

INTRODUCTION

This project’s aim is to bring a change in the traditional plant phenotyping .
It is presently concentrating on tobacco and arbidopsis leaves.
When a tobacco or an arbidopsis leaf is given as an input then the obtained output is leaf segmentation.
Inspite of the small dataset we got satisfactory results in segmenting.
The leaves part of the plant is segmented as gray scale image i.e.,the background is in black color and plant part is in white color.

METHODOLOGY

I. GET THE DATASET

The dataset is available from the codalab leaf segmentation challenge.
The dataset contains the tobacco and arbidopsis leaves.
It is organised as 4 groups i.e., A1,A2,A3 and A4.
The below images are the sample images from A1,A2,A3 and A4 respectively.

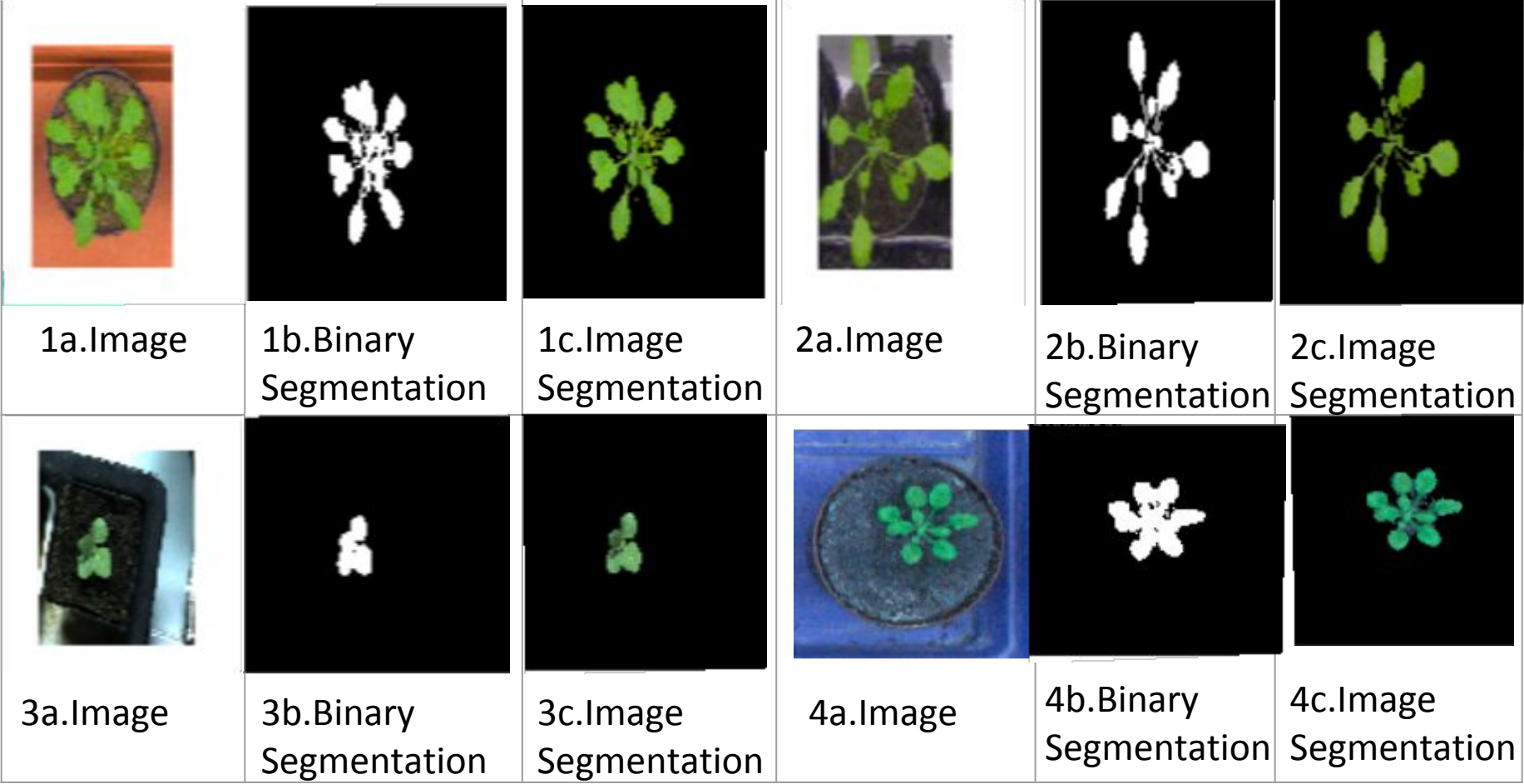


II. MAKING THE MODEL AND TRAINING

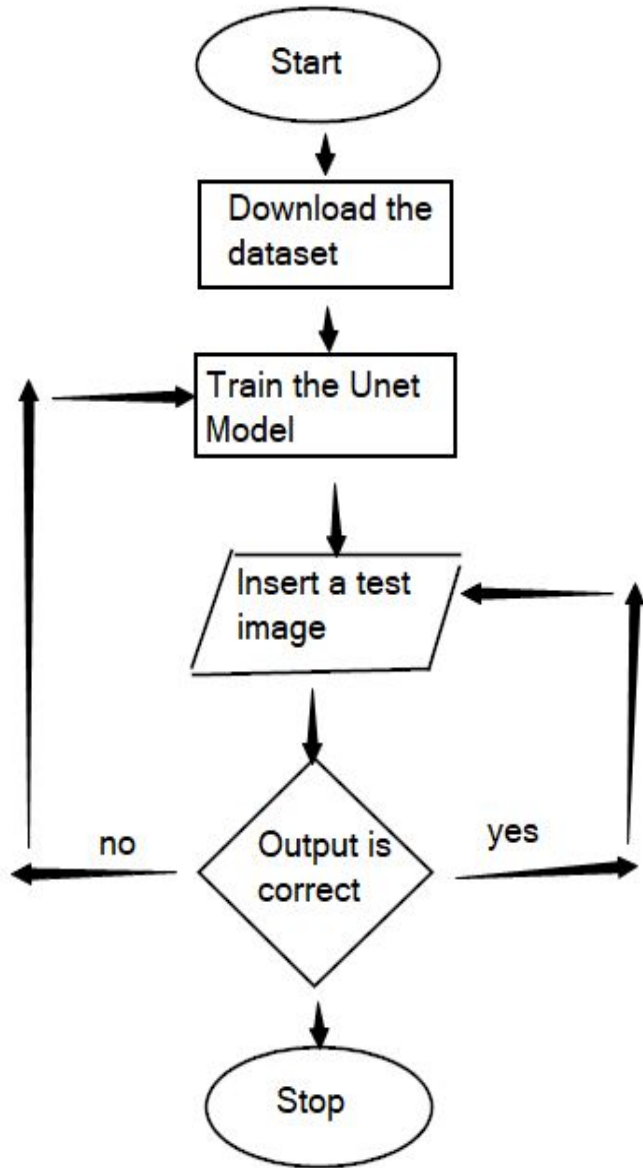
- We have used the UNet Convolutional Network for segmenting the leaves.
- We have split the training data into 90% for training and 10% for testing.
- Here we chose the RMSprop as the optimizer and MeanIOU as the metrics.
- The training is done for 100 epochs.
- We trained the model with RGB images and annotations in which the plant is in gray scale image.

III.PREDICTIONS

After training the model we have predicted the outputs of some images which belongs to the training dataset.The metrics we used here is MeanIOU.The intersection over union (IoU) metric is a simple metric used to evaluate the performance of a segmentation algorithm.We have achieved an MeanIOU of 92.7% after training the model for 100 epochs.
Some of our predictions are:



FLOW CHART



References

[1] Leaf Segmentation Challenge. <https://www.plant-phenotyping.org/CVPPP2017-challenge>, 2017.

[2] H. Scharr, M. Minervini, A. P. French, C. Klukas, D. M. Kramer, X. Liu, I. Luengo, J.-M. Pape, G. Polder, D. Vukadinovic, X. Yin, and S. A. Tsafaris. Leaf segmentation in plant phenotyping: a collation study. Machine Vision and Applications, 27(4):585–606, 2016.

[3] S. Song, S. P. Lichtenberg, and J. Xiao. Sun rgb-d: A rgb-d scene understanding benchmark suite. In IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pages 567–576, June 2015.

[4] Scharr, H., Minervini, M., Fischbach, A., Tsafaris, S.A.: Annotated image datasets of rosette plants. Tech. Rep. FZJ-2014- 03837, Forschungszentrum Jülich GmbH, Germany (2014). URL <http://hdl.handle.net/2128/5848>

[5] <https://www.sciencedirect.com/science/article/pii/S2214317318301562>