

# Autocontrast

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## 1 Introduction

This work addresses the problem of analyzing histograms of color images and applying autocontrast to improve visual brightness and contrast. The goal is to develop an algorithm that can automatically adjust the colors of an image, making it clearer and more vibrant.

## 2 Problem Statement

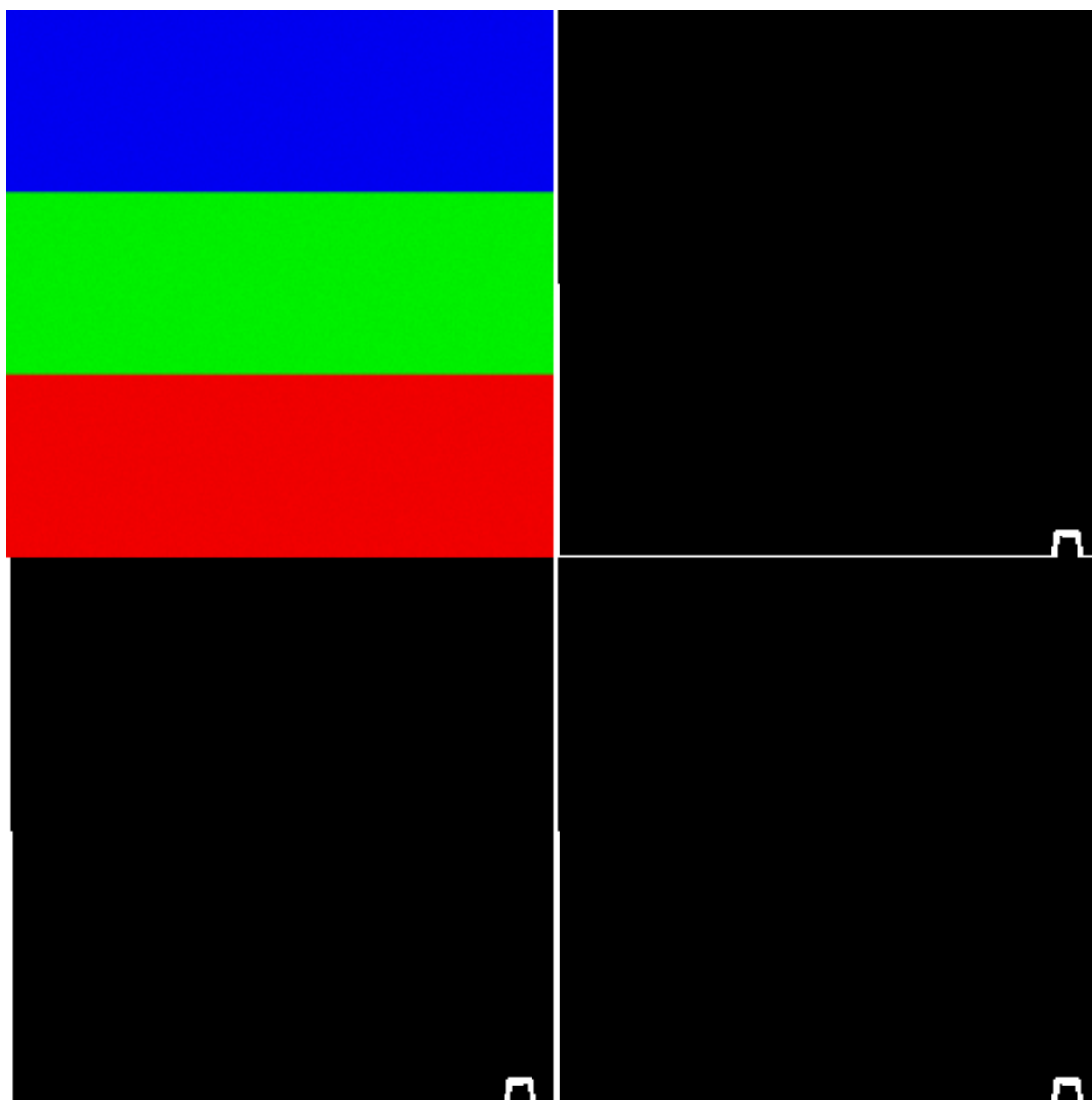
The task includes several key stages:

- Creating histograms for the red, green, and blue channels of a color image.
- Calculating optimal threshold values for each color channel.
- Applying autocontrast based on the calculated threshold values.

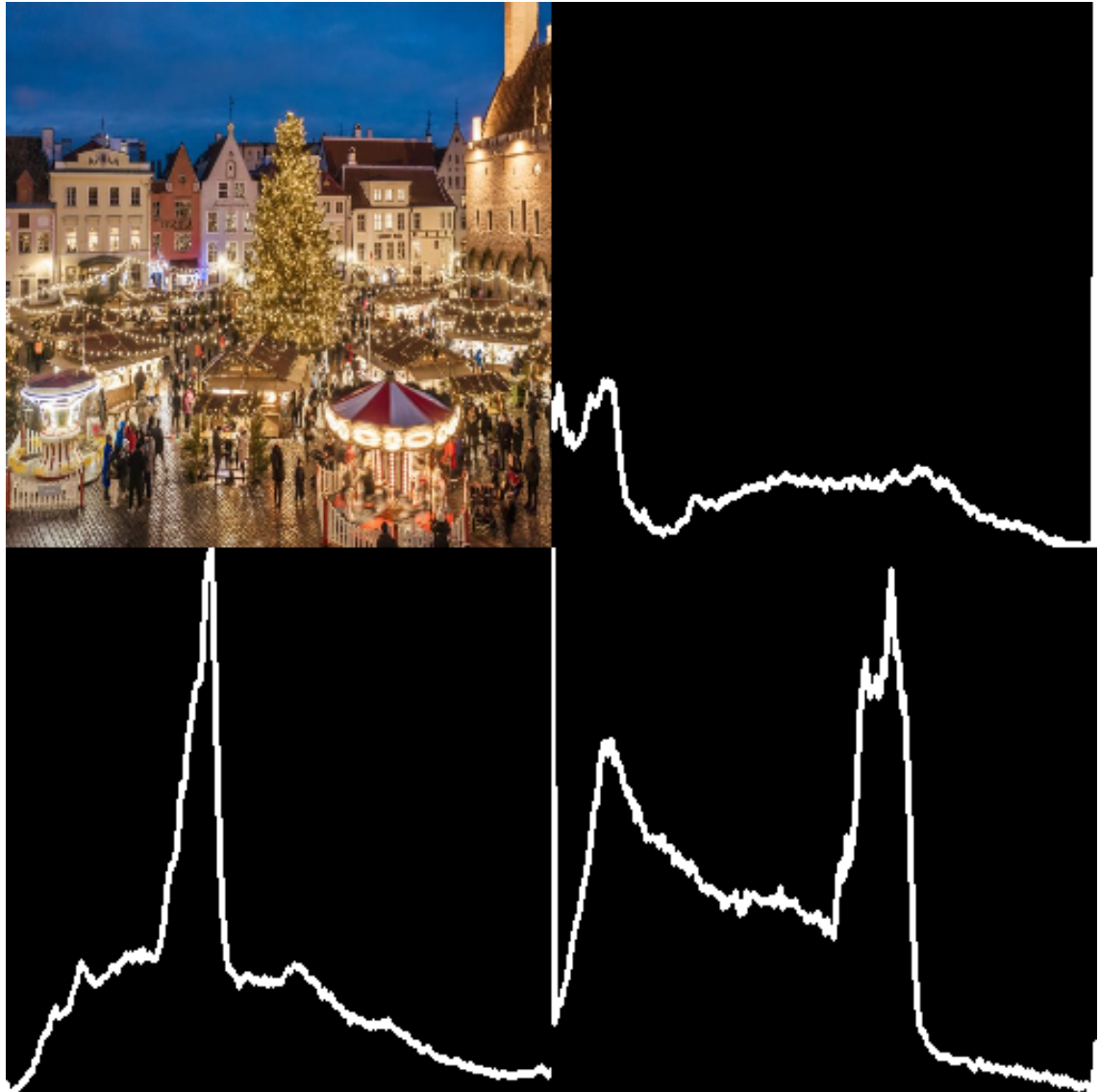
## 3 Solution

### 3.1 Creating and Analyzing Histograms

A function has been developed to build histograms for each color channel (R, G, B) of the image. The function analyzes the distribution of pixel intensities and visualizes this distribution in the form of histograms. A test image was generated containing three stripes of red, green, and blue colors. The intensity values were  $240 \pm 5$  for one channel and 0 for the others. The histograms were built correctly:



Next, another image was input and its histograms were built:



### 3.2 Calculating Threshold Values

Based on the obtained histograms, threshold values were calculated for each color channel. These values determine the range of intensities that will be used in autocontrast.

### 3.3 Autocontrast

Using the calculated threshold values, an automatic contrast function was implemented. This function adjusts the pixel intensities of each channel to expand the dynamic range of the image, making it brighter and more contrasting. Here is the original image and the autocontrasted image with quantiles 0.07 and 0.93:



The quantiles can be different:



Рис. 1: Autocontrasted image with quantiles 0.05 and 0.95



Рис. 2: Autocontrasted image with quantiles 0.09 and 0.91

## 4 Conclusion

An efficient autocontrast algorithm has been implemented, significantly improving the visual quality of images.

The code can be found [here](#)