

2812ICT PROJECT PROPOSAL: PHOTOGRAPH STITCHING FOR THE CREATION OF PANORAMAS

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Introduction

In today's world people the world over practice the tradition of preserving events, locations, and points in time through the use of photography, for subjects on a scale too large for a single image, the need and popularity of panorama photographs have shone through.

Many cameras today offer this feature as just another option on the camera, but they're not perfect; these modes require the user to be in the location alone and unharried by outside influences and with a steady hand slowly pan in order to have a hope of achieving a good result.



What if instead someone could take several good photos (a much easier task), or not even be there at all maybe just find multiple images of the same location and stitch them together to create a panorama after the fact. The possibility just stated is what will be the focus

of this paper, with the hope of developing a panorama creation method which can take in multiple separate photos and use them to create a panorama after the fact.

Technical Approach

When approaching the technical aspects of this task a report titled *Recognising Panoramas* (Brown, M. and Lowe, D.G, 2003) was found which describes methods that were used to achieve results desired by this paper, as such work will be made to attempt the replication of the methods and therefore results shown in the report. As such the approach that which will be used by this paper will be as follows:

First multiple images of a subject will be either taken or found which are slightly adjacent to each other but still over lapping with special care taken to ensure there is something visually, and geometrically distinct in the overlap.

Secondly the SIFT algorithm will be used on these images separately in order to extract features from them.

Third KNN trees will be used to match photos to their nearest neighbours, verifying that they are an image of the same subject, and that they both contain a similar feature.

Forth RANSAC will be used to be used to find a set of distinct features that should be on the overlap of the images, allowing for the matching of images.

Fifth these images must be aligned based on these features

Sixth all these details should be used to stitch the images together to create one cohesive image.

This approach will be achieved with a variety of libraries already known and others which will be found along the way to aid in the project's completion

Expected Outcome / result

By the end of the project, it is expected that a python program will be created which will be able to be given a set of photos, with these photos it should be able to distinguish the photos which are of the same subject, find distinct details in these images, and then use these distinct details to correctly orientate and scale the images such that they can stitch together.

Below is an example pulled from the aforementioned report which shows the process described above being carried out on four images separate images of this house



(Though please note that in the scope of this project, for time concerns no colour correcting will be done for the final image, and as such there may be visible seams)

Milestones

The following is a projection of the work that will be needed to complete this project, and how long each task is expected to take:

- This proposal
 - completed
- Commencement of workflow and project development environment
 - Not complete
 - projected completion date: 20/9
- Acquire images for testing the project
 - Not complete
 - projected completion date: 20/9
- Develop SIFT application to images
 - Not complete
 - projected completion date: 26/10
- Develop KNN tree matching for images
 - Not complete
 - projected completion date: 26/10
- Develop RANSAC for the separation of distinct features in the images
 - Not complete
 - projected completion date: 30/10
- Develop the orientating and scaling functionality
 - Not complete
 - projected completion date: 4/10
- Develop image stitching
 - Not complete
 - projected completion date: 8/10
- Produce video presentation
 - Not complete
 - projected completion date: 10/10
- Project paper due
 - Not complete
 - projected completion date: 10/10
- Video presentation due
 - Not complete
 - projected completion date: 10/10

References

Brown, M. and Lowe, D.G, 2003. Recognising Panoramas. Vancouver, Canada: Department of Computer Science, University of British Columbia.

[online] Available at:

<http://matthewalunbrown.com/papers/iccv2003.pdf>

[Accessed 1 September 2021].
