

# Computer Vision 2021 Lab 5

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## 1 Goal

Create panoramic images given some sequences of unstitched images.

## 2 Implementation

The implementation follows the provided guide for the homework.

The class `PanoramicImage` has been implemented, but its functionality could have been implemented as static functions, since it does not actually hold mutable state.

The provided static method `PanoramicUtils::cylindricalProj()` produces an image where the border has shifted or distorted colors. A 1 pixel wide border is removed on the projected images before further processing.

A value of 3 for the `distance_ratio` parameter is shown to work well for all image sets; it is a good compromise which finds the right amount of matches to be accurate and fast enough.

The homework guide suggests to equalize the images before merging do reduce the crease effect between stitched images. I chose not to do this because, intuitively, matching regions in the equalized images would still differ in color depending on the the rest of the image content. A better approach could be implemented: from the second image forward, a histogram specification could be performed on the left-most pixel column to match the pixel column covered in the previous image. Going from left to right, the same histogram should be reused for each remaining column in the image, applying a linear interpolation to the histogram, so the histogram of the right-most pixel column remains unchanged. This algorithm ensures there are no jumps in color between neighbouring images and also there are no jumps in color within the same image. This algorithm was not been implemented because of time constraints.

In some instances the stitching alignment is not perfect and it cannot be solved with simple image translations.

## 3 Results



Figure 1: dolomites.png



Figure 2: kitchen.png



Figure 3: lab.png



Figure 4: lab\_19\_automatic.png



Figure 5: lab\_19\_manual.png