Image Splicing Detection Through Illumination Inconsistencies and Deep Learning

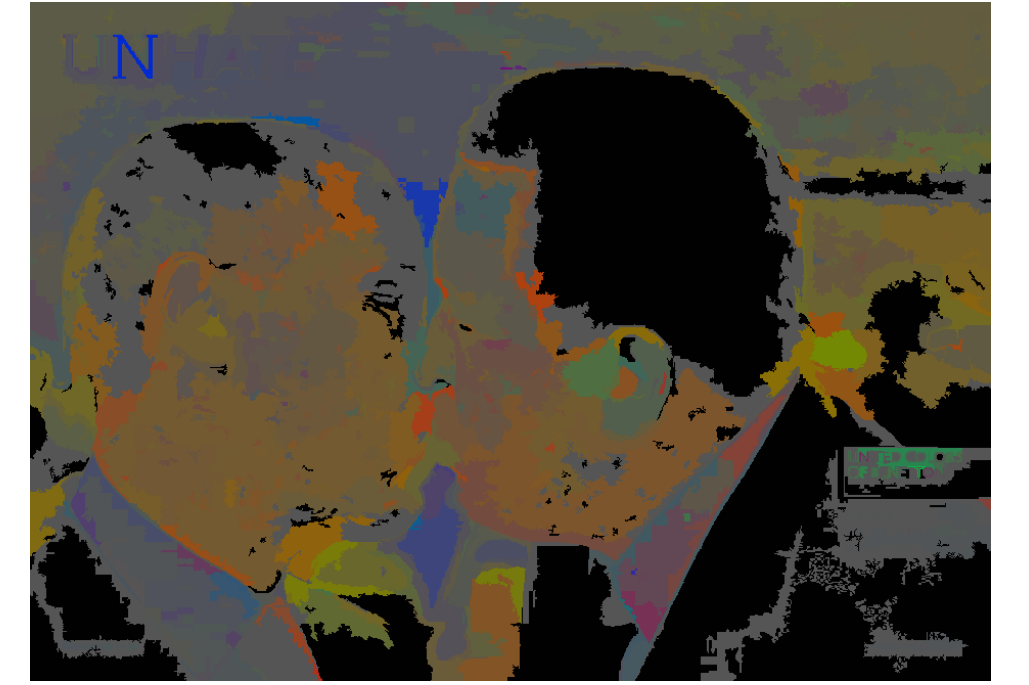Thales Pomari, Guilherme Ruppert, Edmar Rezende, Anderson Rocha and Tiago Carvalho

Motivation

The usage of splice images has become very popular, in special to try provide credibility to fake news. This wave of fake news and deep fake approaches could easily be used to sway the public opinion on an specific topic. For fighting back this problem, here we propose a new method that for splicing image detection and localization, that explores a combination between illumination characteristics and convolutional neural networks, resulting in a efficient and effective method.

Methodology

After generate illuminant maps, which are able to highlight illumination inconsistencies, proposed method uses ResNet-50 architecture and transfer learning process to extract relevant features, which are them classified by a SVM classifier.

Once a fake image is identified, our proposed method uses gradient information flowed from the final convolutional layer in our ResNet-50 to highlight forged region.

Illuminant Maps

Splicing image
RGB

Splicing image
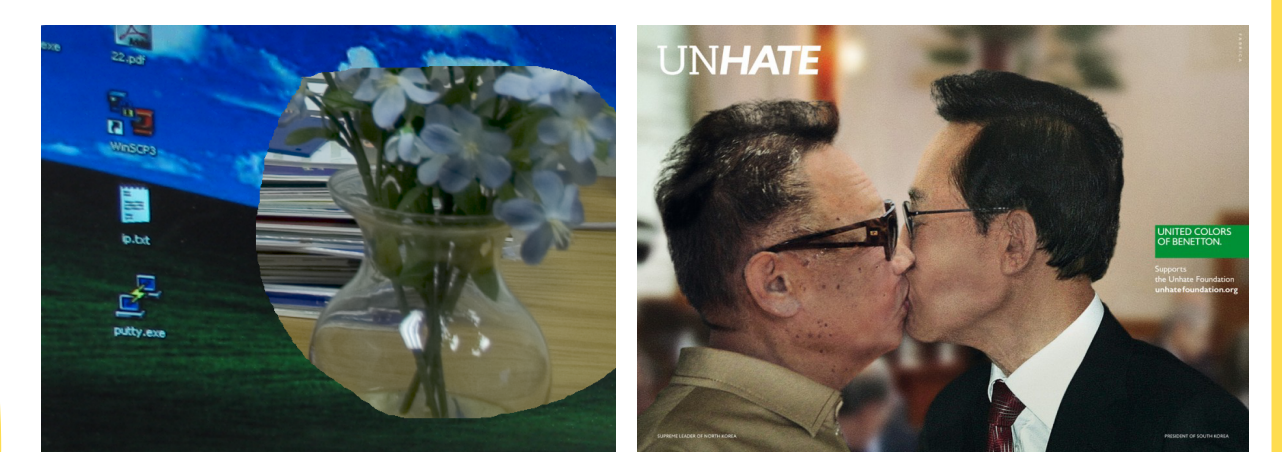Illuminant Map

The Problem

Distinguish between fake and pristine images

Datasets

Three public datasets have been evaluated: DSO, DSI, and Columbia
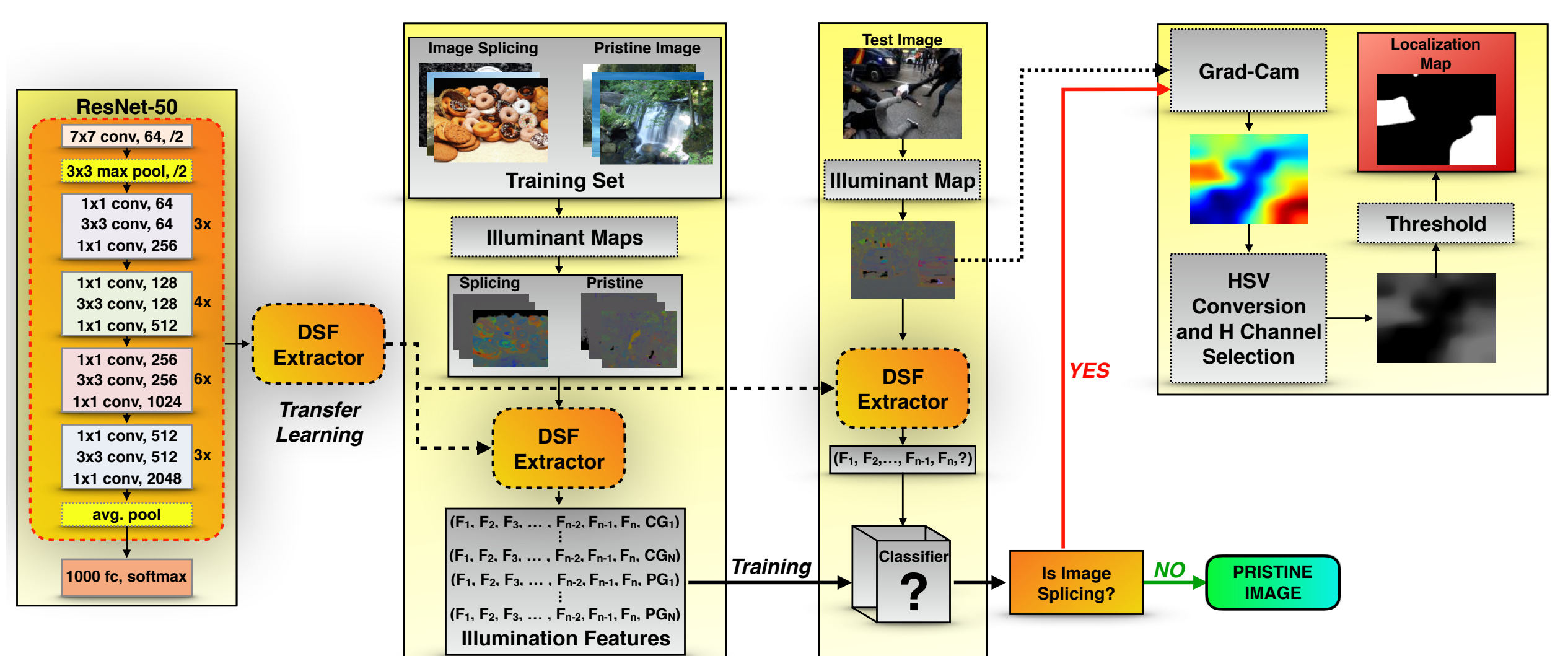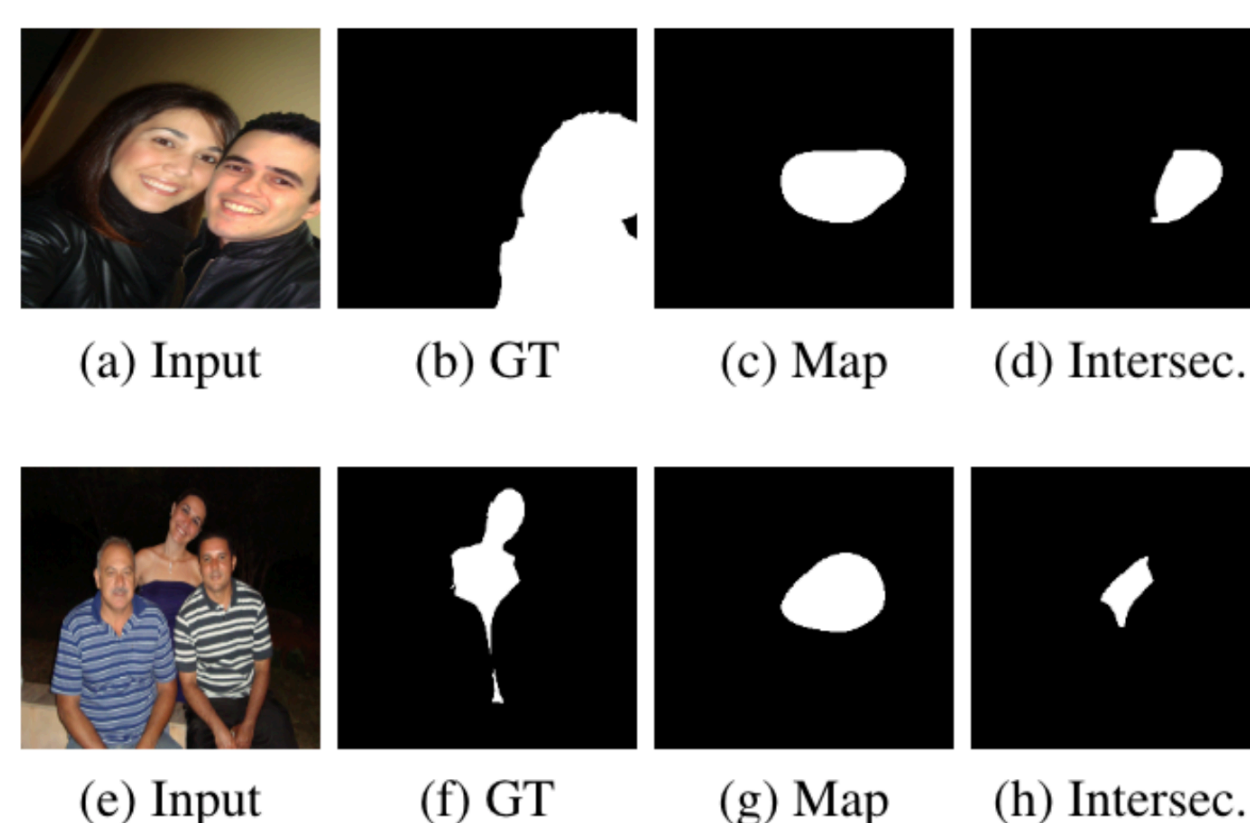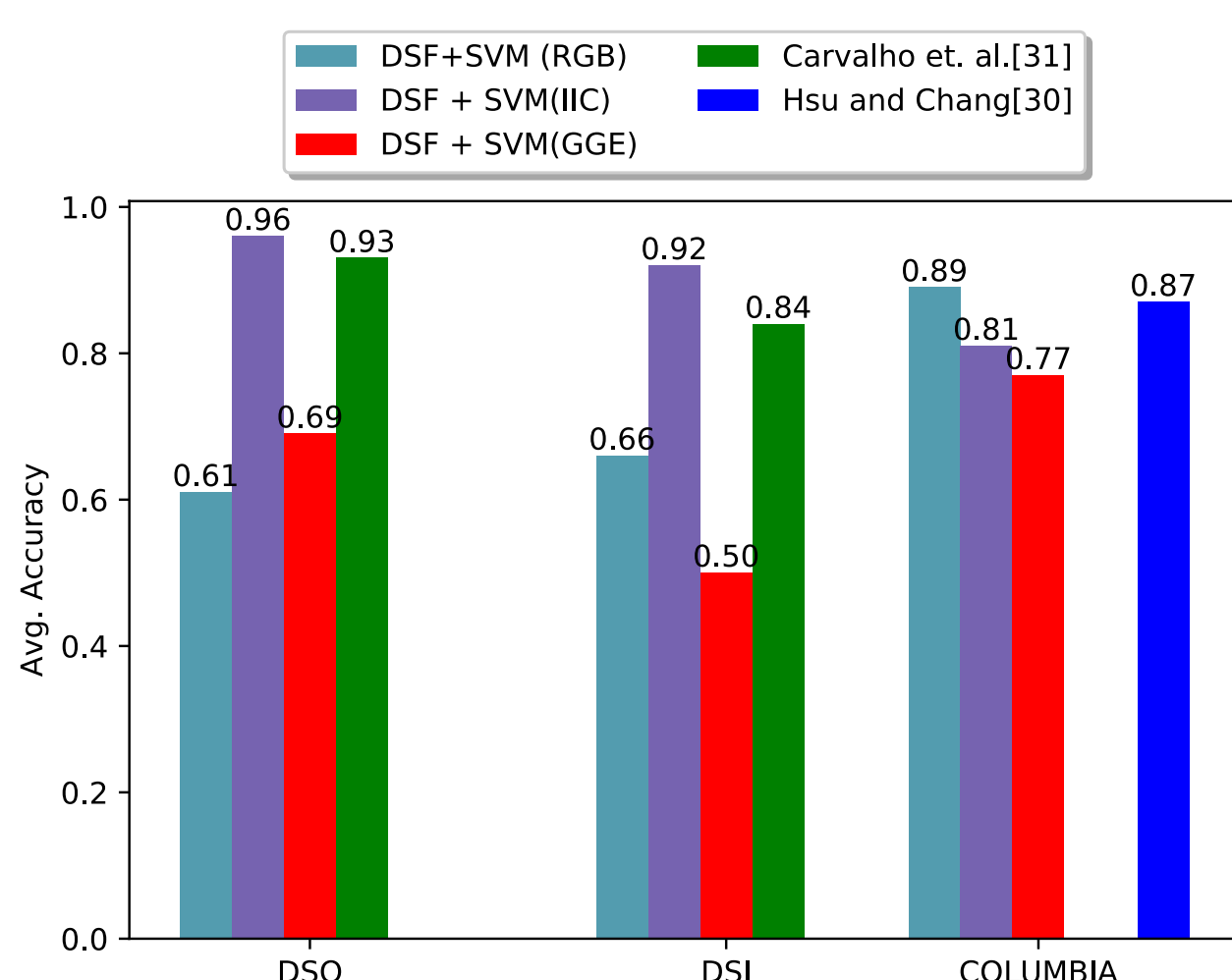

Columbia   DSI

DSO

Results

(a) Input   (b) GT   (c) Map   (d) Intersec.

(e) Input   (f) GT   (g) Map   (h) Intersec.

Acknowledgements