

# Image Stitching

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## 1 Introduction

This is a homework about constructing the panorama of a set of images. The whole process reference to [1].

## 2 Cylindrical Projection

We use the method in class as Figure 1. First, we transform the image coordinate into x-y coordinate. The origin of the x-y coordinate is the center of the image. Then we do the cylindrical projection on the image. After calculating the new index, we transform the new index back to the original coordinate. Figure 2 shows the result.

## 3 Feature Detection

We adopt Harris Corner Detection for feature detection as shown in Figure 3.

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\*equal contribution

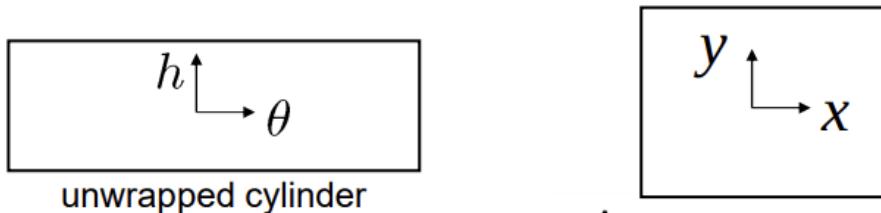


Figure 1: projection coordinate transform



Figure 2: Result after Cylindrical projection.

## 4 Feature Descriptor

We use orientation description as in SIFT.

## 5 Feature matching

We simply calculate Euclidean distance between keypoints. Then adopt RANSAC to evaluate the offset between two adjacent images. An example is shown in Figure 4.

## 6 Blending

We use the method as shown in Figure 5 mentioned in class. Result is shown in Figure 6.

## 7 End-to-end alignment and crop

We find the matching between the first and the last images. Then evaluate the offset. We translate each image in equal proportion. Result is shown in Figure 7.

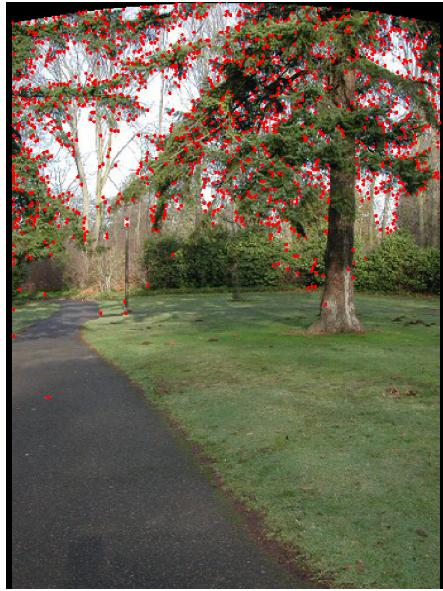


Figure 3: Keypoints detected by Harris.



Figure 4: Matching points between two adjacent images.

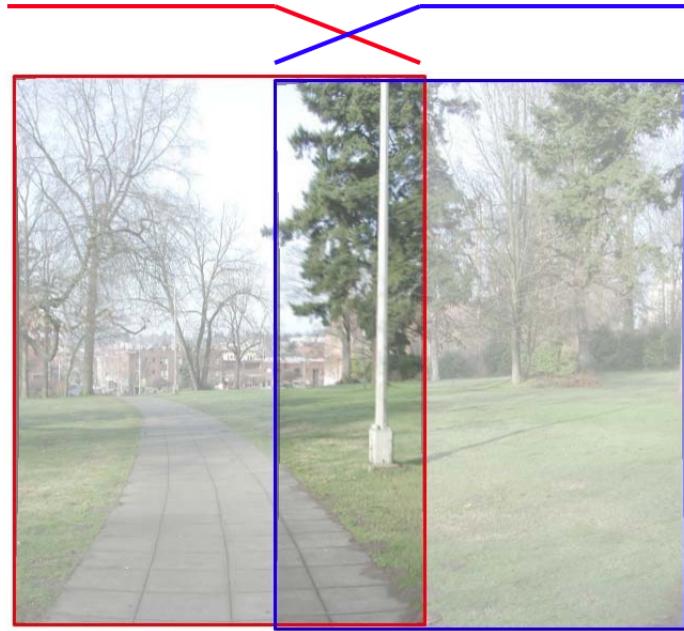


Figure 5: Blending method



Figure 6: Result after Blending.



Figure 7: Result after alignment and crop.

## 8 Other experiences

The pictures were taken without a tripod. Thus resulted in lots of blur. The stability of a camera is really important. More results can be found in the folder "result".

## References

- [1] M. Brown and D. G. Lowe. Recognising panoramas. In *Proceedings of the Ninth IEEE International Conference on Computer Vision - Volume 2*, ICCV '03, page 1218, USA, 2003. IEEE Computer Society.