



Image Colorization

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Progress so far

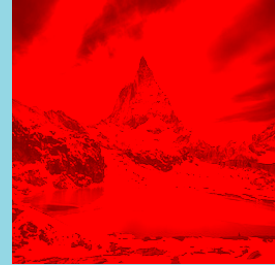
- Our data is obtained from ImageNet, where we have categorized data into the following: Scenes, Animals, Faces (of peoples). Each image is of size 256x256 px.
- We have decided upon 2 machine learning techniques for our project – SVM and CNN.
- Evaluation is done using Root Mean Squared Error and Structural Similarity Index (SSIM = 1 meaning identical images).
- SVM has a one-vs-all approach, and an RBF Kernel.
- It acts as a baseline and features used are SURF, FFT, Mean and Variance. Further features we would try out are DCT, LBP, GIST Descriptors, Shape Histograms, Edge Histograms, Line Features and SIFT.
- Results for SVM are as follows:
 - SSIM = 0.70
 - RMSE = 9.66



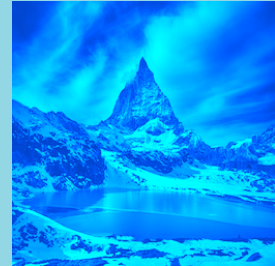
Progress so far

- CNN
 - After reading a few papers, we have started out by implementing a few modules like Caffe and Keras for CNN.
 - As Keras is simple, we have started out with it and are experimenting with the VGG architecture, as has been previously implemented.
- GPU – as one epoch over 10 images takes around 15 minutes, we will be using a GPU.

2 epochs
10 train
images
SSIM = 0.14
RMSE = 10.27



10 epochs
10 train
Images
SSIM = 0.41
RMSE = 10.12



1000 epochs
1 train
Image
SSIM = 0.85
RMSE = 8.50



Tasks left to complete

- Add more layers of conv, pooling to the current VGG network
- Work on more architectures for CNN (AlexNet, Inception-ResNet)
- Add more features to the current SVM model
- Increase the image size to support higher resolutions.
- Analyse results
 - Finalize points of analysis (features that are to be analysed)

Advice we would like

- Any other architectures that we could try for CNN.
- Some other features for SVM.
- Any suggestions regarding our approaches and any other machine learning technique we could implement.