

DLCV 2020 Final Project

[RandomBaseline] Challenge 1 : Face Anti Spoofing

Team Member : R08921013 陳顯云 R08942035 許軒瑋 R09942075 邱耘偉

Introduction

Facial anti-spoofing is the task of preventing false facial verification from a photo, video or a different substitute for an authorized person's face. The goal of this task is to train a model for telling whether input images are Real or Fake.

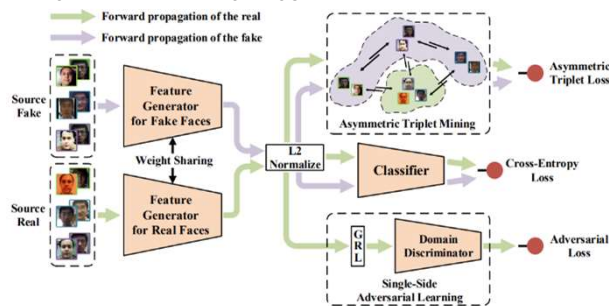


Methodology

Our solution is based on frame-by-frame classification approach. The framework we use is [1]. The main idea of this paper is to learn a generalized feature space, where the feature distribution of the real faces is compact while the feature distribution of the fake ones is distributed among domains but compact within each domain.

We also use heavy data augmentation in our method, especially background removal, we speculate that the spoofing artifacts on the faces (foreground) and background have obvious deviations. Due to this guess, we separate foreground face and background scenes in our training phase.

Network Architecture



Classifier: MLP

Feature Generator: Resnet-18 based

Domain Discriminator: MLP

Loss: Classification_Loss + Triplet_Loss + Adversarial_Loss

Experiments

Data Augmentation

RemoveBackground (RB), RandomHorizontalFlip, RandomAffine, RandomPerspective (RP), ColorJitter (CJ), RandomErasing (RE)

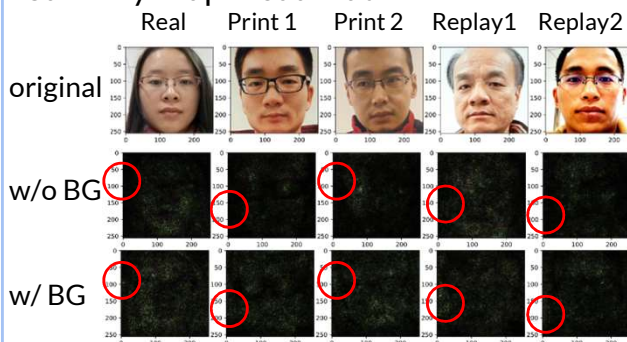
Ablation Study

	Oulu Testing	SiW Testing
No Data Augmentation	0.97401	0.91938
RB	0.98549	0.98764
RB+CJ	0.98795	0.98428
RB+CJ+RE	0.99506	0.99514
RB+CJ+RE+RP	0.99858	0.99559
only Background	0.98972	0.97832

Final Results

	Oulu	SiW
Testing AUC	0.99979	0.99559

Saliency Map Visualization



Conclusions

- We use the framework from [1] to solve the face anti-spoofing problem.
- We shows that in face anti-spoofing problem, model can easily be confused by the background.
- By heavy data augmentation, especially background removal, we achieved much better result compare to the model without data augmentation.
- We found that good data augmentation with simple model can easily outperform heavy model without it.

Reference: [1] Jia, Yunpei, et al. "Single-Side Domain Generalization for Face Anti-Spoofing." CVPR. 2020.