

Seam Driven Image Stitching

Project Id : 30

Github Link : <https://github.com/samyak0210/DIP-Project>

Team Members:

- **Samyak Jain (20161083)**
- **Mudit Surana (20161100)**

Goal :

The goal of the project is to compute geometric transforms to align images based on the best fit of the feature correspondences between overlapping images.

Problem Definition :

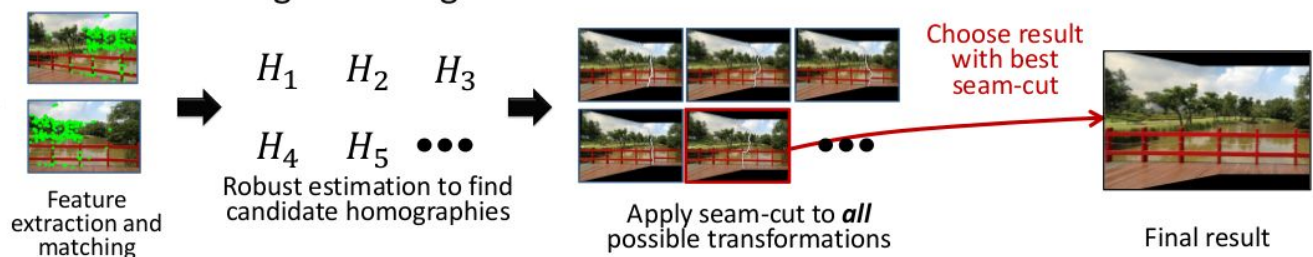
The traditional image stitching approach used Homography-based alignment to align the two overlapping images to generate a single image. It assumed that the captured scene is far enough away from the camera to be treated as planar or that the camera is rotated about its center of projection to avoid parallax. This leaves behind misaligned artifacts. A second step, such as seam-cutting was applied to realistically blend the images which resulted in it being the most crucial step in the process.

This gave rise to the idea of Seam-driven image stitching. Instead of selecting homographies based on the best geometric fit of matched feature points, a transform is evaluated based on the perceptual quality of the resulting seam-cut.

Results :

Firstly, we will compute feature points like **SIFT** to match image pairs resulting in a set of feature correspondences. Due to the non-planar scene geometry and erroneous matches, **random sample consensus (RANSAC)** is used to robustly estimate the homography with the best geometric fit. We robustly generate a set of candidate homographies in a manner that encourages diversity. All candidate homographies are used to align the images and seam cut is applied to all aligned images. Then, different seam-cuts are evaluated based on our novel ranking metric that favors results with good perceptual quality.

Seam-driven image stitching



Tasks :

- Samyak Jain:
 - Finding the proper dataset.
 - Implement and evaluate seam cutting over overlapping pairs of images.
- Mudit Surana:
 - Implementing and properly understanding RANSAC.
 - Final presentation, demo and project report.

Timeline

| Dates | Work to be done |
|-----------------------------|---|
| Week - 1 Oct 1 - Oct 7 | <ul style="list-style-type: none">• Proper understanding of the problem statement and thorough reading of various research papers.• Finding proper dataset for the project. |
| ~Week - 2 Oct 8 - Oct 12 | <ul style="list-style-type: none">• Proper understanding of the RANSAC method.• Implement the RANSAC method to generate various candidate homographies. |
| Week - 4 Oct 18 - Oct 25 | <ul style="list-style-type: none">• Implementing the seam cutting on the overlapping regions of pairs of images aligned with the candidate homographies. |
| Milestone - 1 | |
| Week - 5 Oct 26 - Nov 1 | <ul style="list-style-type: none">• Proper evaluation of the cut for minimizing the image gradient between pair of images. |
| Week - 6 Nov 2 - Nov 10 | <ul style="list-style-type: none">• Prepare the presentation and demo of the final submission.• Final Evaluation of the code and code submission.• Prepare a final project report . |
| Milestone - 2 | |