Create Pointillism Art with 3 Primary Colors from Natural Images

Project Proposal

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Description

Pointillism is a branch of impressionism that can be dated back to the late 19th century. It is a painting technique that only uses tiny, distinct dots to form patterns of color. It enjoys a duality in being both discrete up close (the dots) and continuous from distance (the patterns). Combining this artistic inspiration with the techniques of digital image processing, we want to develop a special image filter that creates pointillism art from ordinary digital images.
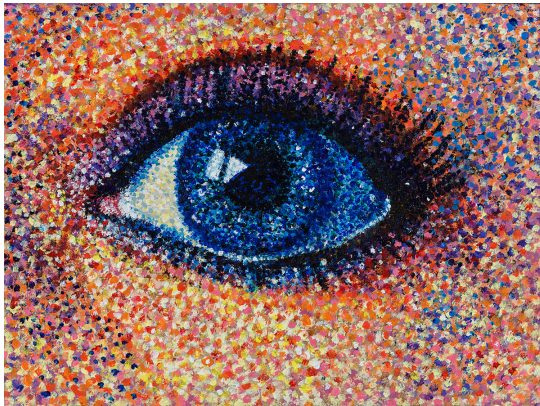
Plan

The process of creating pointillism art will be as followed:

(1) We take an image.

(2) We will apply various image processing techniques to our image, such as blurring the image with a structuring element that is larger and proportional to the size of the dots we want to use in our pointillism art.

(3) We will then downsample the image to reduce the resolution of the image. By blurring the image and downsampling, we want to create an image that allows us to more easily deconstruct the image into Pointillism art composed of 3 primary colors.

(4) After the preprocessing, we will determine the intensity map of the image by converting it to grayscale. The intensity map of the image will be used to determine a density map of the dots in our subsequent pointillism art.

(5) We will apply histogram normalization to the image to make it more saturated so that the distribution of colors in the image can be better mapped to the limited gamut of colors we can create with three primary colors. Then we can create a linear mapping between the colors in the image to the colors we want to use for the dots.

(6) Once the conversion is done, we will analyze pixels in the original image to create regions of dots that represent each pixel of the original image. We will determine the distribution of dots and color in the regions to closely represent the original pixel in an artistic manner. We will overlap the resulting regions of dots, to reduce artifacts and create a more blended distribution of dots across the entire resulting pointillism image.

(7) Once our Pointillism art is created, we will display the image on a printout. The goal is if you stand close to the art, the art looks like a bunch of dots, but the farther you stand from it, then it looks like an artistic representation of the image.

The procedures here are tentative and subject to changes for the pursuit of aesthetics.

Equipment

We won't be using an Android device.

References

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