

2nd Place Solution for the Zindi CGIAR Wheat Growth Stage Challenge

Problem Description:

The problem is to estimate the growth stage of a wheat crop based on an image sent in by the farmer. Model must take in an image and output a prediction for the growth stage of the wheat shown, on a scale from 1 (crop just showing) to 7 (mature crop).

Hardware Description:

- P100 Google Colab

Packages Description:

- torch==1.6.0+cu101
- torchvision==0.7.0+cu101
- efficientnet_pytorch==0.7.0
- albumentations==0.4.5

Instructions to run the code:

The `How_to_run_the_solution.pdf` file contains details on how to run the code.

Solution Description:

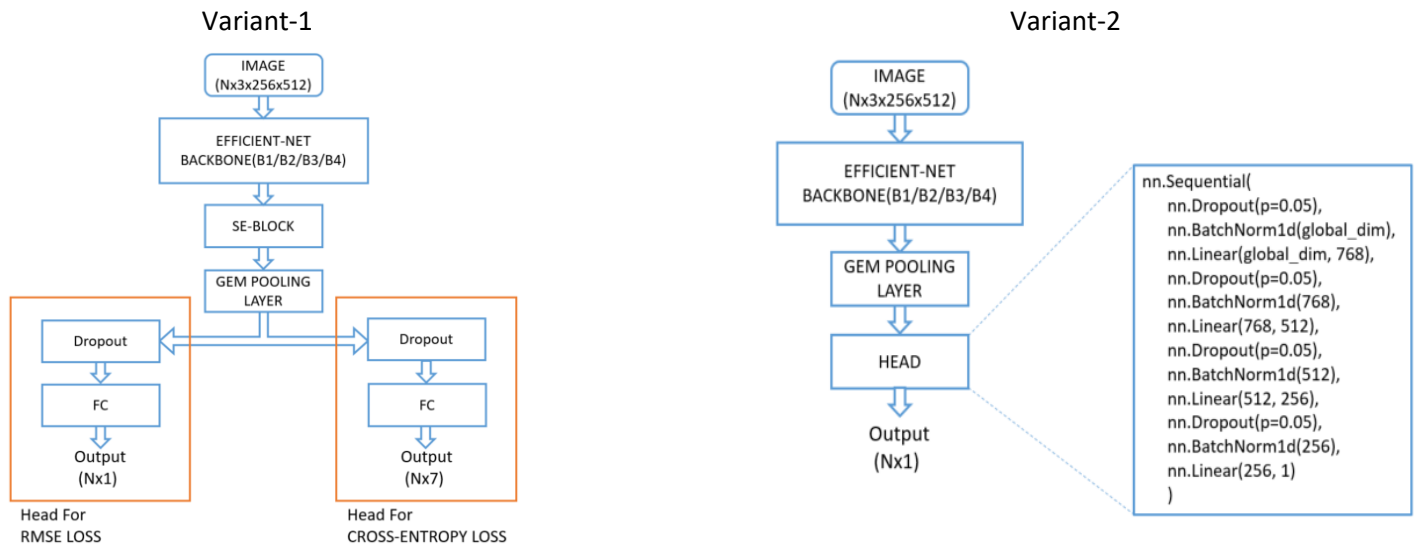
The dataset given in this competition is noisy. The labelling qualities of the data are also given. Label quality 2 means high quality labelling where one means low quality. Expert scientists label the high quality labels and farmers label the low quality labels. Test dataset only contains the high quality labels.

Dataset:

- If a train image does not have `dim==3`, they are discarded.
- If a train image has height less than 43px, they are also discarded.
- Train images are resized to 256x512x3 dimensions.
- Heavy augmentations are used:
 1. Cutout or Cutmix
 2. Jpeg compression
 3. Horizontal flip
 4. Random contrast and brightness
 5. Random resize
 6. Shift, scale, rotate and etc.

Model:

- Efficient-Net backbone is used. Two different variant of heads are used.



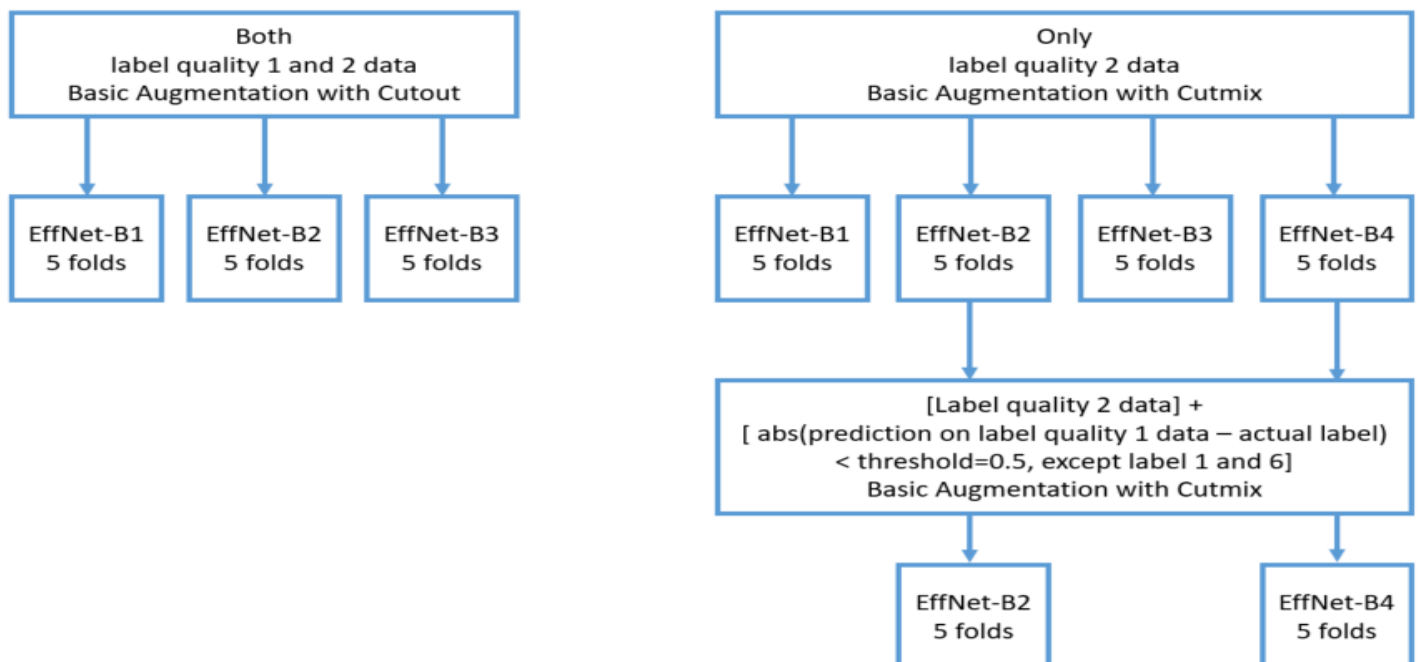
Loss Function:

- RMSE Loss is used for model variant 2.
- Both RMSE and Cross-Entropy loss is used for model variant 1.

Hyper-Parameters:

- Learning Rate: 0.01
- Scheduler: Reduce on Plateau with patience of 5 and factor 0.5
- 100 Epochs
- Optimizer: Over9000

Overall Train Procedure:



Ensemble:

- TTA: Horizontal flip
- Method: Simple Average of 10x B1, 15xB2, 10xB3, 10xB4

Did not work:

- Pseudo Labelling
- Se-Resnext Architecture