

National Institute of Technology, Calicut



Cartooning Of An Image - Report I Image Processing

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Group - 6

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1. Problem Identification :

The term "cartoon" dates back to the Middle Ages and was originally used to describe a preparatory drawing for a work of art, such as a painting or fresco. It is a simple drawing that exaggerates the features of its subjects humorously, particularly one that seems in a newspaper or magazine, especially a satirical one. Previously, cartoons were solely for amusement. For a long time, cartoons have been widely used as a pedagogy tool.

However, in today's world, the major concern is time. Since it took a lot of time to draw the cartoon images manually. Because of which a variety of technology is now at our disposal to make the work ease and reduce the time. So here, we have to use those technologies and make a cartoon effect of an image.

2. Objective :

The main objective of this project is to transform the images or snapshots into cartoon images. So, it will help in today's scenario of the Cartooning of an image.

- As we all are familiar with today's demand of anime movies and cartoons that are widely used in publications to express political commentary and editorial opinion, as well as in magazines for social entertainment and visual irony.
- This is a brief summary of Cartoons, and Comic Strip, as well as Short Films like Animation for anime films.
- In this we can also have a look over the majority of books with cartoons are magazine-format "comic books," or editions of newspaper cartoons.
- With the help of this project we can teach our young ones about our society and about today's situation and what we are going through in any field. With this they will understand the current scenario easily as they used to watch cartoons and animes from which they are understanding more rather than articles.
- Political cartoons are a drawing (often a cartoon character) used to express editorial comment on governance, politicians, and current affairs. Such cartoons have a place in the political discussion of a culture that values freedom of the press which is also playing a vital role in politics.

3. Related Work

- **Automatic Cartoon Colorization -By Shivangi Kesharwani [M190402CA]**

This paper deals with automatic cartoon colorization which is done by **Domonkos Varga and his team**. They have shown that proper color filling is possible in different scales of cartoon images. Where there were many directions for further research. Unfortunately, the color uncertainty in cartoons is much higher than in natural images.

To overcome this problem, they examined the learning based colorization problem using additional information such as color-scribbles or a colorful reference image. The another direction of research would be the fine-tuning of VGG-16 based algorithms on the cartoon domain which they have used .

In this the method can also be extended to decolorize highly textured natural images as cartoon-like samples, where the cartoon part and the textures can be separated and this artificially de-textured image can be filled by recoloring to get a cartoon-like colored image and this artificially de-textured image can be filled by recoloring to get a cartoon-like colored image.

- **Non-photorealistic Rendering - By Apurva Rathore [M190376CA]**

Non-photorealistic Rendering (NPR) reflects image elements with artistic modes, such as pencil sketching, dyes, watercolor. Image cartoonization is also broadly studied from a filtering-based method to an end-to-end neural network, covering the use cases of pictures, videos, and portraits.

NPR algorithms that synthesize images with cultural style by integrating the content of one image with the style of another are known as neural style transfer methods. They have used an end-to-end network with awareness loss to speed up stylization.

In image abstraction, NPR methods are generally used. These techniques are widely used for cartoon-related applications because they highlight textual edges while filtering out image specifics and giving abstracted optical knowledge of initial images. This method learns the cartoon data distribution from a collection of cartoon images, unlike style transfer methods that use a single image as a reference or image abstraction methods that only consider material images. As a result, the model will produce high-quality cartoon images for a wide range of scenarios.

- **Ruben Winastwan - By Naziya Khanam [M190393CA]**

According to this article, we basically need to use two steps to convert an image into cartoon, Edge detection and region smoothing. Region smoothing is to reduce the noise. We can get different - different cartoon effects according to the filters we apply. Here, he is using pencil sketch, Detail enhancement, bilateral filter and pencil edges. In Pencil sketch, he is converting the image into grayscale image and blurred it using GaussianBlur(). The stronger the blurry effects, the more the value of each pixel changes with respect to its origin and hence, it gives us a sharper pencil sketch. He used a Bilateral filter for smoothing the image and to reduce noise from it. If we will take bitwise and of pencil sketches and bilateral filtered images we will get a good cartoon effect.

- **Image-to-Image Translation - By Saif Ali Khan [M190379CA]**

Image-to-Image Translation addresses the issue of converting images from a source domain to another target domain. Its uses include improvement of image clarity, stylization of paint pictures, cartoon photographs and drawings, as well as grayscale picture colorization and drawing colorization.

Bi-directional templates for cross-domain translation have also recently been implemented. Transforms the unpaired photos (i.e. summer to winter, photo to paints). In this article, they follow an unpaired image-to-image conversion method for image cartooning.

In contrast to previous black-box models that direct network training with failure terms, we decompose images into multiple representations that require the network to learn various features with distinct goals, making the learning process controllable and tunable.

- **Cartoon Photo Effect Application - By Nidhi Redekar [M190366CA]**

In this research work, Mr. Kevin Dade had used cel-shading effects offered by graphics engines. Cel shading or toon shading is an art style of rendering designed to make 3D computer graphics or artworks look three-dimensional by creating flat colors on top of a base color, making the object look 3-D while still keeping that 2D effect in it.

Mr. Kevin had also used tools like OpenCV4Android, Bilateral Filters, Median Filters. He had divided his algorithm to produce a cartoon image into 2 parts i.e detecting edges of the image and quantizing the colors of the image and had combined both resulting images. **Mr. Kevin named this tool TOONIFY.**

- **A Personalized Image-based Cartoon System - By Kundan Singh Bhadoriya [M190661CA]**

This research work is done by Mr. Hong Chen and the team and they name it **PicToon**. PicToon is a cartoon system that can generate a personalized cartoon face from an input Picture. This tool consists of three major components: an image-based Cartoon Generator, an interactive Cartoon Editor for exaggeration, and a speech-driven Cartoon Animator. In their cartoon generation approach, an effective non-parametric sampling scheme along with a flexible facial template is implemented to automatically extract a stylistic facial sketch from an input image. The aim of Mr. Hong, while this research was to create a user-friendly platform to create, personalized cartoons and that too with a vision of an artist.

- **CartoonGAN -By Saurabh Shahi [M190378CA]**

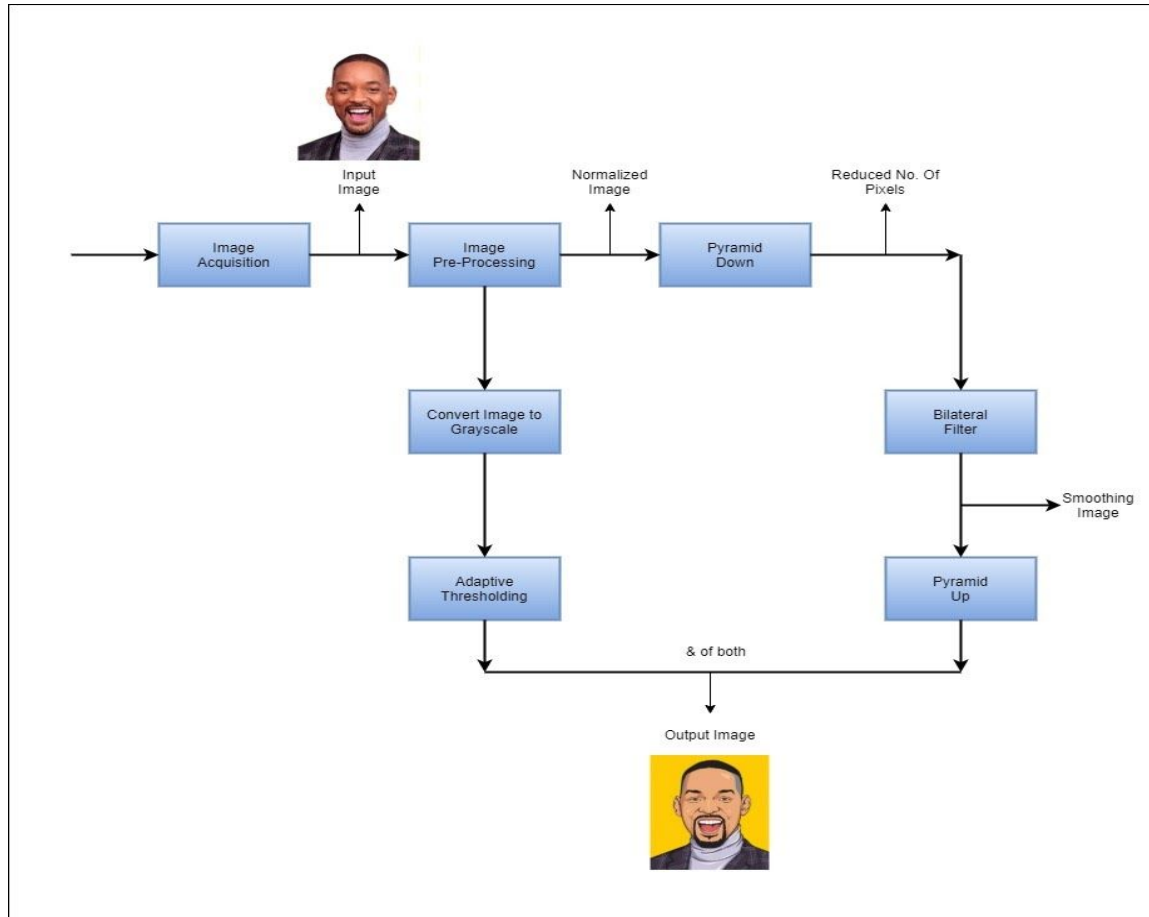
Mr. Yang Chen and his team are responsible for this study. Two CNNs make up a GAN structure. The first is the generator G, which has been programmed to generate output that deceives the discriminator. The discriminator D, on the other hand, determines whether the image is from a real target manifold or a synthetic one. The generator and discriminator networks are tailored to the unique characteristics of cartoon pictures.

The generator network G is used in CartoonGAN to map input images to the cartoon manifold. After the model has been conditioned, it is stylized into a cartoon. G starts with a flat convolution point, then uses two down-convolution blocks to compress and encode the images spatially. This stage extracts useful local signals for use further down the line.

- **International Research Journal Of Engineering and Technology(IRJET)- By Anjali Sharma [M190374CA]**

In this research paper, the author is transforming realistic images and videos into Cartoon images and video by Using GAN (Generative Adversarial Network) as clearly as possible. With the help of the loss function and its two types named as Adversarial loss and Content Loss, they got a flexible as well as a clear edge defined images. Also with the help of CV2 which is known as Computer vision, we have transformed video into animation(cartoonized video).

4. Block diagram:



Acquisition : Firstly, we have to retrieve the image from the source, in our case we are accessing it from our pc. The acquired image is unprocessed.

Pre-Processing : The aim of pre-processing is an improvement of an image. Our image will be read in BGR format so we have to convert it into RGB.

Pyramid-Down : It will reduce the number of pixels of the image.

Bilateral Filter : This is for filtering of an image, It will make the image smooth and reduce the noise.

Pyramid-up : It will increase the number of pixels of the image.

Grayscale Image : It will convert the image into grayscale image.

Adaptive Thresholding : It is used to identify the edges of the image, it contains 3 techniques, mean, median and Gaussian Blur, Here we will use Gaussian Blur.

Now we have filtered the image and identified its edges, By doing bitwise and of this 2, we will get our cartoon effect image.

5. How Python and simulator will support our project :

Python has a huge library and in our project, we are using open-cv, which provides a common infrastructure for computer vision application.

We are using jupyter notebook as a platform for this project with python 3.6.

We import this library in jupyter notebook and other libraries too like Numpy or Matplotlib for visualization.

The input and output will be an image that we will read from our pc and on that image we will perform a cartoon effect with the help of some built in functions provided by python.

6. References

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