

The machine learning aided log-end biometric system developed, has shown potential as a replacement to the current bar code tagging systems


Development of a machine learning aided log end biometric system

INTRO

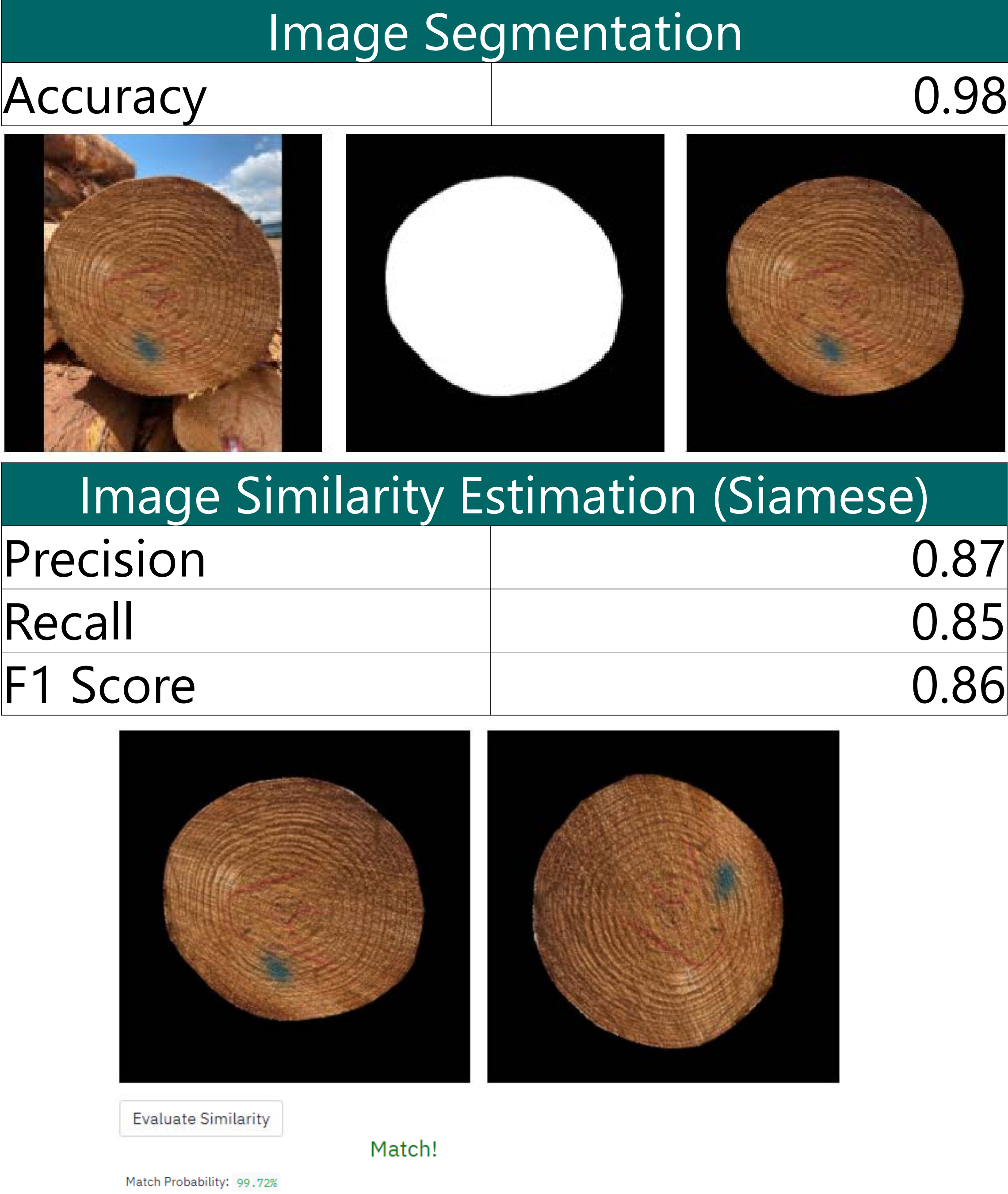
- The objective of this research is to develop a log end biometric system with the use of machine learning and computer vision.
- It is important for the system to be able to identify and store distinguishing characteristics between different logs for successful tracking.
- The system would require a basic camera and computer (once pipeline is trained).

METHODS

1. Obtained a dataset of 348 log end images of varying resolutions.
2. Image augmentation occurred to compensate for small dataset (scaling and rotation)
3. Images were reduced to a resolution of 512x512 (square).
4. CNN semantic segmentation model trained to segment logs from the background in each images.
5. Siamese network model was trained; it establishes a similarity function and takes 2 images as input and encodes each as fixed length feature vectors to determine the similarity between the 2 logs.

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RESULTS



DISCUSSION

- Models developed have yielded promising results considering the small dataset used.
- A significant performance improvement is expected for the Siamese model with a larger training dataset.
- The proposed system is a more environmentally friendly alternative as it eliminates barcode printing and could result in cost saving in the long term.

AMMO BAR

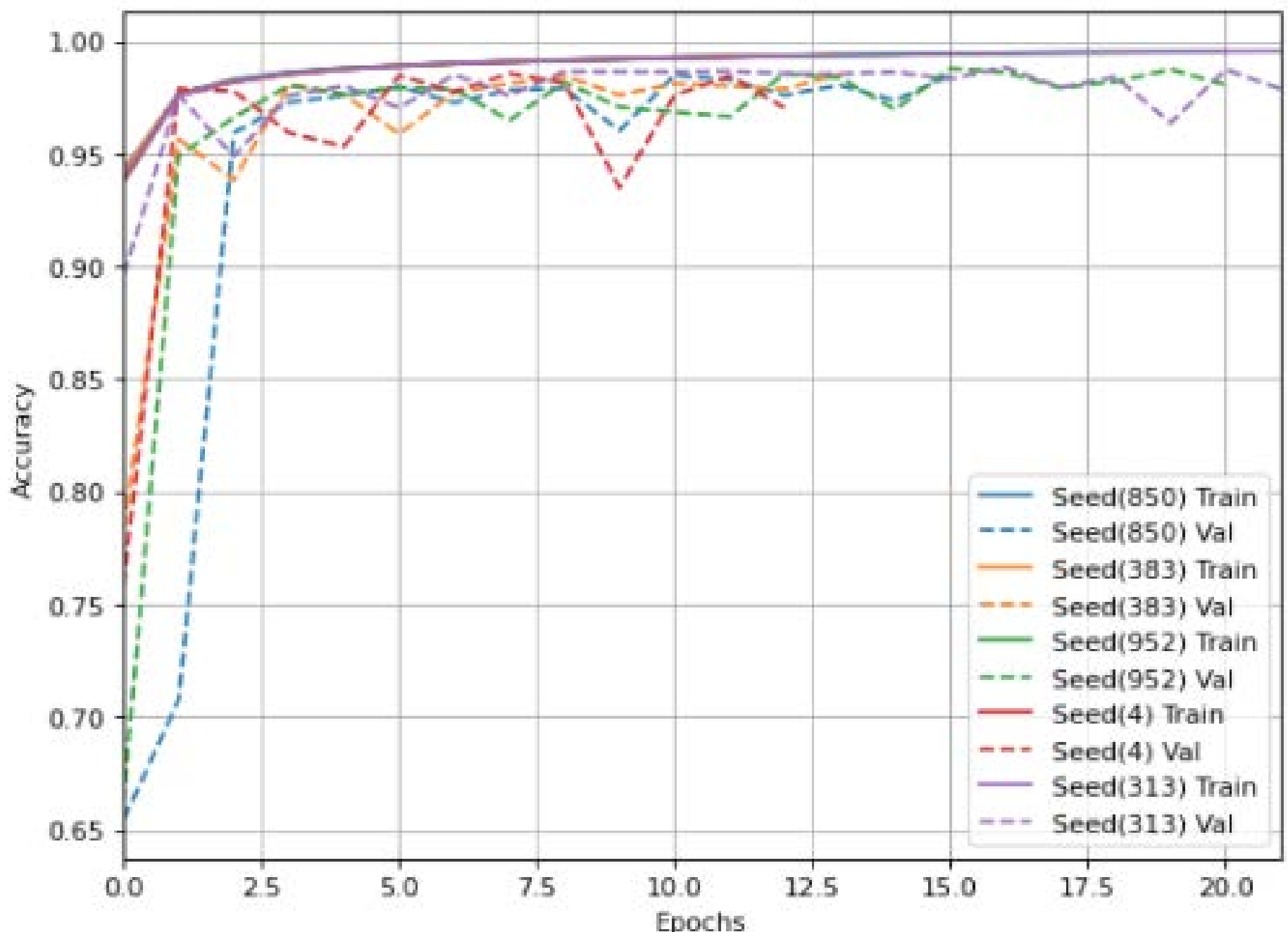
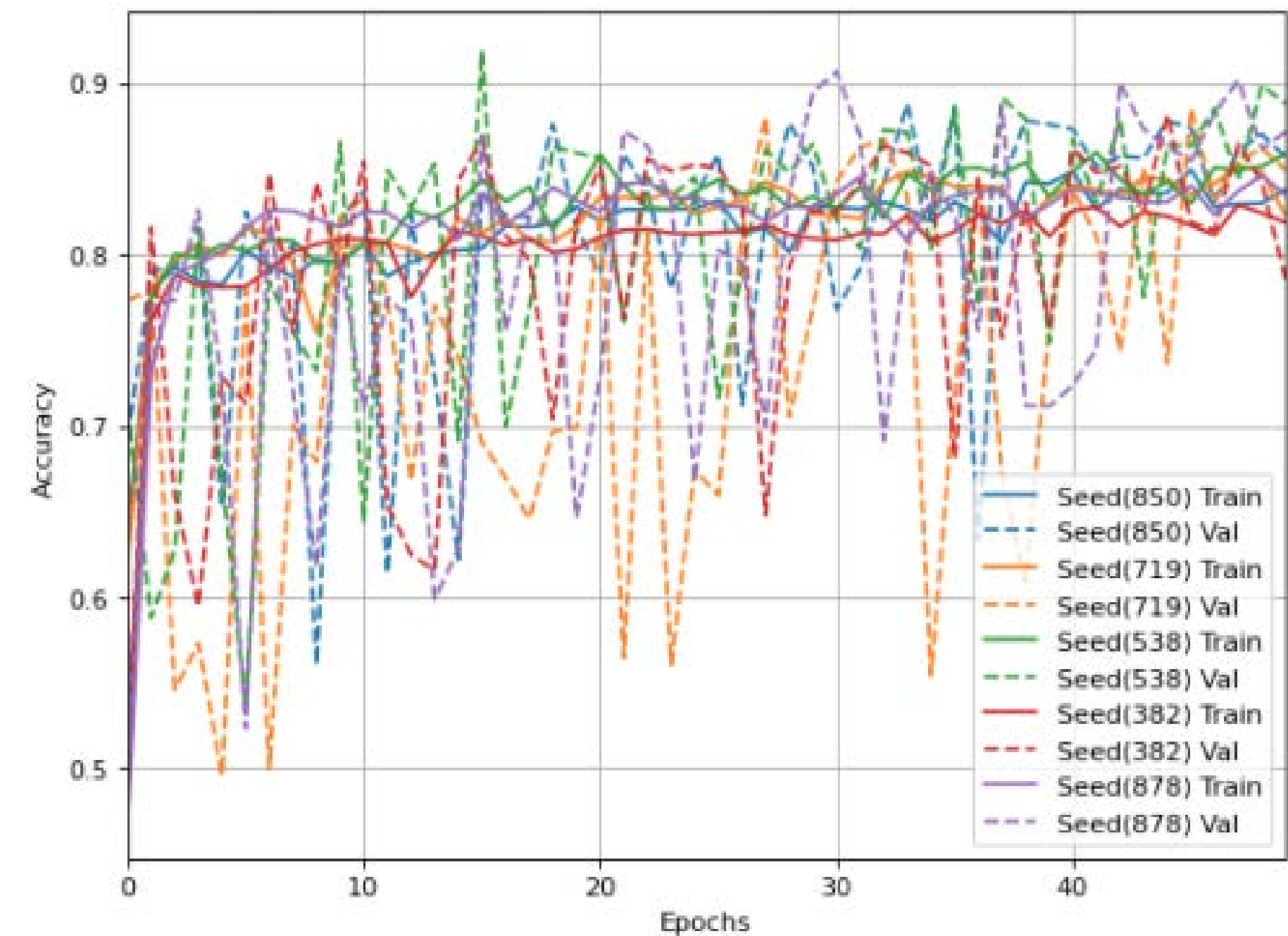
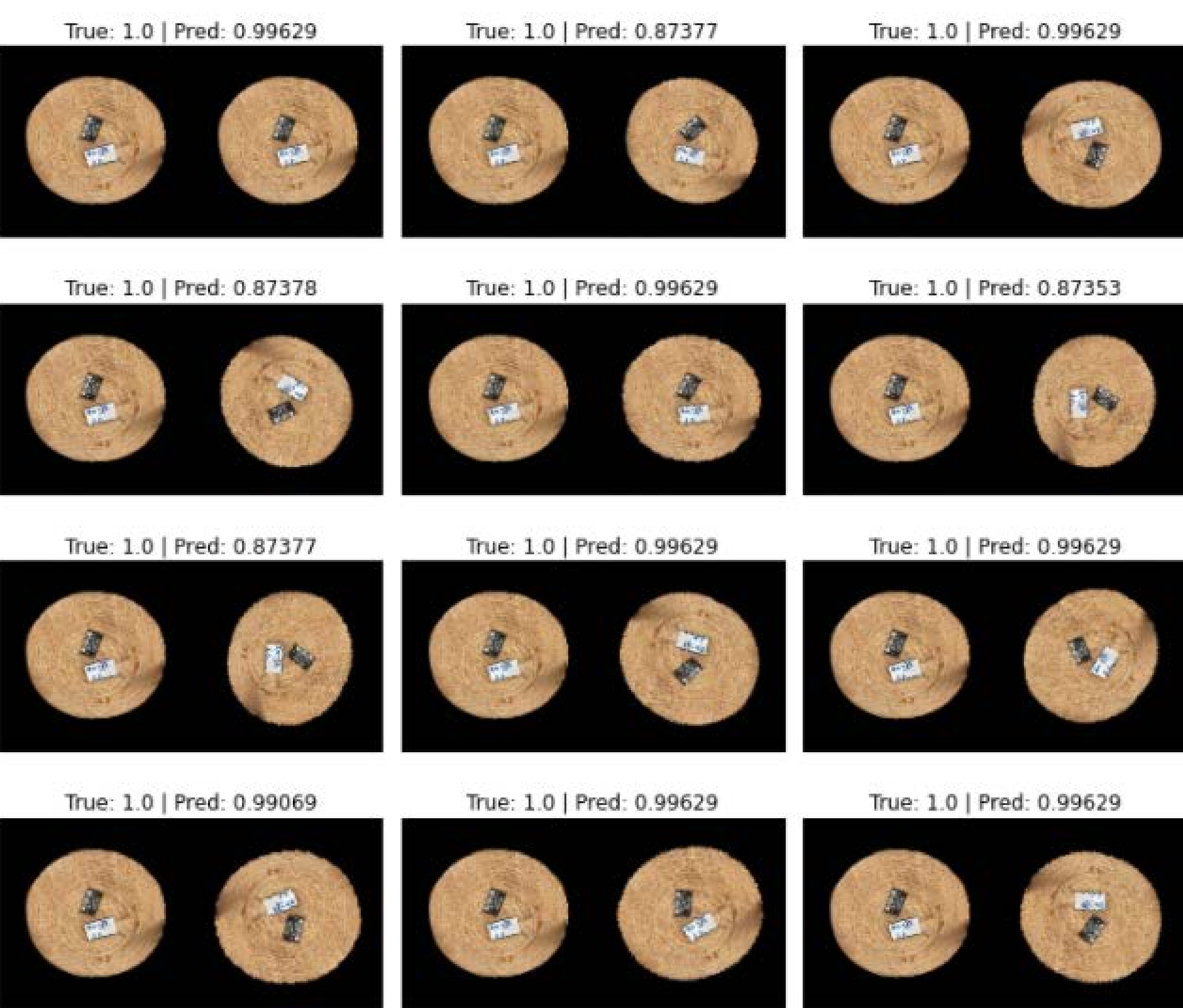


Image segmentation model training output



Siamese model training output



Showcasing image similarity estimation robustness (performance invariant to transformations such as rotation and scaling that may occur in the field)

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