GG
GRAPHICS GROUP

IVS Intelligent Vision Systems New Zealand

CompSci 773: Intelligent Vision Systems

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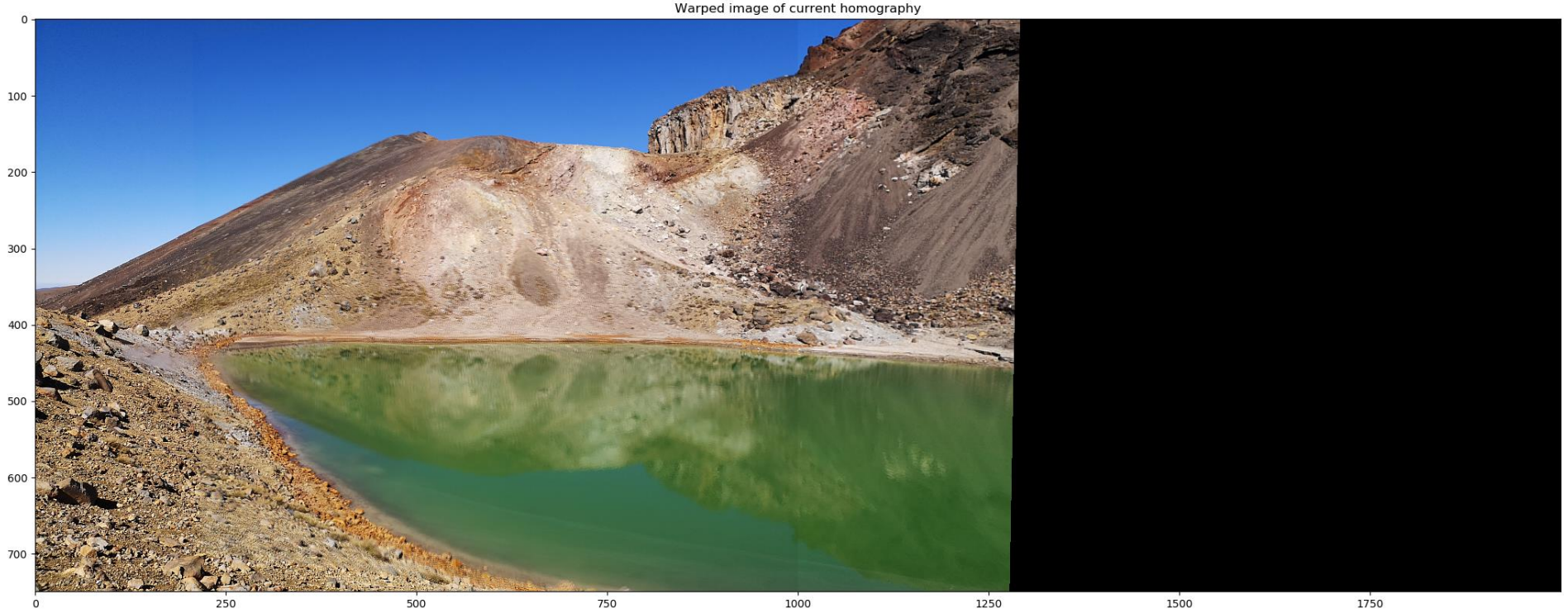
Assignment Image Stitching

- Motivation: I have my holiday images from Tongariro Alpine Crossing…

Assignment Image Stitching

- Problem: I would like to see them stitched together!
- This is where you come into the story!

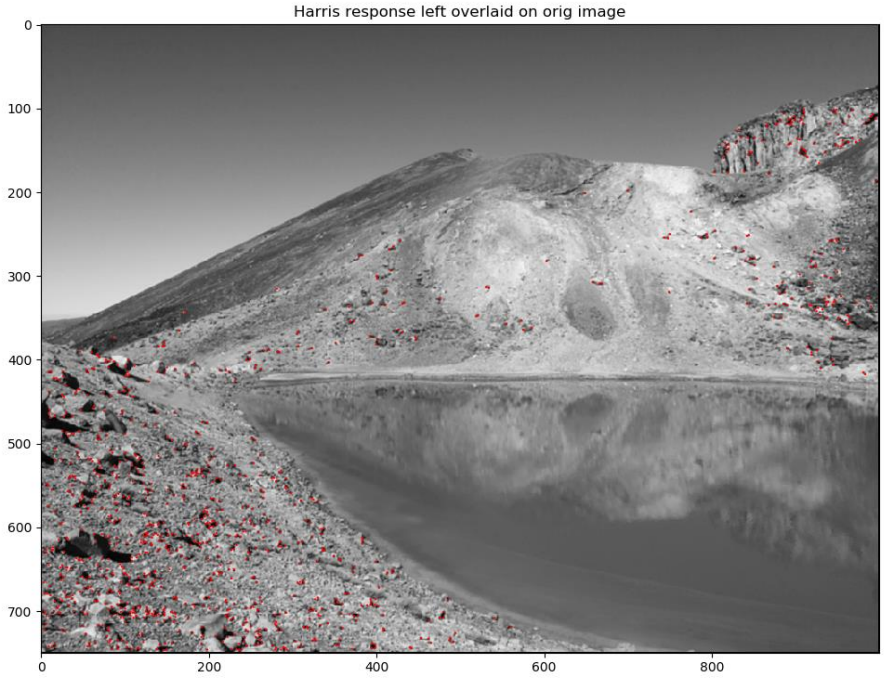


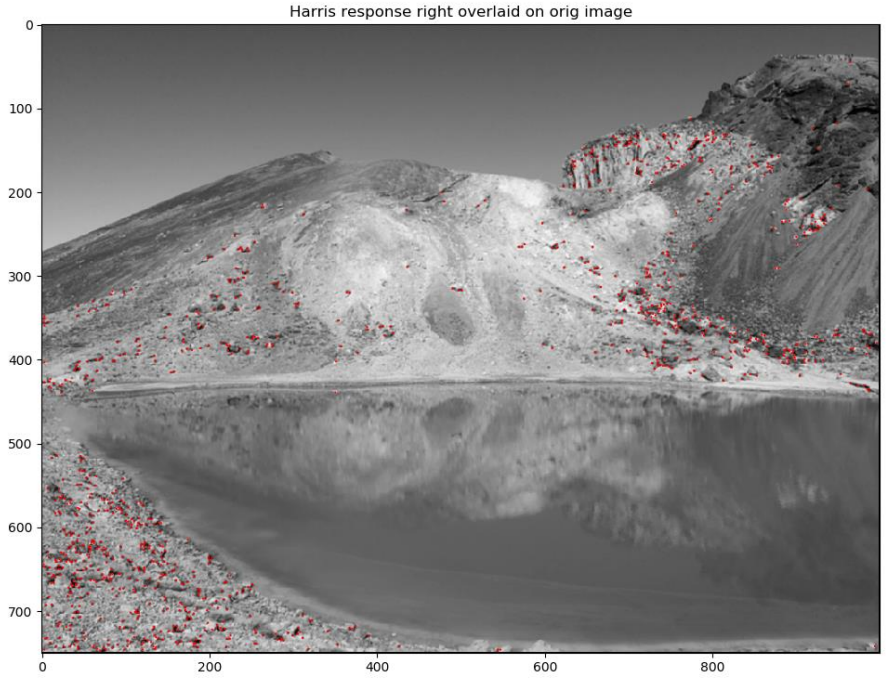
Assignment Image Stitching

- Detailed Specification:
  - Given pairs of input png images from the same camera assuming a slight rotation of the camera inbetween images.
  - Perform image stitching by estimating a homography and warping the right image onto a canvas double the size of the left image.
  - Use Python3 to do the programming. A simple skeleton is given for download from Canvas, requiring only *matplotlib* as a dependency.
  - You are supposed to implement the whole stitching pipeline on your own to receive full marks! You can use ‘numpy’ or ‘pillow’, but if you use OpenCV I will remove marks. The aim is to learn the necessary steps by implementing them in a simple yet powerful scripted programming language!

Assignment Image Stitching

- Phase 1: Extraction of Harris corners
  - Due date: Friday, 14th of May, 23:59
  - According to lecture, compute Harris corners for both images
  - Perform a simple non max suppression in a 3x3 neighbour-hood, and report the 1000 strongest corners per image





Assignment Image Stitching Hints

1) Use a 3x3 averaging as an initial blurring of input images (see skeleton code, already there)
2) Implement Sobel filter in x and y (on your own or follow the implementation of Gaussian blurring in the skeleton)
3) When smoothing the squared derivatives, play with different sized Gaussian windows (5x5, 7x7, 9x9)
4) Harris constant $\alpha = 0.04$
5) It makes sense to extract Harris corners as (x,y) tuples in a datastructure, which is sorted according to the strength of the Harris response function C
6) Only put a corner into this datastructure, if the response function C is larger than all its 8 immediate neighbours (non maximum suppression)
7) Prepare n=1000 strongest corners per image for next phase

Organisation

- All submissions have to be submitted using the Assignment Dropbox from Canvas before due date
  - Zipped archive of code including images and readme which libraries are needed to execute the Python3 code
- Tuesdays you will have the opportunity to clarify content and to interact during the lecture slot
- My main focus is on you doing some programming, since that is how you can learn most effectively!