Software Engineering WS 18/19

Implementation of an Euclidean Color Filter
in .Net Standard2.0

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Contents

Euclidean color filter overview

RGB-Colors and Euclidean distance

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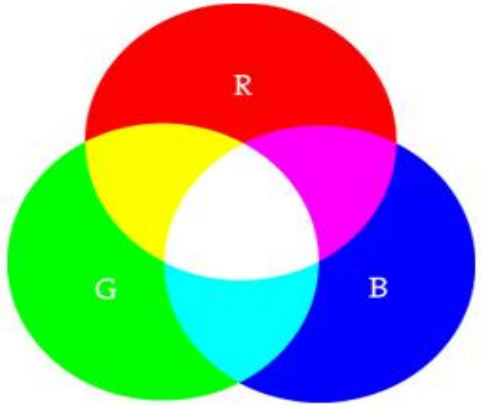
- RGB color space → mixed portions of red, green and blue
- The RGB value is represented 3 dimensional
- VS use 8 bits per color channel by default
- 2^8 bit → each value ranges from 0 .. 255
- White → 255,255,255; Black → 0,0,0



- Euclidean distance describes the distance between two Points
- Since the RGB-values are 3 dimensional →

$$d(p,q) = \sqrt{(q_1 - p_1)^2 + (q_2 - p_2)^2 + (q_3 - p_3)^2}$$

- Example: $d = \sqrt{(101-220)^2 + (90-200)^2 + (58-51)^2} = 162{,}2$
- Special cases of points

Euclidean color filter overview

What does the Euclidean Filter do?

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- Two parameters to specify: Color center and float radius
- Loops through all pixel of an image
- Calculates the Euclidean distance between the RGB value of the pixel and the specified center value
- If the the Euclidean distance is within the radius

→ Pixel keeps its RGB value

- If the Euclidean distance is bigger than the radius

→ Pixel is set to color Black.

```
float distance = CalcDistance.ComputeEuclideanDistance(color, Center);

if (distance <= Radius)
{
    GetAndSetPixels.SetPixel(result, i, j, color);
}
else
{
    GetAndSetPixels.SetPixel(result, i, j, Color.Black);
}
```

If/else statement for filtering

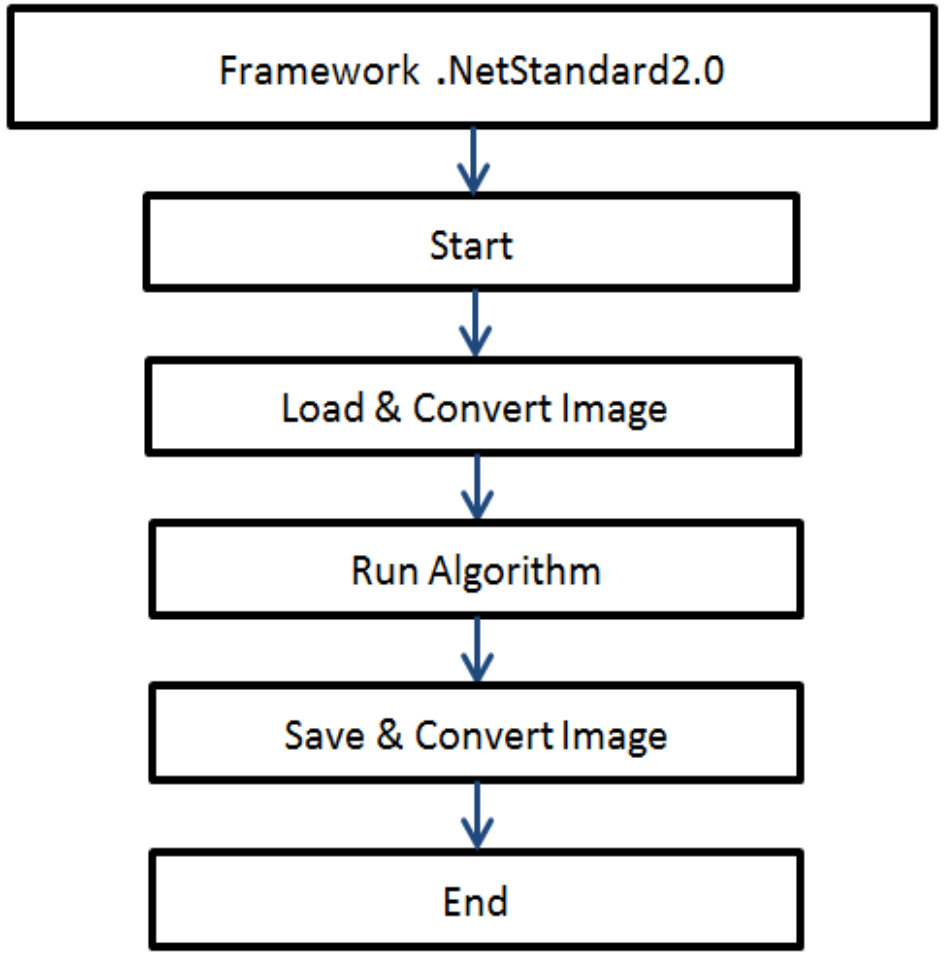
Euclidean color filter overview

Example

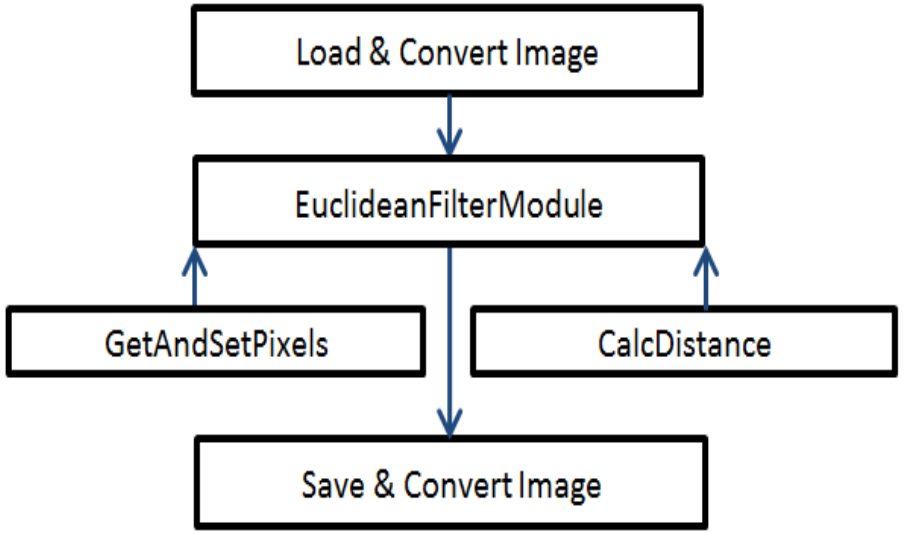
Original image (before running the algorithm)

Filtered image (after running the algorithm)

Architecture of the Project



The main architecture of the program



Overview of the classes which are necessary for the filter

Implementation

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Code explanation…

Thank you for your attention!

Do you have any questions?