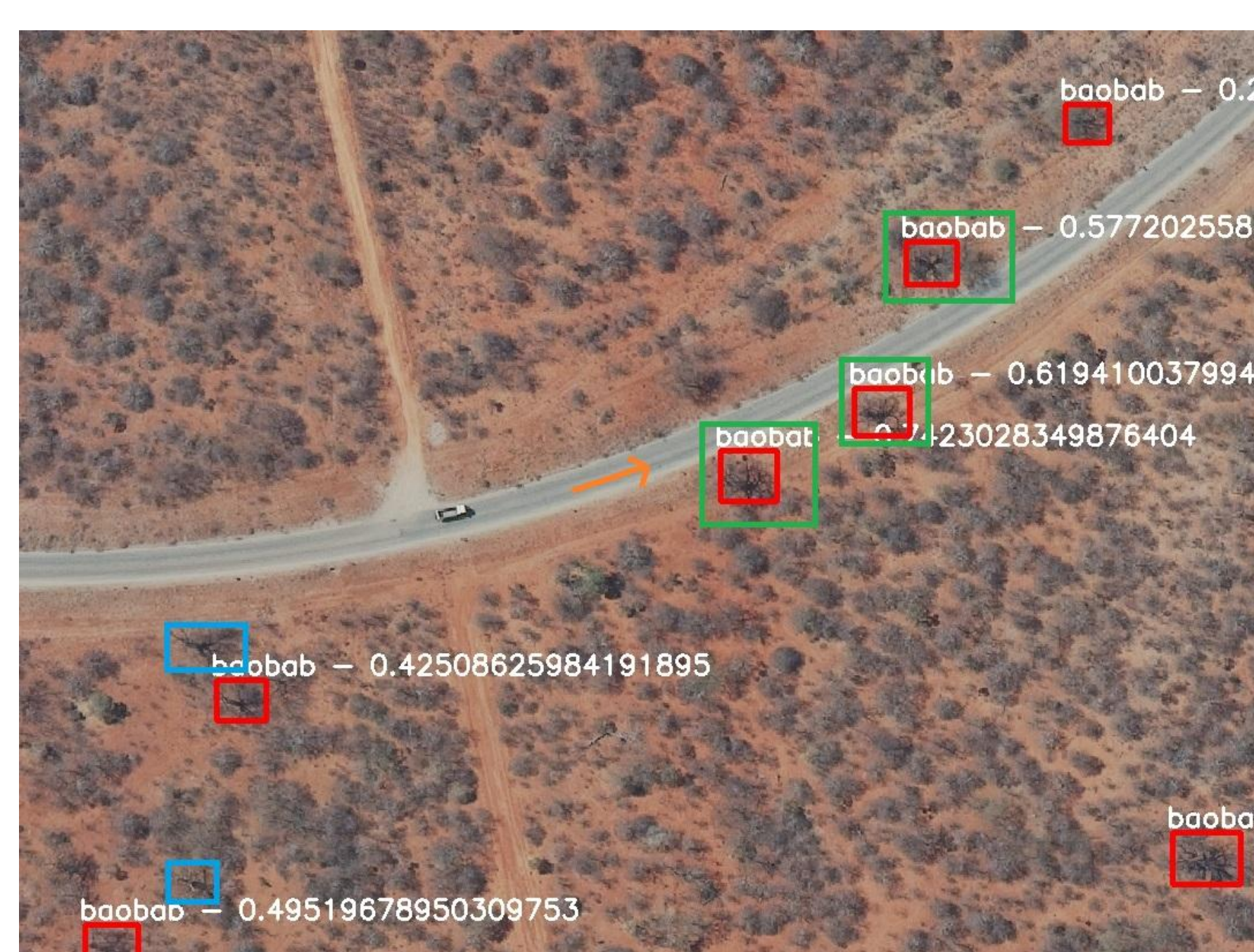
Visualised results from model. Green is correct, red is predicted and blue is missed.

DISCUSSION

- Training set was not diverse or large enough and model is very sensitive to image quality and colour as well as the season when it was taken.
- The spatial resolution of the Spot6 imagery made it hard to identify single trees.
- By using a YOLO8 model on NGI aerial images, we were able to find additional locations of Baobab trees. Future work can use this to increase the data set size and train models off of satellite images which are updated more frequently.
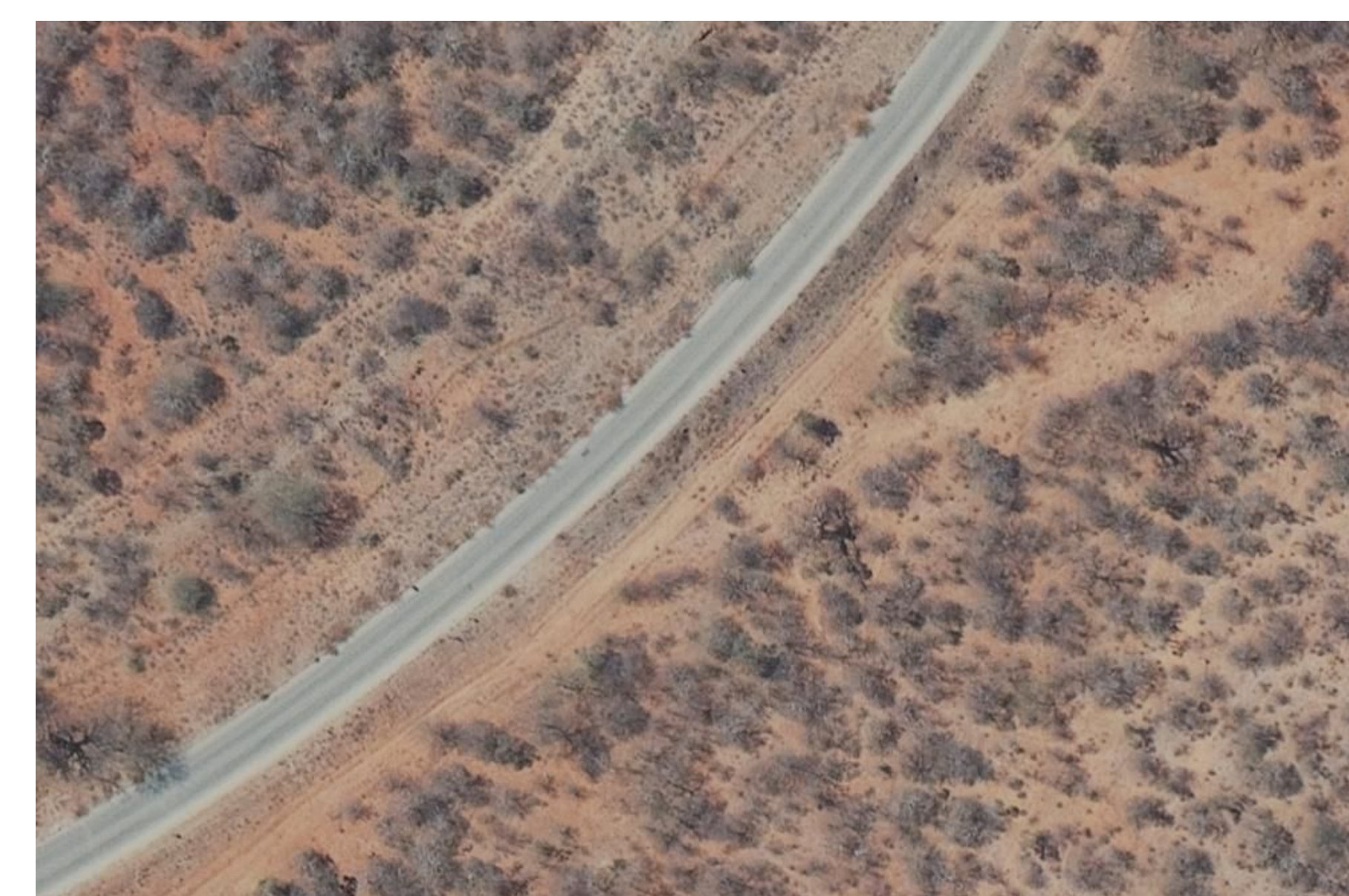
Sample of an NGI image with Baobab trees

The trees that the model identified as potential Baobab tree locations
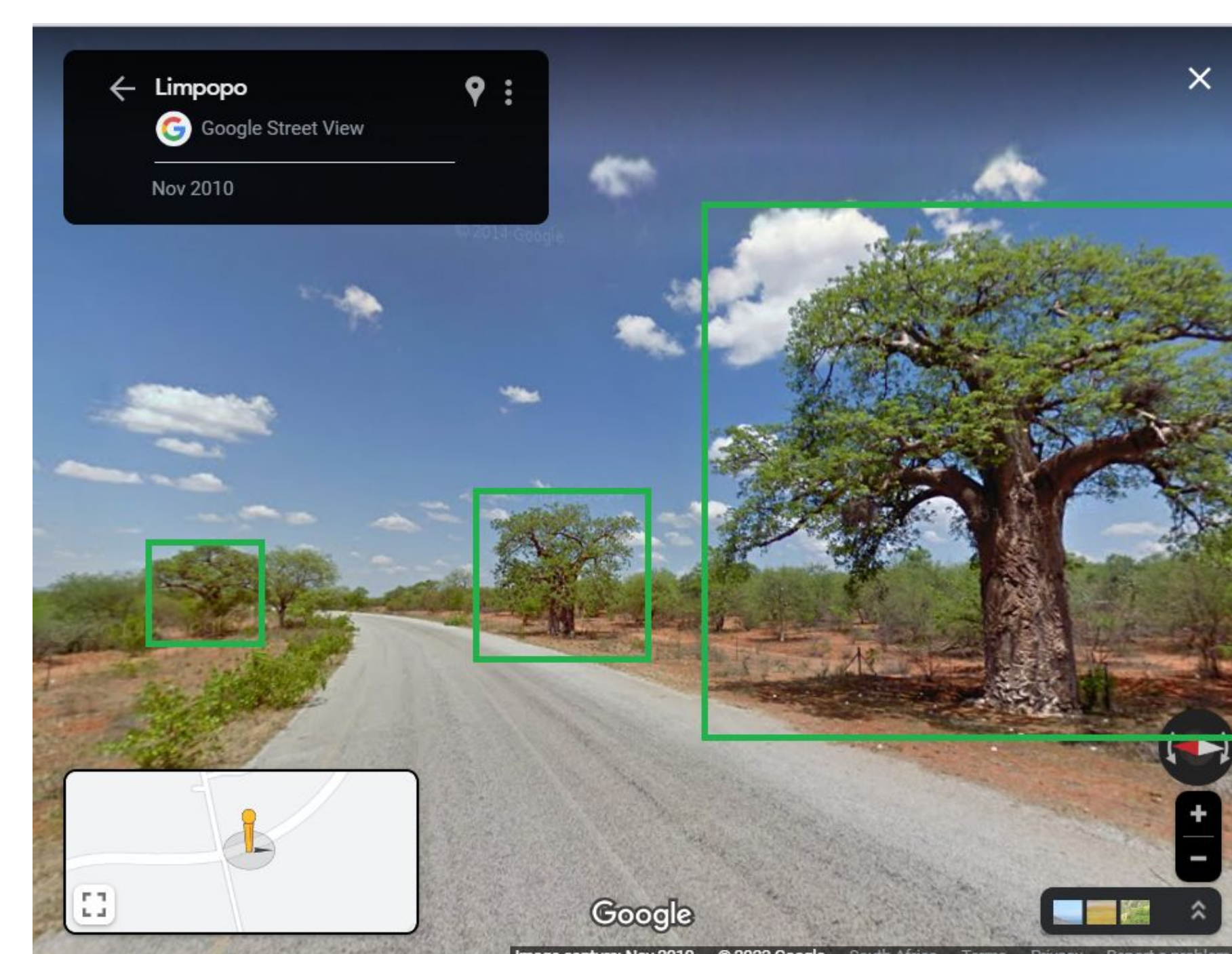
Using Google Streetview to validate results.

📱 Scan me