### **IMAGE COLORIZATION**

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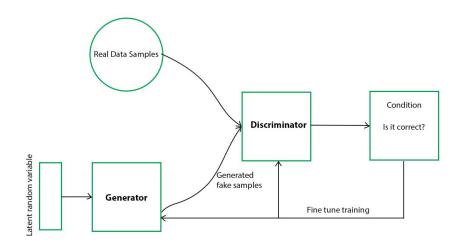
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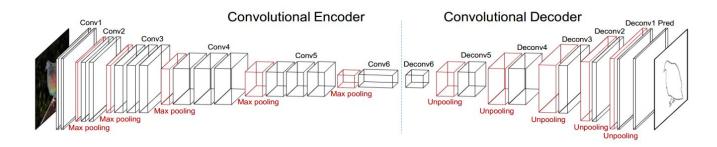
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#### Introduction

- What is Image Colorization?
- Possible problem scenarios
- Different architectures





# Image Colorization using CNNs and Inception-Resnet-v2:

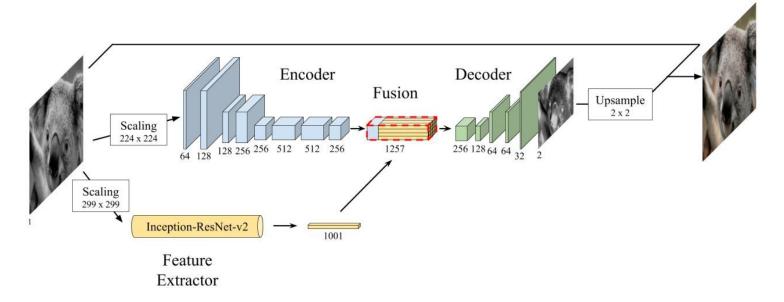
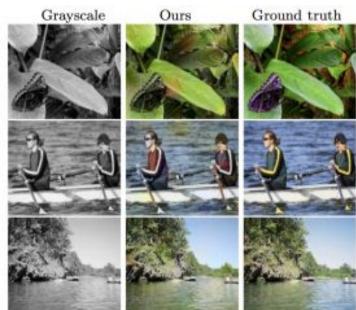


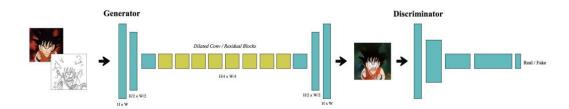
Image Colorization using CNNs and Inception-Resnet-v2:

- Mapping L\* to a\*b\*
- Pre-trained model used



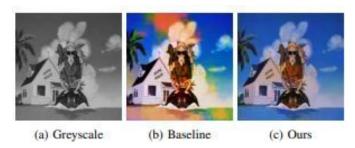
### Automatic Temporally Coherent Video Colorization:

- Convert Grayscale or line sketch images to colorized images using pervious coloured image.
- Using a U-net based GAN(Baseline).
- Use Style Loss, Content Loss, L1 Loss, etc.



## Automatic Temporally Coherent Video Colorization:

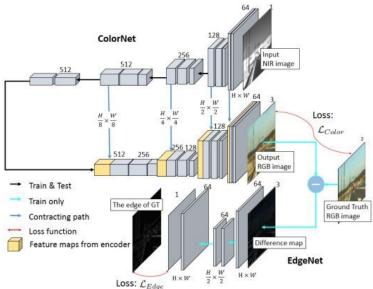
Effect of Losses



- When any new character is introduced
- Repetition of incorrect colourization

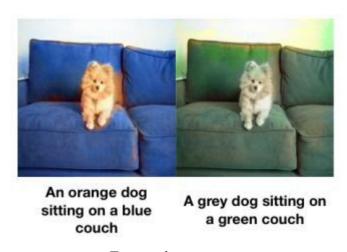
Infrared Image Colourization Using an S-Shape Network:

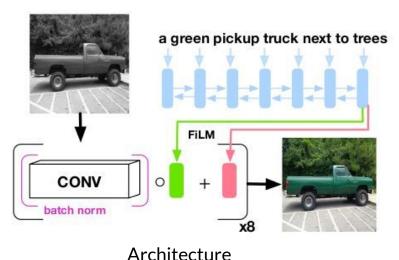
- Architecture
  - ColorNet
  - EdgeNet



### **Learning To Color From Language:**

Benefits of using caption for colourization





Example

### **Learning To Color From Language:**

- Limitation
- Scope of Improvement



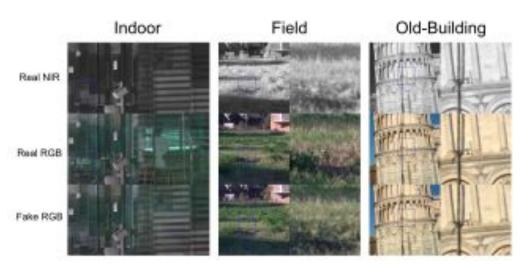
**Ground-truth image** 

**FCNN** output

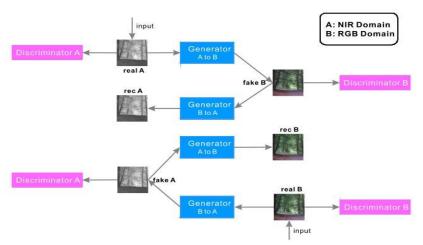
FILM conditioned on "a school bus driving on the road"

# NIR to RGB Domain Translation Using Asymmetric Cycle GAN:

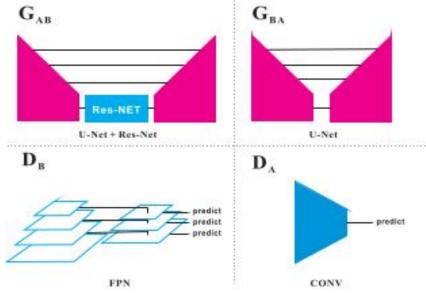
- NIR to RGB Conversion
- Use of Asymmetric Cyclic GAN



NIR to RGB Domain Translation Using Asymmetric Cycle GAN:



**RGURE 1.** NIR to RGB domain translation using asymmetric cycle GAN, redrawn from [14]. Single directional model often calculates  $L_1$  norm L(lake B, red B) as training loss. When real A is not registered with real B, the training loss is confused by unregistration but the cyclic loss L(lace A), E(lace A)



### **Near-Infrared Imagery Colorization:**

#### Conditional Generative Adversarial Network Model: (G) Triplet Level Generator Network (D) Discriminator Network Infrared Gaussian Gaussian Noise RGB Patch Generated Gaussian **RGB Patch** Generated **RGB Patch** Ground Truth G(z|y) D(z /y) Gaussian Noise 64x64x3 64x64x3 Gaussian 4x4x32 4x4x64 4x4x32 Noise Infrared Patch 64x64x1 64x5x5 128x5x5 64x5x5 32x5x5

Fig. 1. Illustration of the proposed triplet GAN architecture used for NIR image colorization.

64x64x1