ORBO.AI CODING CHALLENGE REPORT

Note: The algorithm is performed on basis of given below research paper. Steps for convolutional network are taken from this paper only. Accuracy and predictions achieved are not upto the mark (since need some more time to test and bring improvements in the model)
Paper link: http://cs231n.stanford.edu/reports/2016/pdfs/003_Report.pdf

Please find below the pseudo code:
Pseudo Code:

1. Function: load_dataset
    - Load the female and male datasets separately
    - Add Target variable with two values – 0 for female and 1 for male
    - Resize the images in the folders to (227, 227, 3)
    - Scale each image by maximum value of a pixel (255)
    - Divide the sets in training, test and validation (60%, 20%, 20%)
    - Return Input and output data for training, validation and testing
2. Combine the training, testing and validation data for both datasets to form one dataset
3. Functions: create_weights, create_biases, create_conv_layer, create_flatten_layer, create_fully_conn_layer, shuffle_dataset_batch
4. Define hyperparameters and placeholders for input and output
5. Define network architecture
6. Train the model and save it
7. Restore the model and find the different values of last epoch – last batch (since all values that are being stored are of last batch of each epoch)
8. Output Female prob (0), male prob(1), predicted class, true class values and store it in csv (value will be for last epoch last batch).
9. Plot the curve between train loss and validation loss.

Errors:

- Some error is occurring in predicted prob and predicted class. (Need to look into it)

Observation:

- Dataset is biased having more Male images than female images - Currently each female and male dataset is divided into 60-20-20 ratio. But either female images should be augmented to get much better results.
- Validation loss is less than training loss
    - This might be because of difference in images in different sets since no shuffling is being done during train-val-test creation
    - This many a times occurs due to dropout since in training certain nodes are being dropped but during validation (here testing) system is more robust with parameters and thus produces better accuracy.

Improvements suggested:

- The dataset for female and male combined should be first shuffled and then divided into train, validation and test sets since because of this a bias is being created between sets (A general observation that validation loss is less than training loss)
- Dataset is biased, should be augmented with more female gender images.
- Hyperparameters to be tested
- Currently, validation set only acting as test set, but hyperparameters should be tested on validation set and those than with good results should be applied on test set.
- Currently, model restores value of last epoch which need not to be a best indicator of parameters of CNN. Therefore, best parameters having less validation loss should be stored in model saver.