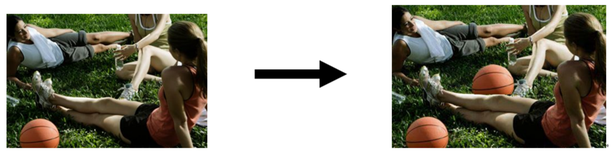
Augment and Adapt: A Simple Approach to Image Tampering Detection

R&D SHOWCASE

INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY HYDERABAD

INTRODUCTION

- Types of tampring under consideration : o*bject removal*, *copy-paste* and *splicing*. These are the most common forms of tampering.



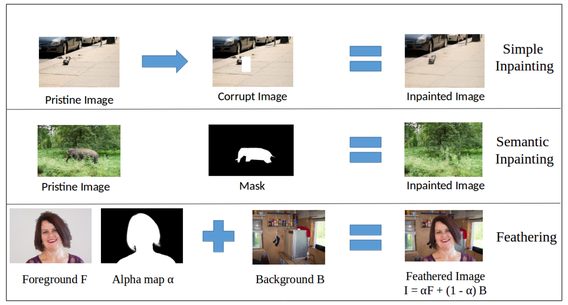
Copy-Paste

Splicing

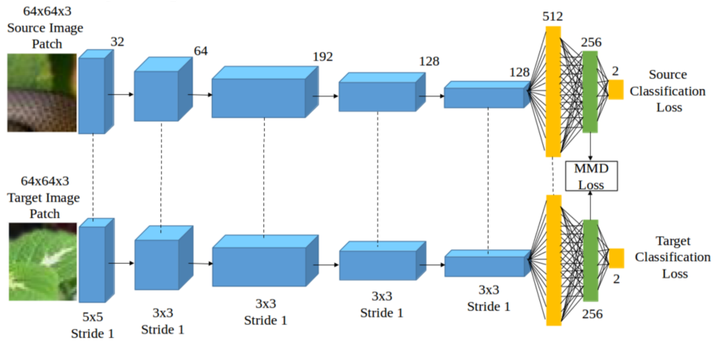
- Convolutional Neural Networks are shown to be promising for the general task of image tampering detection. However, they have not yet been fully exploited as the data available in terms of number of tampered images is still small.
- Manually generating tampered data using proprietary softwares is cumbersome and time consuming.
- The goal is to seek alternate methods of augmenting tampered data which can improve the tampering detection accuracies.
- In this work, inpainting and compositing are posited to be equivalent to tampering and is used as augmented data.

APPROACH

- Inpainted and composited images are obtained in order to augment the data.
- It is relatively straightforward and fast to generate this augmentable data.
- Three forms of augmenting schemes are chosen based on the type of tampering to be augmented.



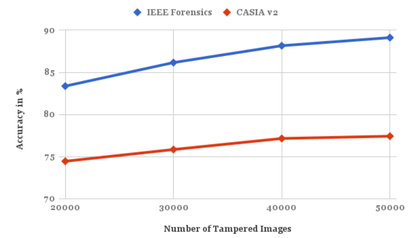
- Patch-based approach is used to train the network. Input to the network is of size 64x64x3.
- Approach is a Siamese Network wherein one stream is for source domain consisting of samples from generated data and the other stream is for the target domain which consists of samples from the manually tampered dataset images.
- An MMD [1] loss is incorporated to decrease the discrepancy between the two domains.

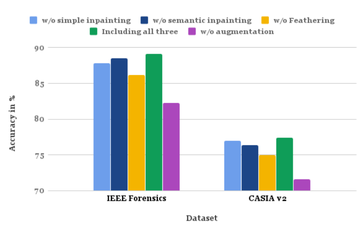


RESULTS

Method	IEEE Forensics	CASIA v2
Rota et al [2]	83.24	73.29
Bappy et al [3]	86.75	75.84
Train from scratch	82.25	71.61
Finetune on generated data	87.62	74.75
Proposed	**89.12**	**77.43**

Detection accuracies in % on two satndard datasets.





REFERENCES

1. E. Tzeng, J. Hoffman, N. Zhang, K. Saenko, and T. Darrell, “Deep domain confusion: Maximizing for domain invariance,” arXiv preprint arXiv:1412.3474, 2014.
2. P. Rota, E. Sangineto, V. Conotter, and C. Pramerdorfer, “Bad teacher or unruly student: Can deep learning say something in image forensics analysis?” in ICPR, 2016.
3. J. H. Bappy, A. K. Roy-Chowdhury, J. Bunk, L. Nataraj, and B. Manjunath, “Exploiting spatial structure for localizing manipulated image regions,” in ICCV, 2017.

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