DEEP DREAMING AND ARTISTIC STYLE TRANSFER

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ABSTRACT: Rendering the semantic content of an image in different styles is a difficult image processing task. Arguably, a major limiting factor approaches has been the lack of image representations that explicitly represent semantic information and, thus, allow to separate image content from style. Here we use image representations derived from Convolutional Neural Networks optimised for object recognition, which make high level image information explicit. We introduce A Neural Algorithm of Artistic Style that can separate and recombine the image content and style of natural images. The algorithm allows us to produce new images of high perceptual quality that combine the content of an arbitrary photograph with the appearance of numerous wellknown artworks. Our results provide new insights into the deep image representations learned by Convolutional Neural Networks and demonstrate their potential for high level image synthesis and manipulation.
Keywords: Machine Learning, Deep Learning, Convolutional Neural Network.

I. INTRODUCTION

Artistic Style Transfer is a process of merging three images a base image, content image and a style image. We adjust the proportions of each such that it will look like the content image but will be printed like the style images, i.e we make the base image much similar to both the content and the style image.

Convolutional Neural Network

CNN is a type of neural network that is mainly used for image classification. It is a Key factor in computer vision to solve problems like face recognition, image recognition etc. Here we train the raw image and obtain the necessary details after several epochs. There are many network frameworks popular of which is VGG(Visual Geometry Group) .

Deep Dreaming

Deep Dreaming is the base or foundation for Artistic style transfer. Here we follow the same steps as that of Style Transfer. We take a base image, a content image and a style image, we merge these three to have a hallucinating effect to the base image. We make use of CNN and inception network, inception network is network of networks, in this network we merge all the convo and max pool layers to obtain a bigger network where task is assigned to each intermediate sub network and the final result as passed on as a single channel using softmax layer.

II. OBJECTIVES

- To obtain a Neural Styleimage.
- To obtain a hallucinating Deep Dreamedimage.
- To make use of these images as a tool for building web applications or mobile applications ex : prismaapp.
- To understand the concept of Inception model and VGG frameworks.
- To get familiar with the cloud environments such as colab,cloud9etc.

APPLICATIONS

- Deep dreaming is used as a base for artistic styletransfer.
- It can be used as a social mediaapplication.
- Itcanbeusedfordataaugmentation.
- It can be applied to naturallanguage
- It can be used as a form ofart
- It is used to obtain some detailed features from historicimages.

TOOLS AMD TECHNOLOGIES USED

HARDWARE TOOLS

- Laptop
- GPU Nvidia GeForce1050Ti

SOFTWARE TOOLS

SoftwareEnvironment

- GoogleColab
- Jupiternotebook
- Anacondanavigator
- EagerExecution

SoftwareTechnologies

- Convolutional NeuralNetworks
- InceptionModel
- VGGNetwork

Frameworks

- Keras
- Tensorflow

Libraries

- Numpy
- PIL
- Matlib
- Octave
- Time

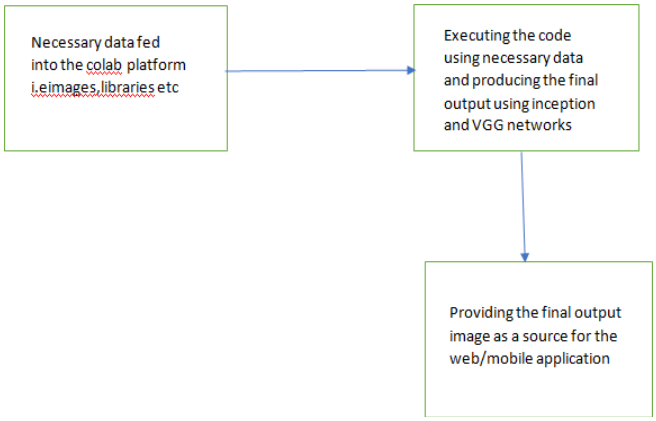
III. SYSTEM DESIGN AND IMPLEMENTATION

The gist of implementation is that we take a base image, content image and a style image , we feed all the three to a VGG network. We make use of Google colab as a platform for the execution, we use eager Execution as a framework for faster execution.

User casedescription

System	Scenario
Use case	Styled image
Description	We obtained a styled image which can befed as a result tothe application that we are wishing todevelop.

Architecture



• Description of the implementation

Here we make use of the colab cloud environment, this is a platform by google we input the necessary data , install the necessary library and we use keras and tensorflow as framework for execution.

Artistic Style Transfer steps :

- ArtLoad the content and the style image from any source or your personal computer.
- Resize the image asrequired.
- Make use of Eager Execution for faster execution of thecode.
- Use a VGG19 network and assign task to each of the hidden layers and obtain the final output by softmax layer.
- compute the style and contentloss.
- Run the code for some iterations say100.
- Display the styledimage.

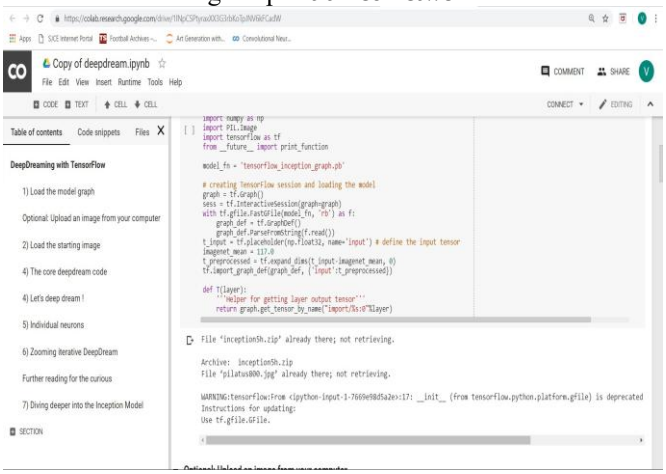
Deep Dreaming Steps :

- Load the content and the style image from any source or your personal computer.
- Resize the image asrequired.
- Here we use a array called octave for storing the intermediateresults
- Run the code by making use of a VGG 16 network using gradientdecent.
- Compute thelosses.
- Customize your code for changing the attributes values ofoctave.
- Visualize theoutput

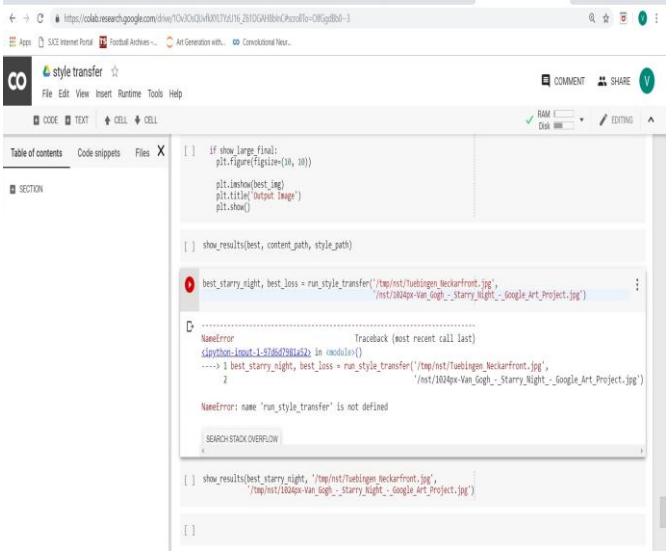
SYSTEM TESTING AND RESULT

We came across many errors while execution, as we have only one component so we deal with only unit testing there is no integrity testing in our project

• ERROR 1:Loading the pre-trained network



• ERROR 2:Failed to load the image for calculating gradient descent



The following is the output for the deep dreaming code with the parameters set to the shown values

Figure 4.1: Parameters

Figure 4.2: Output Image

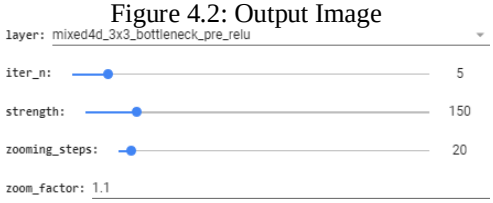
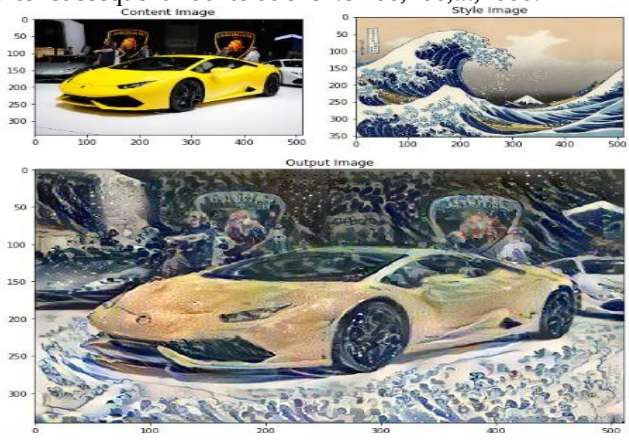


Figure 4.3: Parameters

Figure 4.4: Output Image following is the result of the neural style transfer

Figure 4.5: The image shows the output of the style transfer after subsequent 100 iterations i.e 100,200,...,1000.



IV. CONCLUSION

We thus obtained a styled and a deep dreamed image using necessary tools. We can use these images for application purposes, we can build a web or mobile application , there are many mobile apps such as prisma,Instagram etc which make use of this concept to provide filters for images.

REERENCES

[1] https://www.tensorflow.org/lite/models/style_transfer/overview
[2] https://towardsdatascience.com/artistic-style-transfer-b7566a216431
[3] https://medium.com/artists-and-machine-intelligence/neural-artistic-style-transfer-a-comprehensive-look-f54d8649c199
[4] https://deepdreamgenerator.com/
[5] https://en.wikipedia.org/wiki/DeepDreamof Electrical, Electronics and Data Communication, ISSN: 2320-2084.
[6] Design and Implementation of Digital Notice Board Using Power Line Com-munication.
[7] Guifen Gu and Guili Peng The Survey of GSM Wireless Communication Sys- tem, International Conference on Computer and Information Application(ICCIA 2010).
[8] Shruthi K., HarshaChawla, AbhishekBhaduri SMART NOTICE BOARD", Department of Electronics and Communication, Manipal Institute of Technology, Manipal University,Karnataka.
[9] https://www.researchgate.net/publication/323958492_Wireless_notice_board_using_GSM
[10] https://www.instructables.com/id/Digital-Notice-Board-Using-Raspberry-Pi-and-MQTT-P/

