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## Cartoonify Image using Bilateral Filter and Adaptive Threshold

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### ABSTRACT

*In the ever evolving technology and research in various domains processing of an image which having an object in an image, finding out dimensions, the objects count, changing images to blurring effect and providing animated features are given appreciation in the modern world involving media and communication. There are multiple properties in image processing. Each of property helps to produce image with more clarity. Each image is looked through various grids. Each picture element is together viewed as a 2-D matrix. With each cell storing different individual pixel values corresponding to every cell of picture element.*

**Keywords:** Image Processing, Animated Features, 2-D Matrix

### 1. INTRODUCTION

Advanced technology is rapidly becoming the integral part of our life. To satisfy our needs as a society, almost in each department of work, we use the technology. In the present era computer science is important subject. It provides real life applications such as cloud computing, remote monitoring, Wireless sensor network, internet of things, Neural network, artificial intelligence, internet Security and so on. Technology is the medium by which user can store, get, communicate and utilize the information. The image processing technology plays a important role in all computers related applications. The image processing takes place in many real-life scenarios, e.g., home security, banking system, education sector, defense system, Railway, and so on. In this paper we discuss about the cartooning of an image. There are many factors that enables to give out the essence of an image. The concerns are contrasting and suitable color mixing, matching between pixels connecting cells, precise placing of objects together resulting production of image features. In the recent times technological advancements resulted in many fields especially in medical field processing of images

enabled us to get accurate images. Image Processing is widely used in the medical field such as in the MRI/ET scans [14]. The research in the image processing has helped in early detection of tumors. This research helps in livelihood in detecting issues and early treatment can be provided. These improved concepts have enabled to build better security systems which provides safety. The security/surveillance systems have managed to build systems using image processing algorithms. The recent technology of fingerprint system, face detection systems has resulted in providing better security. These Biometric systems can be installed on to smaller devices for the simpler usage. The basic concept of cartooning is to use the technique of converting the image to an accurate, precise, cartooned image with multiple filtration with proper facilitation of edge retain. This paper involving bilateral filter and adaptive threshold technique of image process essentially provides an artistic effect and comics with wide range of pictures.

### 2. LITERATURE SURVEY

Animation pictures takes our daily life instances and implements it in cartoon world where there is room for for technical research and development in field of image processing[1-2]. The natural animation object cartooning is exceptionally helpful in various applications; one of the most important one is the animation images recovery, where the client for animation images recovery framework concentrates to get related images to question image from information base in character (i.e., a client has animation image with object Dora, so the client will focus to get all applicable images with Dora character). Today, many of analysts have misused the ideas related with content based pictures recovery (CBIR) to look for animation images having specific object(s) of interest [3]. A few area based many recovery techniques and applications proposed, for additional information see [4-6]. A part of the programmed techniques and methods, which differs the regions of premium from the different less

helpful areas of picture, have been adjusted and many functions are introduced to recover animation features [7-8]; they make use of incomplete highlights for studying locales and additionally angles which will be helpful for animation representation. A few advancements go past separating focal papers [3], others made use of Salient Object Detection (SOD) [9-12]. In this paper, a basic strategy for cartooning images is presented.

### 3. OBJECTIVE OF RESULT

- ❖ Rapid image processing technique with high detection rates.
- ❖ To provide High accuracy model which is precise as compare to current existing models.
- ❖ To provide possibly low false positive rate.

### 4. METHODOLOGY

The process of creating a cartoon effect of an image can be initially branched into 2 divisions – 1)Reduction of color palette 2)Highlighted Edges.

#### 4.1 Reduction of color palette

The most important task is to minimize the color regions and apply cartoon features. Through this method, the colors are minimized on multiple filters so as to create a equal color regions.

**BILATERAL FILTERING-** The important aspect of this filter is to smooth the images without creating any sort of noise also while preserving the edges. Filtering is performed by reading an image in a file and storing image in a matrix object. Firstly creating an empty matrix to store the result and applying bilateral filter. The nature of filter totally depends on the kernel size and testing by running many number of iterations.

**GAUSSIAN BLUR-** It is a widely used effect in image processing, typically to reduce image noise and minimize detail. Gaussian smoothing is used as a initial process in computer vision algorithms with intention to improve image structures at different scales.

#### 4.2 Highlighted Edges

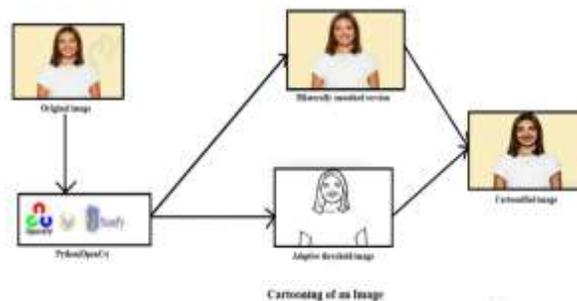
Figuring out smooth outline that represents or bounds image shape is an important property to receive a quality image. All Edge processing tasks done here are:

**MEDIAN BLUR** – In the process of smoothing the image a blur effect is applied. This is done with the help of median Blur() function. Here the center pixel is made to assign a mean value which is the mean of all the pixels existing under the kernel. It also helps to remove noise in the image.

**ADAPTIVE THRESHOLD** - In this step we try in retrieval of edges and highlight them. This is carried out by adaptive threshold. The threshold value is the mean value of surrounding pixel values that comes under a single block minus constant  $c$ .  $c$  is constant that is to be subtracted from the mean of surrounding neighborhood pixels.

#### 4.3 Combine of reduction of color palette and highlighted edges image

The final task is done by masking where we perform bit wise and on the highlighted edges and the smooth colors. With this we get a cartoon image.



**Fig 1: The Cartooning of an Image**

### 5. CONCLUSION

Reduction of color palette and highlighted edges are two common problems in cartooning image. This paper proposes an efficient method for cartooning images. The test results by using proposed method of cartooning will show that the developed method could possibly extract meaningful cartoon objects well in different characters and backgrounds. The cartoon objects that are extracted are expected to be effectively used in cartoon image retrieval because they can surely are able to represent the color characteristics of cartoon objects well. The result of the experiment shows we get a precise cartoon image by using bilateral filter and adaptive threshold methods with complete removal of noise and retain of clear edges from the original images. In short this method could be most reliable methods for cartooning images.

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