



IMAGE FORGERY DETECTION

BYTE MAKES RIGHT

INTRODUCTION

- ❖ The pixel-based image forgery detection aims to verify the authenticity of digital images without any prior knowledge of the original image.
- ❖ Three of the most common manipulations in literature:

1. Splicing
2. Copy-move
3. Removal



DATASET

The CASIA v2.0 dataset contains 12,622 images distributed 60-40 amongst authentic-tampered.

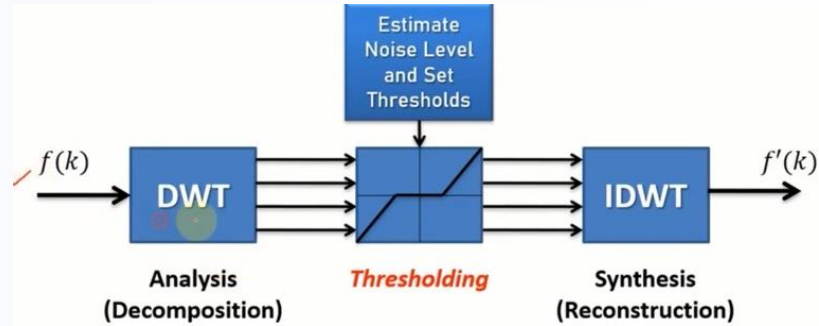


AUTHENTIC IMAGE



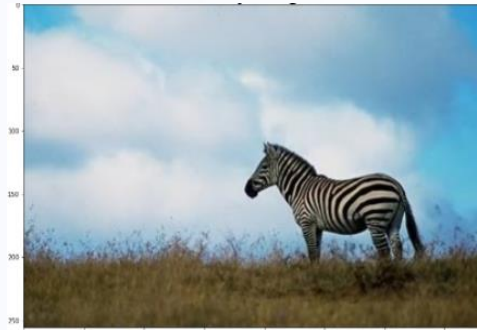
TAMPERED IMAGE

DENOISING



PSNR[Original vs. Denoised(VisuShrink)] 97.24783471476827

PSNR[Original vs. Denoised(Bayes)] 120.58626094108678



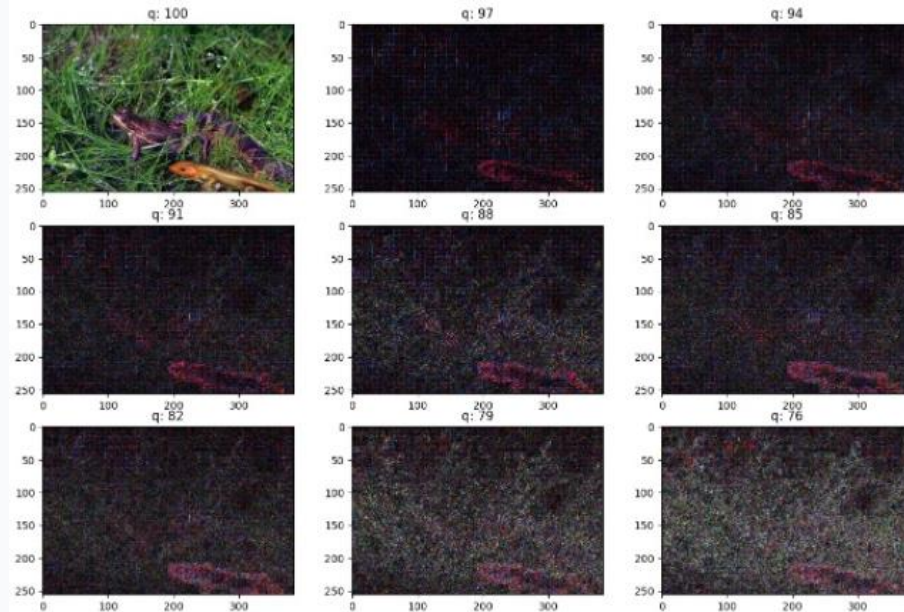
NOISY IMAGE



DENOISED IMAGE

ERROR LEVEL ANALYSIS

Error level analysis (ELA) is the analysis of compression artifacts in digital data with lossy compression such as JPEG.



DATA AUGMENTATION





MODELLING

❖ CONVOLUTIONAL NEURAL NETWORK

A **CNN** is a Deep Learning algorithm which can take in an input image, assign importance to various aspects/objects in the image and be able to differentiate one from the other.

1. Convolution Layer
2. Pooling Layer
3. Fully – Connected Layer

❖ VGG-16

VGG-16 is a convolutional neural network that is 16 layers deep.

- Loads a set of weights pre-trained on ImageNet
- Default input size is 224 x 224 pixels with 3 channels for RGB image.
- Contains convolution layers of 3x3 filter with a stride 1 and maxpool layer of 2x2 filter of stride 2.

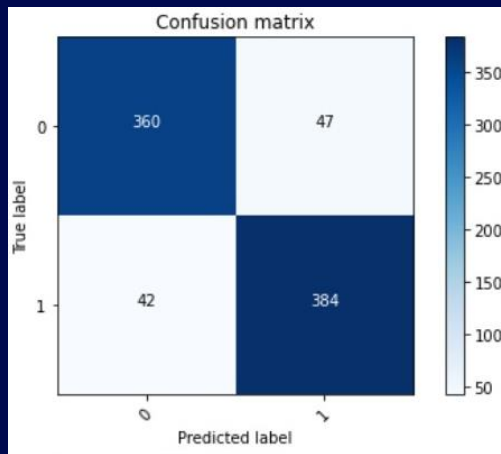
MODEL COMPARISON

CNN

Tampered accuracy - 94.4282%

Authentic accuracy - 92.4802%

Total accuracy - 92.9072%

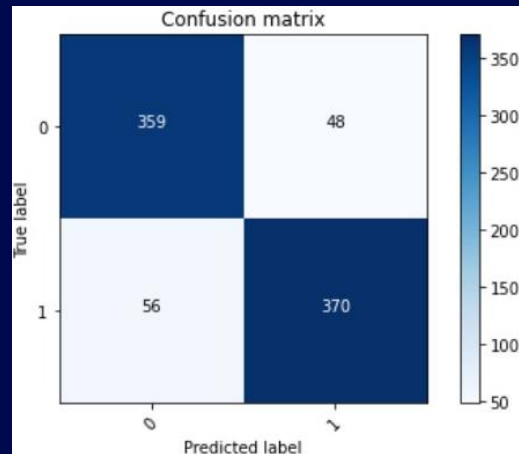


VGG16

Tampered accuracy - 93.2655%

Authentic accuracy - 88.5368%

Total accuracy - 89.5732%





CONCLUSION

- ❖ From the comparison, we conclude normal CNN model gives good accuracy.
- ❖ To conclude, while there is surely a lot of work still to be done in the image forgery detection domain, we believe that neural networks will be able to detect tampered images regardless of their difficulty in the near future.

