Toonify: Cartoon Photo Effect Application

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ABSTRACT
The goal of this project is to create artistically and comically appealing results from a wide variety of input images. We will be implementing this paper from a sample project done at Stanford:
Toonify →https://stacks.stanford.edu/file/druid:yt916dh6570/Dade_Toonify.pdf.

KEYWORDS
⋆ Edge detection ⋆ Morphological operations ⋆ Edge filters ⋆ Bilateral filter ⋆ Color quantization

INTRODUCTION
Cartoons have always been a topic of interest for people. For children in T.V. shows to adults in caricatures, illustrations and posters, cartoons have always played a role in our lives. The emerging trend of social media and image filters, people have creatively come up with new ways to modify/enhance photos and videos. Keeping both these aspects in mind, this feature will have significant applications in the world.

METHODS AND PROCEDURES (ALGORITHMS)
The method of producing cartoon effect is divides in two branches :

1. Detecting and boldening edges
2. Smoothing and quantizing the colors in the image.

For the first branch, we will be implementing Canny edge detection algorithm. We will also use morphological operations and edge filters for edge detection.

For the second branch, we will be implementing edge-preserving bilateral filtering and median filtering. The final step is to combine the two results to produce the output image with cartoon effect.

EVALUATION/VALIDATION STRATEGY
As Toonify seeks to meet aesthetic goal, measuring its success poses some difficult problems. The main goals are to achieve solid continuous contours, avoid small line clutters and achieve large homogeneous color regions to make the output image as good as possible.

DATASETS
The data to test the algorithm will contain a variety of images from the real world. We will ensure that this application will satisfactorily work on a spectrum of images like nature, portrays, man-made structures, etc. We will then try to extend it to videos(if time permits).

EXTENSION
We will try to extend the work to videos. At first, we will Toonify each frame independently and then improve it to make it better in case of noise by independently applying noise reduction filters on each frame and also exploiting the fact that consecutive frames will be correlated.