Term Project Topic: Panoramic Image Stitching

Members

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Brief plan

We try to expand the *recommended work flow* as indicated in the instruction.

1. Take a continuous 360-degree video of an outdoor scene

- Use our mobile phone (iphone 6, or Android devices) to generate a short video(.mp4 or .avi are acceptable by Matlab), outdoor scene may contain the most iconic building(i.e Brain Anderson building, Ian Rose Building)

2. Read the video, and then automatically select some key-frames.

- We assume there are no repeat scene of in the video, which means we could summarize the input video in time series or other naïve methods. (e.g extract 1 frame from every 5 frames, or so on)

- If above assumption is not enough(probably not :p), then, we may implement the principle component analysis related to video summarization, then, we could get the summarized frames in a list of .jpeg files. Or using the method introduced by Brown etc.

3. Detect SIFT points on the key-frames. Matching these SIFT points between neighboring key-frames.

- apply SIFT algorithm to get the SIFT points on key frames.

4. Estimate a homography between the key-frames.

- apply RANSAC method.

5. Warp the neighboring frames using the estimated homography, and blend the pixel color by a suitable method.

- Proposed blend algorithm: alpha blend. If time is enough, may extend to pyramid blend.

6. Repeat the above steps until a full 360-degree panorama is generated.

- Proposal: Try to implement it “2 by 2” i.e: if we have 16 images, the output sequence should be: 16-->8-->4-->2-->1(final output before )

7. Save the panorama in a jpeg file

- Corp it to rectangular image: apply edge detection to get the border of image, corp it based on its width and height.

8. Display the original video, and also display the panorama on screen.

- May write a simple inter face to receive user input and response the corresponding result.

- if time is not enough, simply display the video *after processing.*

Reference:

1.Blend modes <https://en.wikipedia.org/wiki/Blend_modes>

2. Image stitching: <https://www.microsoft.com/en-us/research/publication/image-alignment-and-stitching-a-tutorial/>

3. Recognize panorama: <http://matthewalunbrown.com/papers/iccv2003.pdf>