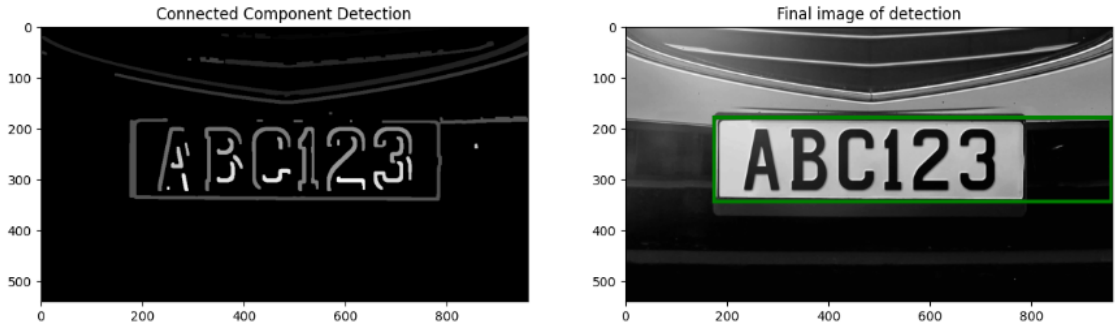
COMPSCI 373 - Assignment Extension

Problem

While developing the licence plate detection program I would often have problems with *licenceplate2.png*, as there was a similar contrast element to the right of the licence plate, resulting in the detection bounding box extending **beyond** the correct region.



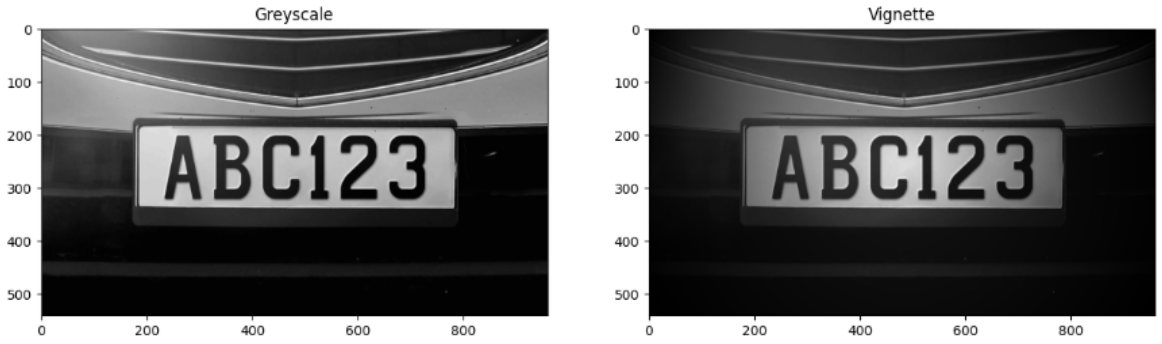
I wanted to solve this problem and problems similar to this, where high contrast elements are present near the licence plate.

Solution

My solution to this problem required to assume the following,

- The target of the image is the licence plate, **i.e.** the licence plate is located near the **centre** of the image.

To solve this problem I want to lower the **weight** of elements based on their proximity relative to the centre of the image. In essence it would be like applying a *vignette* to the image, darkening the edges with a gradient.



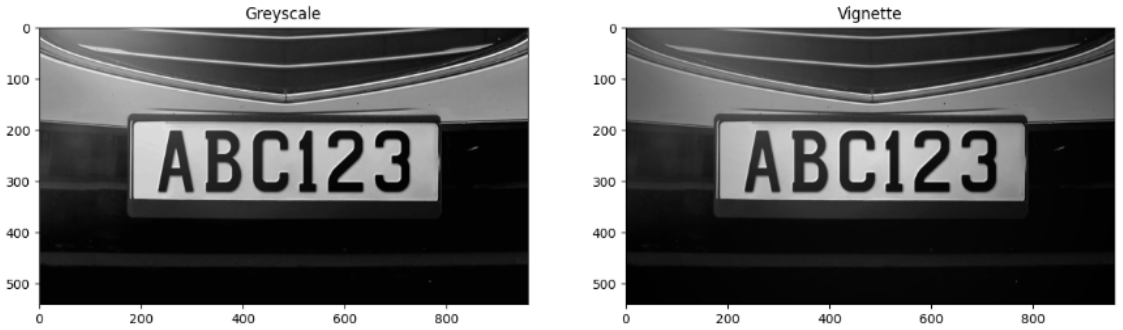
Algorithm

The following is the algorithm used to apply a vignette filter to any image. In order to determine a weight coefficient for each pixel we will use the **Euclidean** distance metric. The *strength* argument determines how strong the filter should be.

- Compute the midpoint of the image.
- Compute the maximum distance from the midpoint *(length of the midpoint)*
- **For each pixel,**
    - Compute the distance from the pixel to the midpoint of the image.
    - **New** pixel intensity = distance from pixel to mid / maximum distance from mid * strength argument
- **Return** new image

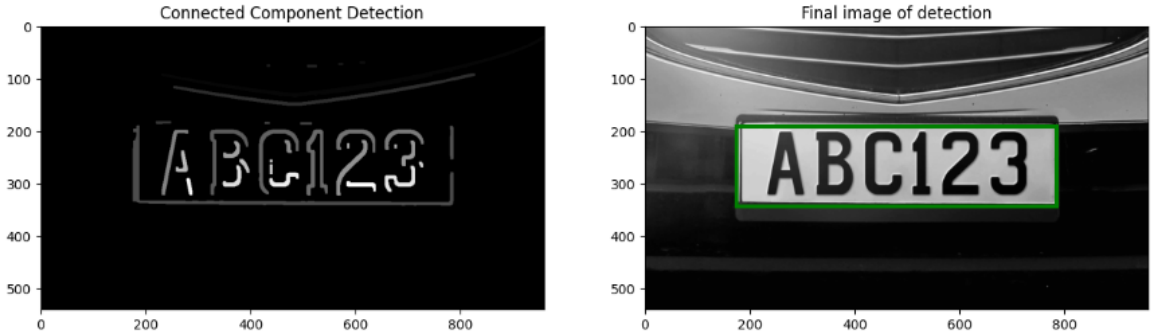
Result

First we apply the vignette filter of strength **0.45** to the greyscale image of licenceplate2.png. There is only a minor visual difference between the two images, but as we apply the original algorithm trailing elements will disappear.



Left: *Greyscale image of licenceplate2.png.*
Right: *Vignette filter applied to licenceplate2.png with a strength of* ***0.45***

As you can see below the right element has disappeared from the connected component detection image. Resulting in our bounding box correctly aligning to the licence plate.



Left: *Connect component diagram.*
Right: *Final image with bounding box.*