LAB 3: DUE 5 JANUARY 2015

Task 1: light field slice(10 pts)

Load the images and plot for a central line of the light field, all the horizontal views. You have two types of data sets, 9x9 and 17x17 images.The slices should have 9 or 17 lines, but you can scale it up in that axis for easier visualisation. These are called 2D Epipolar Images. Do the same for the vertical views. Try with different light fields. You only need to this for one line in this task.

Task 2: Focal stack (20)

Create images with focus at different distances from the light field. You can put them together in a short video/GIF. Use the center view. You simple have to shift away from the center, or towards the center. The distance between views is the same, so the relationship between the displacements should be proportional. The first task should give you an idea of how much you have to displace the images, and its range.

Task 3: (50)

Estimate depth from the light field for every pixel. We will follow the first part of the paper “Depth from Combining Defocus and Correspondence Using Light-Field Cameras”. Except for the MRF part.

The idea is to use 2 metrics, they call them defocus and correspondence. Those are defined over the Epipolar Images. The basic idea is to compute the shear the Epipolar Image by different amounts, and compare which shear produce the best value for the metrics. For that, they integrate in the *u* axis, and then compute the gradient as a measure of defocus, and the variance as the measure of correspondence. Then take maximum gradient, and the minimum variance. They also present a confidence estimation. You should just take the value with bigger confidence. Essentially you should use equations 1 to 7. Once you get it working for 2D Epipolar images, expand it to 4D according to equation 8.

Extra

Think of ways to smooth the depth map.

Deliverables

Horizontal and vertical slice images at least for one 9x9 and one 17x17. Focal stack video (or a sequence of images at least 5). Depthmaps, if possible in blue-red false color.

README file.

- How long did the assignment take?
- Issues and descriptions of your partial solution (for partial credit)
- Any extras?
- Collaboration acknowledgment.
- What was most unclear/difficult?
- What was most exciting?