

How Well Can a Segmentation Task be Transferred between Real and Synthetic Data

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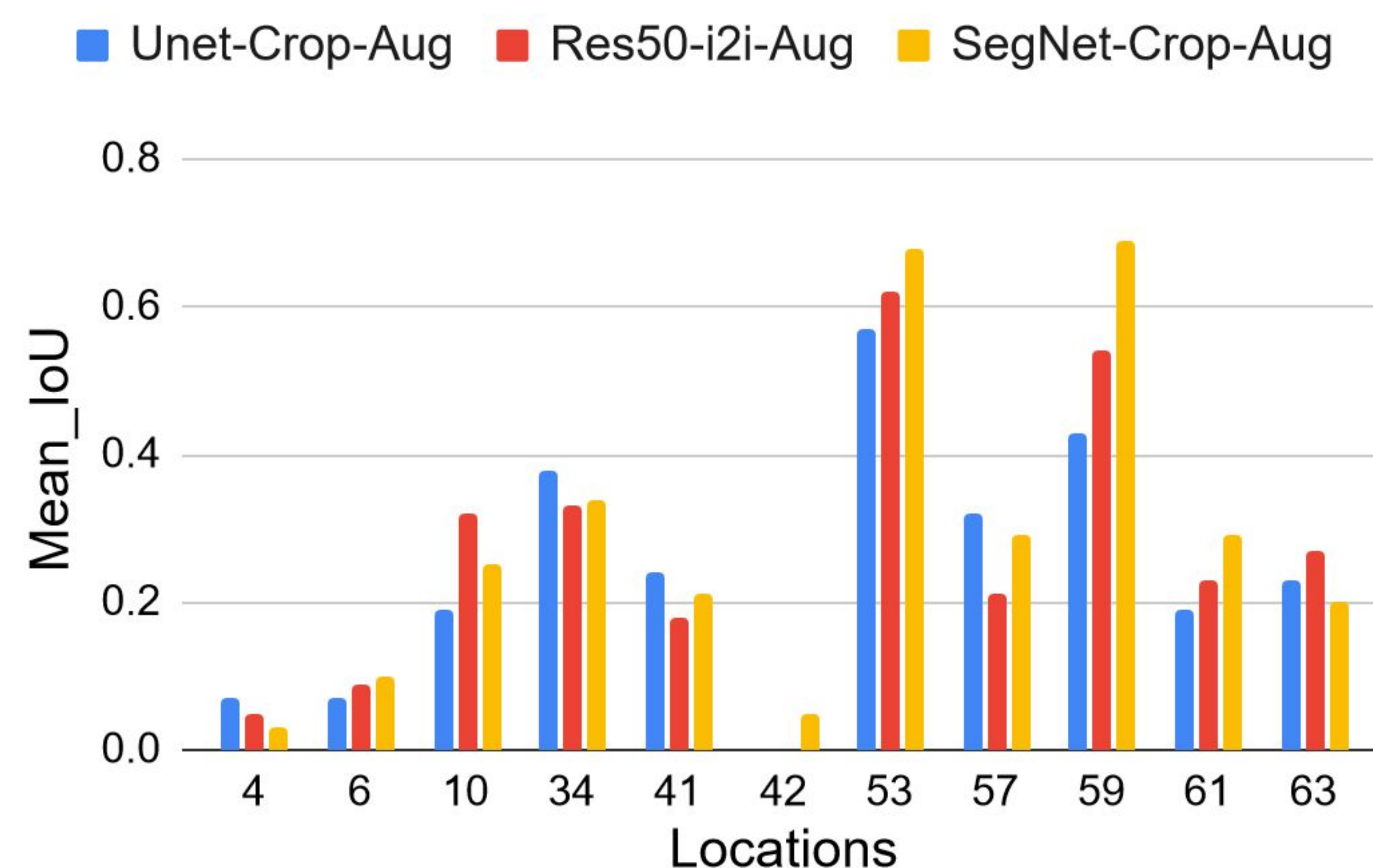
CSE3000 Research Project

1. Background

- Improvement in classification of camera trap data on a rare class could be made by using synthetic data [1].
- Deer class was made rare artificially
- Synthetic images were produced using computer graphics software
- It is easier to create an abundance of data using this method as opposed to using real data

4. Results

Comparison Segmentation Networks



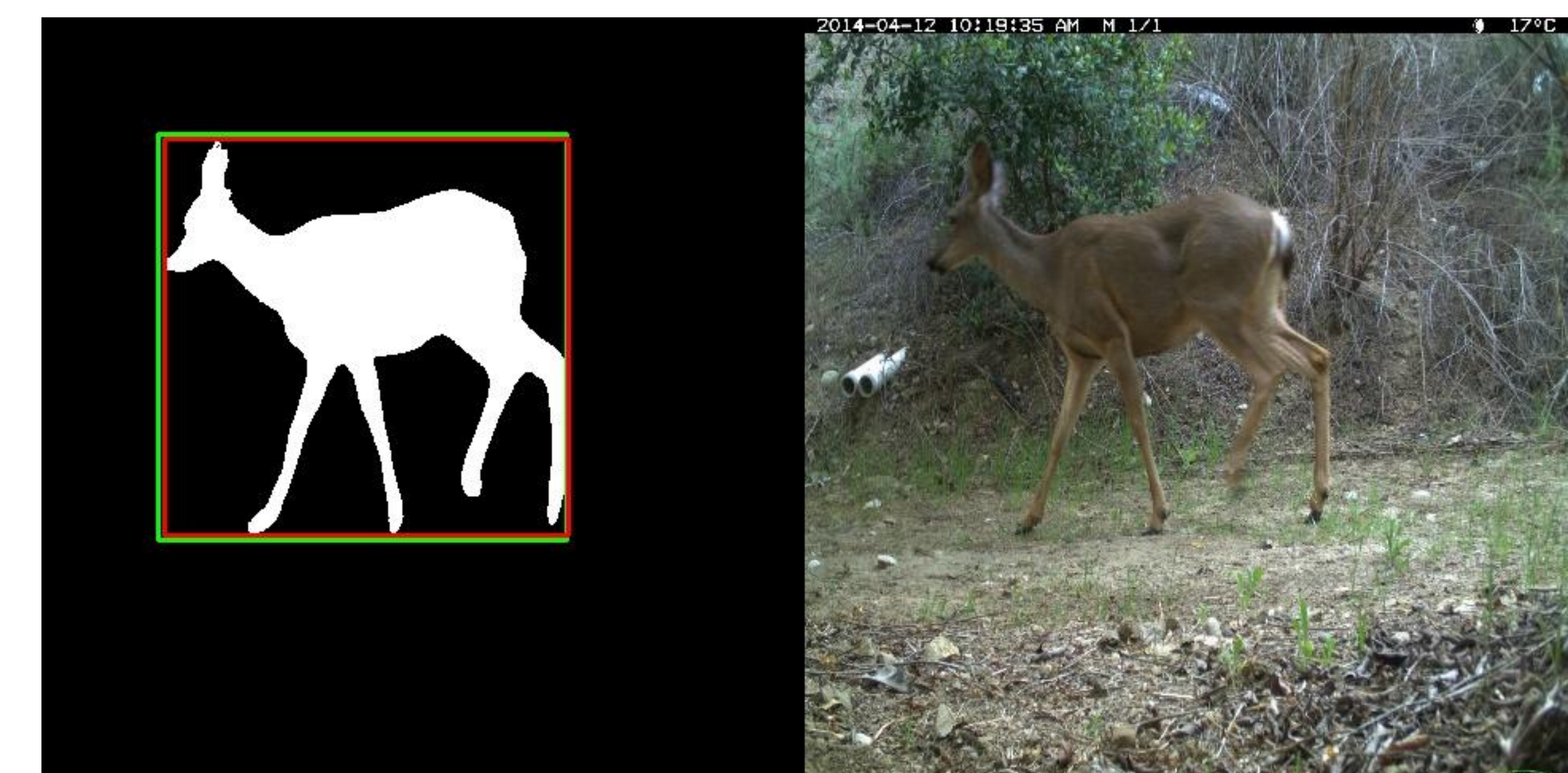
2. Research Question

- Can a segmentation network be trained on synthetic data and still perform well on the real data of the same class?
- Use different segmentation networks and different dataset stemming from the original dataset



3. Method

- Two different types of U-Net's, one not pre-trained and the other using Resnet-50 as an encoder and a SegNet.
- Networks on different types of datasets.
 - Full Sized Images, Cropped Images, Style Transferred Images
 - With and without colour augmentation
- Performance calculated by comparing the bounding box of the prediction and the ground truth bounding box of the real image.
- Using Intersection over Union (IoU) as metric
- Compare IoU over different locations



Example of a prediction on a real image with bounding boxes

5. Conclusion

- Good performance on some locations while poor performance on other.
- No significant difference between networks
- Improvement could be made by using a synthetic environment more similar to the real images.