PANORAMA STITCHING

Image stitching or photo stitching is the process of combining multiple photographic images with overlapping fields of view to produce a segmented panorama or high – resolution image.

- **Step 1:** Detect keypoints (DoG, Harris, etc.) and extract local invariant descriptors (SIFT, SURF, etc.) from the two input images.
- **Step 2:** Match the descriptors between the two images.
- **Step 3:** Use the **RANSAC algorithm** to estimate a **homography matrix** using our matched feature vectors.
- **Step 4:** Apply a warping transformation using the homography matrix obtained from **Step 3**.

A brief description of each step (you'll implement the steps **in bold**):

- Cylinder Projection: Project images onto a cylinder, to reduce distortion at the panorama's edges. For this project, it's optional.
- Detect Corners: identify corner points in your images. (You can just use Matlab's cornermetric.)
- **ANMS**: pick out the stronger corner points.
- **Feature Descriptors**: create descriptors for the corner points, so they can be matched between images (in the next step).
- **Feature Matching**: Match feature descriptors from different images, to find possible point correspondences.
- **RANSAC and Homography Estimation**: refine the feature point matches, and use the correspondences to estimate homographies between images.
- **Image Warping (and Blending)**: Use the estimated homographies to warp the images onto one another, and apply blending to reduce the appearance of seams where they fit together.
  - For blending in this project, you can simply average the pixel values of overlapping images.

References :

https://www.pyimagesearch.com/2016/01/11/opencv-panorama-stitching/
https://cmsc426.github.io/2020/proj/p2/

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