Bauhaus Style

Dataset collection

CycleGAN dataset and Key Aspects

- 2 grid-type image datasets are required (source)
  - Class A of other type images
  - Class B of Bauhaus style images

- We are required to implement style transfer on the images from domain set X (non-Bauhaus style) ↠ domain set Y (Bauhaus style)
- The approach used here would be unsupervised learning ,i.e , we do not need to have exact correspondences between the two image sets , X and Y for the training to take place. (Source of images : deep-learning-v2-pytorch CycleGAN notebook)

Image set X (Summer) -(CycleGAN Transfer) ↠

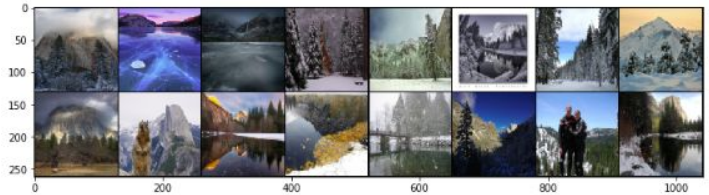
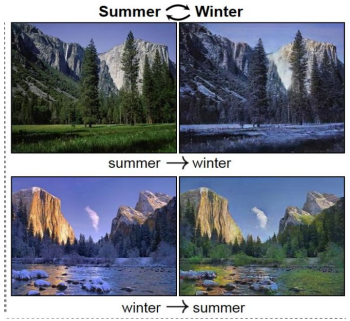
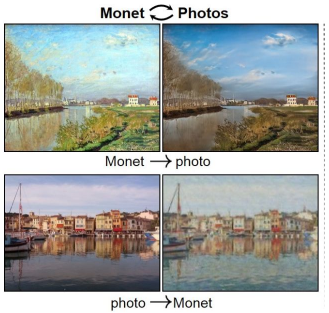


Image set Y (Winter)

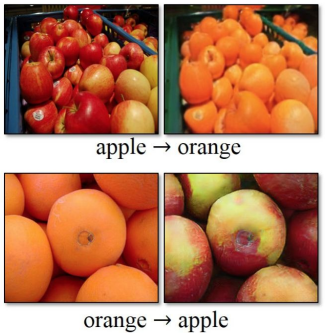
Dataset sample estimation



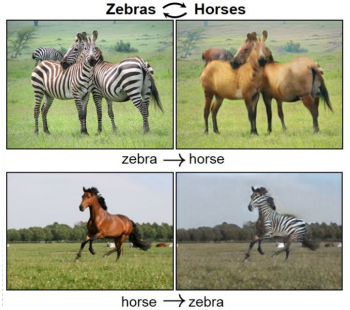
S: testA: 310 trainA: 1232 T: **1542**
W: testB: 239 trainB: 963 T: **1202**



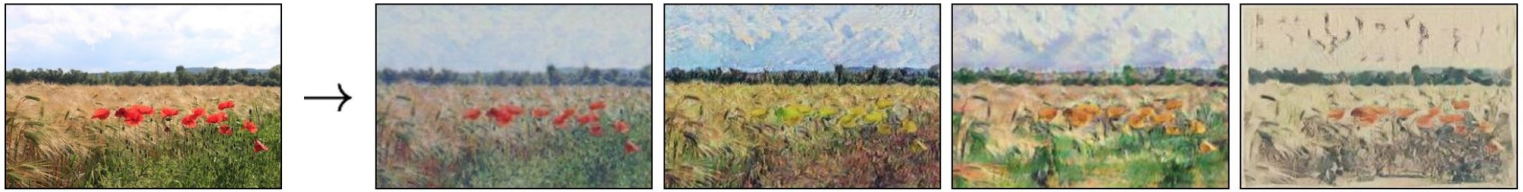
M: testA: 122 trainA: 1073 T: **1195**
P: testB: 752 trainB: 6288 T: **7040**



A: testA: 267 trainA: 996 T:**1263**
O: testB: 249 trainB: 1020 T:**1269**



testA: 121 trainA: 1068 T: **1189**
testB: 141 trainB: 1335 T: **1476**



VanGogn2photo

V: testA: 401 trainA: 401 T: **802**
P: testB: 752 trainB: 6288 T: **7040**

ukiyoe2photo

U: testA: 264 trainA: 563 T: **827**
P: testB: 752 trainB: 6288 T: **7040**

DomainA(notBauhausStyle): vast, wide, +, 'Photos'
trainA:[800,1000] testA:[150,250] Total:[950,1250]
DomainB(BauhausStyle): 'specific style', >'Monet'
trainB:[300,400] testB:[2000,2500] Total:[2300,2900]

Components of CycleGAN

- Input Image sets : X , Y
- Required output : Style transfer from set X to Y
- 2 sets of Discriminator Networks , task is to classify both sets X and Y as real or fake :

    -Convolutional neural network layers

    - Two different types , i.e : Encoder and Decoder

    - Discriminator losses

    - Training discriminator

- 2 sets of Generator Networks, task is to generate convincing fake images for X and Y:

    -Convolutional neural network layers

    -Residual Blocks

    -Generator losses

    -Training generator

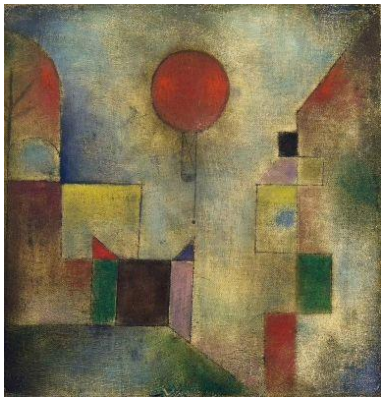
What is Bauhaus Style

- Style of design from Bauhaus Uni (1919)
- Origin of Bauhaus: (source)
    - 20th century
    - Most influential modernist art school
    - **Uniting art and industrial design**
    - Various aspects of Bauhaus:
        - Architecture
        - Interior
        - Furniture and Utensil
        - Textile
        - Woodwork
        - Fineart: Painting, Sculpture

Fundamental aspects of Bauhaus design

- Simple and minimalistic
- Manufacture-related products
- Functionality (Form Follows Function)
- Colors (Blue, Red, Yellow - or more)
- Geometry (Square, Circle, Triangle - or more))

Bauhaus Images



"Red Balloon"
Artist : Paul Klee

Light-Space-Modulator
Artist : László Moholy-Nagy

"Yellow-Red-Blue"
Artist : Wassily Kandinsky

Club Chair
Artist : Marcel Breuer

*Source : https://www.theartstory.org/movement/bauhaus/artworks/#pnt_8

Famous Figures

Color principle

- Johannes Itten
- Paul Klee

Painting

- Joost Schmidt, Wassily Kandinsky, Oskar Schlemmer, László Moholy-Nagy, Kurt Schmidt, Herbert Bayer

Photography

- Joost Schmidt, Lucia Moholy

Textile

- Ida Kerkovius, Gunta Stölzl, Anni Albers

Architecture & Interior

- Walter Gropius
- Herbert Bayer
- Alma Buscher
- Georg Muche

Wood Products

- Peter Keller, Josef Albers, Marcel Breuer, Alma Buscher, Josef Hartwig, Erich Dieckmann

Metal Products

- Christian Dell, Theodor Bogler, Adolf Meyer, Gyula Pap, Wilhelm WagenFeld, Ludwig Hirschfeld-Mack, Marianne Brandt, Wilhelm Wagenfeld

Data acquisition concepts

Field: Painting / Architecture / Furniture / Textile

- (famous) Bauhaus + Field (>200)
- Bauhaus + Artist Name + Field (5 - 10)
- Pictures

Counterpart Dataset:

- Painting: Renaissance Art, Impressionism, Modern Art
- Architecture: before: Ancient, Gaudí (source), after: Postmodernism, Sustainable
- Furniture: Ancient (Greek, Roman, Chinese)

Within Bauhaus Style Transfer

For example:

- Transfer Bauhaus Products/Buildings (simple, black, monotone) to colorful (Bauhaus Style) Painting .
- Also , the reverse as per requirement.

Challenge

- Quality insurance of the dataset?
- Google images:
  - Several objects in one image
  - True Origin of image (from Bauhaus Artist or just based on Bauhaus Style)
  - Duplicate
- Solution:
  - Generalize / Specify the key words
  - Manual Check?
  - Pictures from Books , Museum

IDEA: To ensure that the acquired data that is satisfied(real Bauhaus Style), We can get a portion of images from the guaranteed source, z.B book, museum. Building the neural network to train these images so that we can filter the images we searched/downloaded from google.