Computer Vision (2020) Problem Set #4

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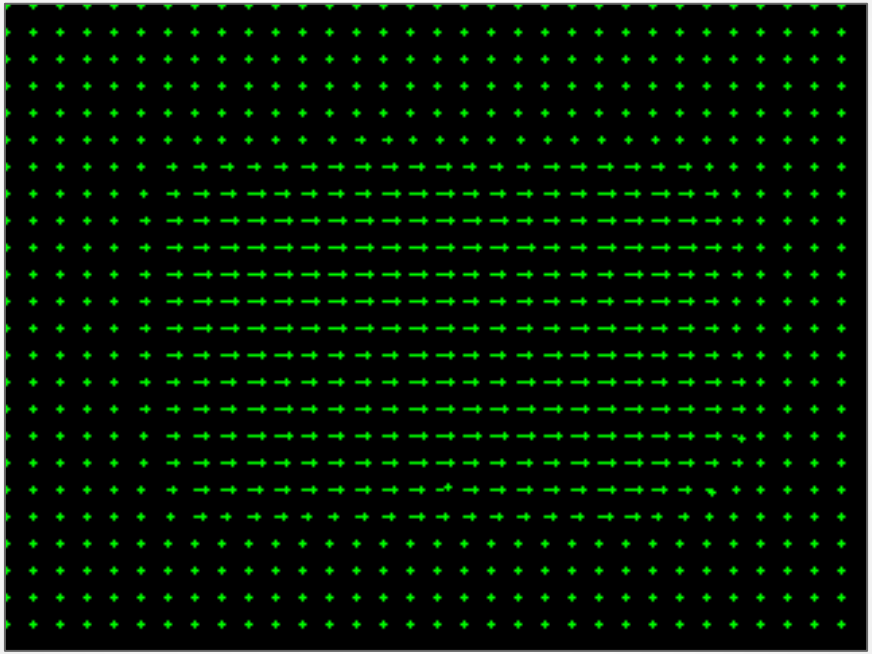
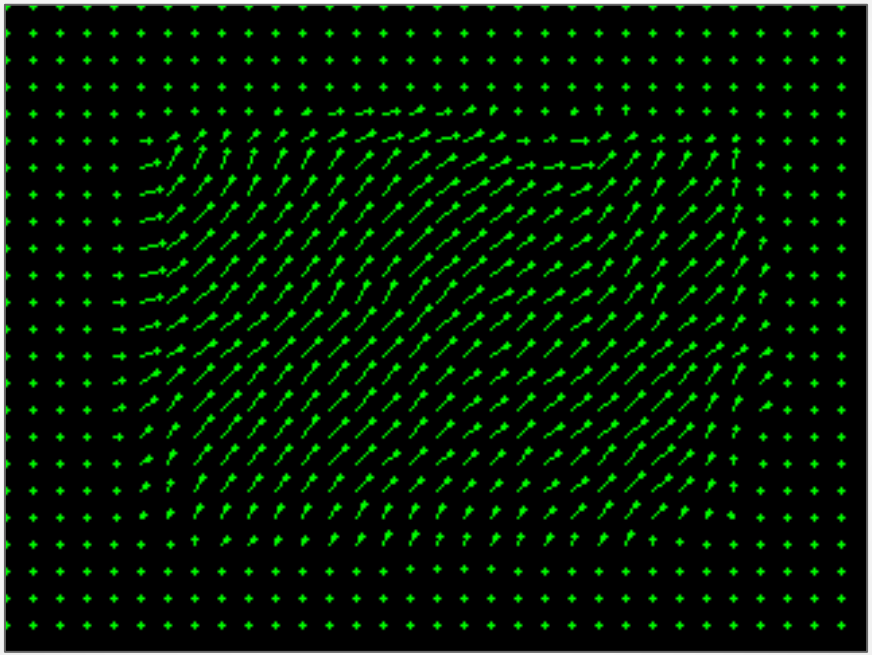
1a: Base Shift0 and ShiftR2



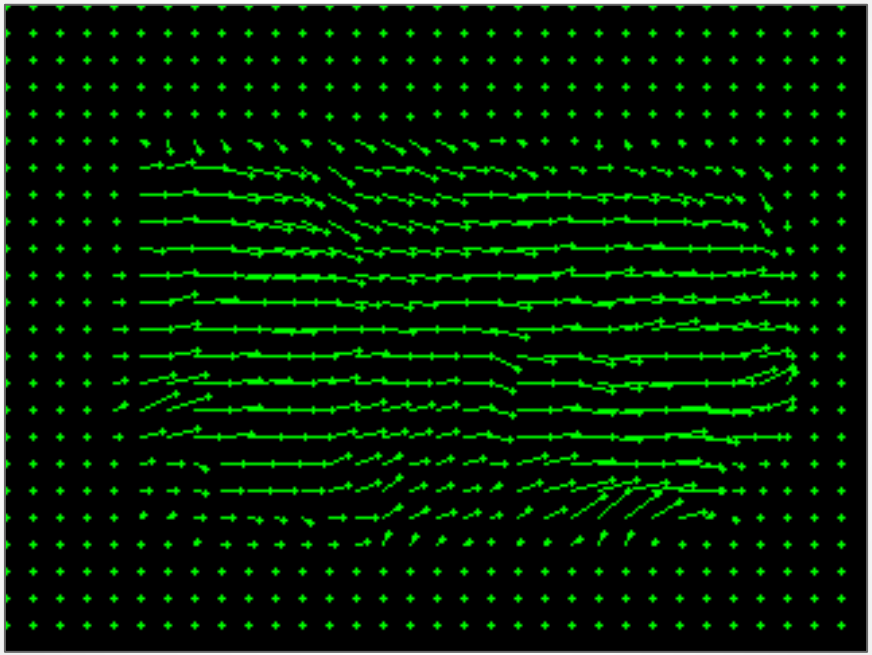
ps4-1-a-1

1a: Base Shift0 and ShiftR5U5



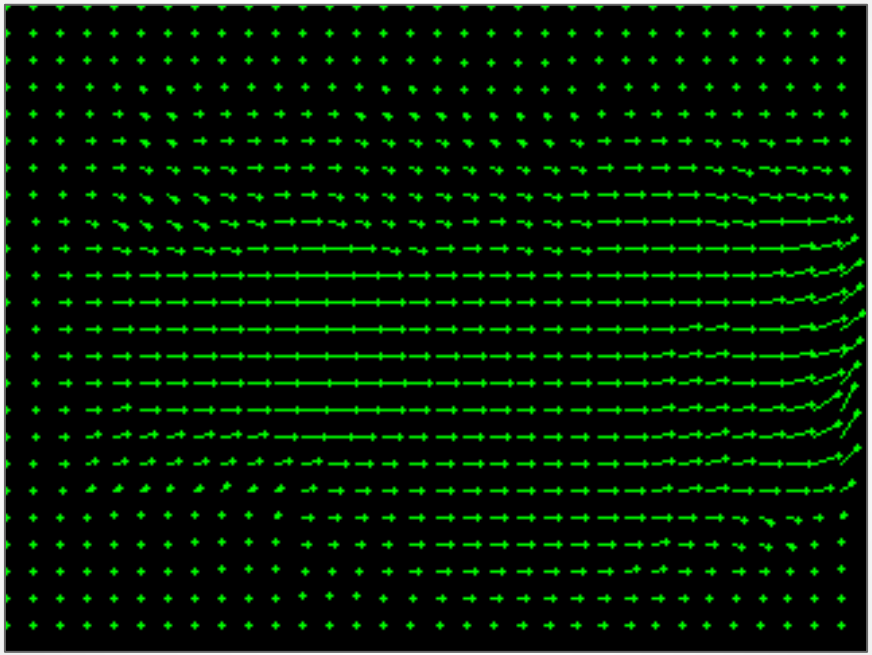
ps4-1-a-2

1b: Base Shift0 and ShiftR10



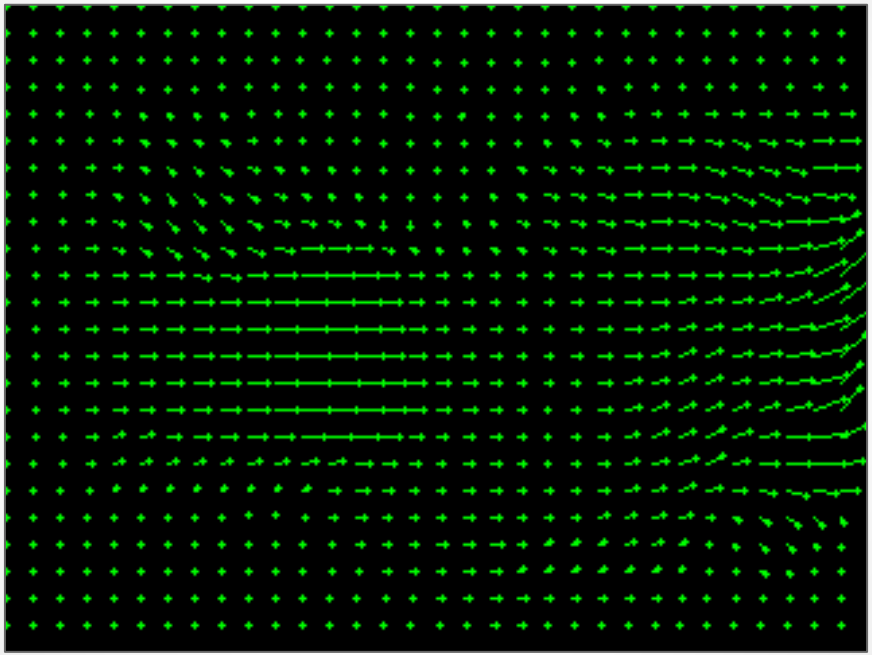
ps4-1-b-1

1b: Base Shift0 and ShiftR20



ps4-1-b-2

1b: Base Shift0 and ShiftR40



ps4-1-b-3

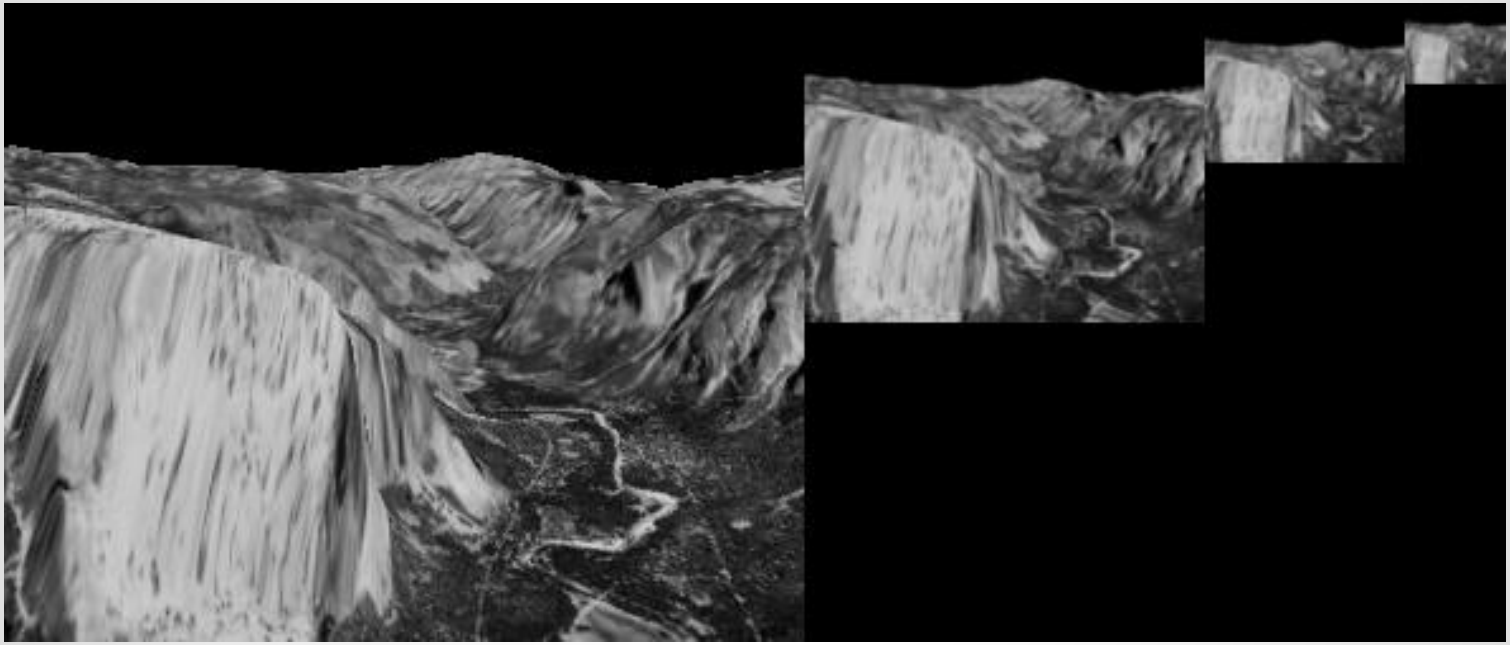
1b: Text Response

Does LK still work? Does it fall apart on any of the pairs? Try using different parameters to get results closer to the ones above. Describe your results and what you tried.

LK does fall apart as the changes in pixels increases. I tried using various filters such as Gaussian, BoxFilters, BilateralFilters and Morphs to try and make LK work with these larger shifts but I was not able to produce good results. Most of the time it was only able to capture part of the movement in the image.

The 10 pixel shift I was able to get most of the vectors pointing in the correct direction and in approximately the correct places in the image. The 20-pixel shift was more difficult to capture than the 10-pixel shift and I was able to produce OK results. The 40-pixel turned bad. I had a lot of difficulty and I tried multiple approaches of filtering to try and be able to capture the displacements, but I was not very successful. In practically each situation it was necessary for me to try and tune parameters such as the kernel size.

2a: Gaussian Pyramid

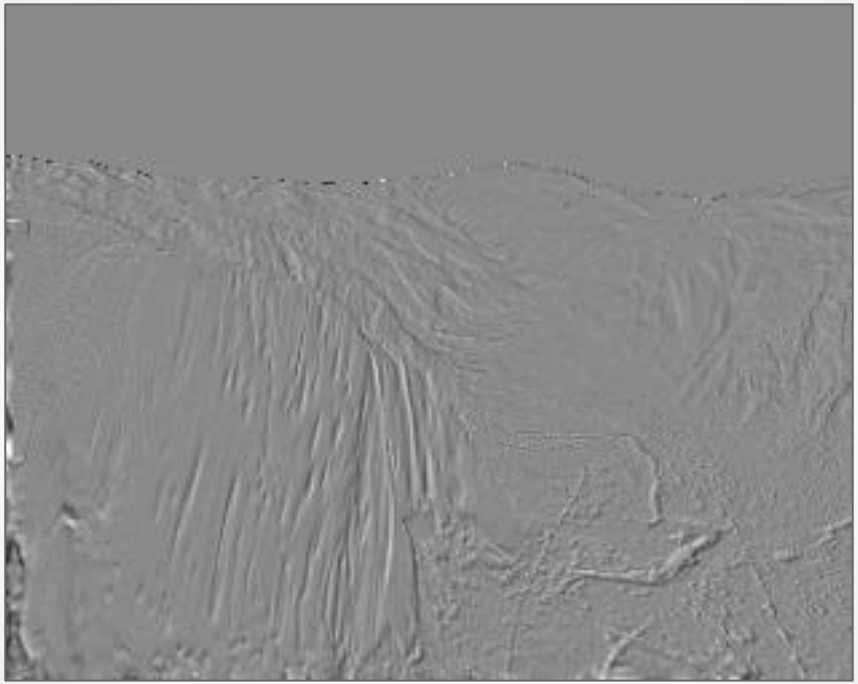


ps4-2-a-1

2b: Laplacian Pyramid

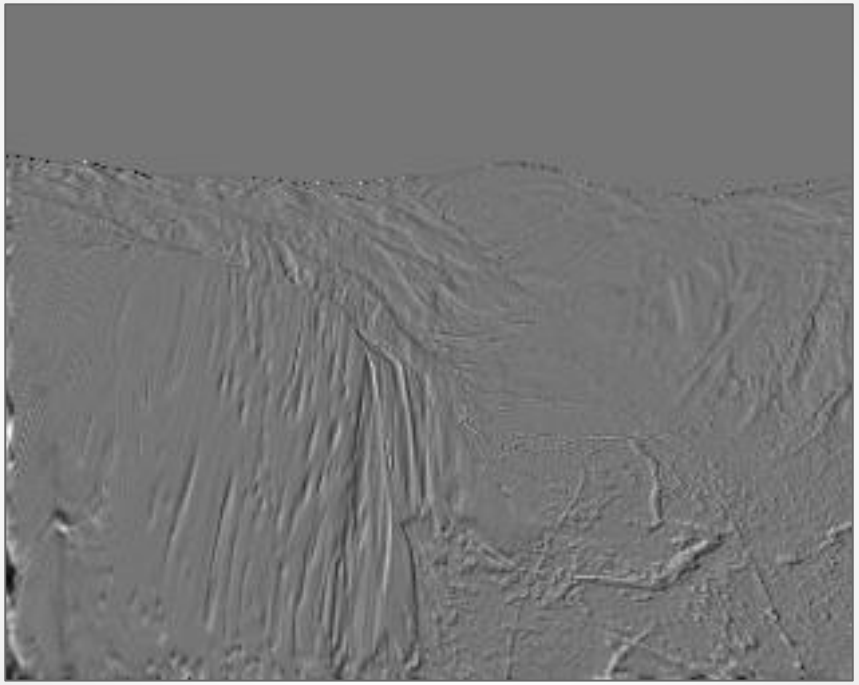
ps4-2-b-1

3a: Difference images



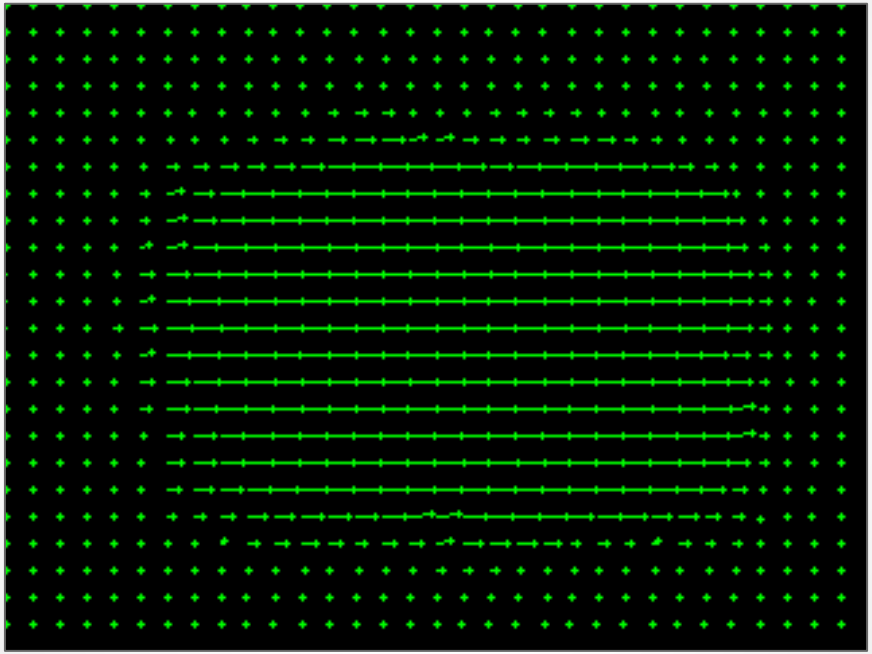
ps4-3-a-1

3a: Difference images (cont.)



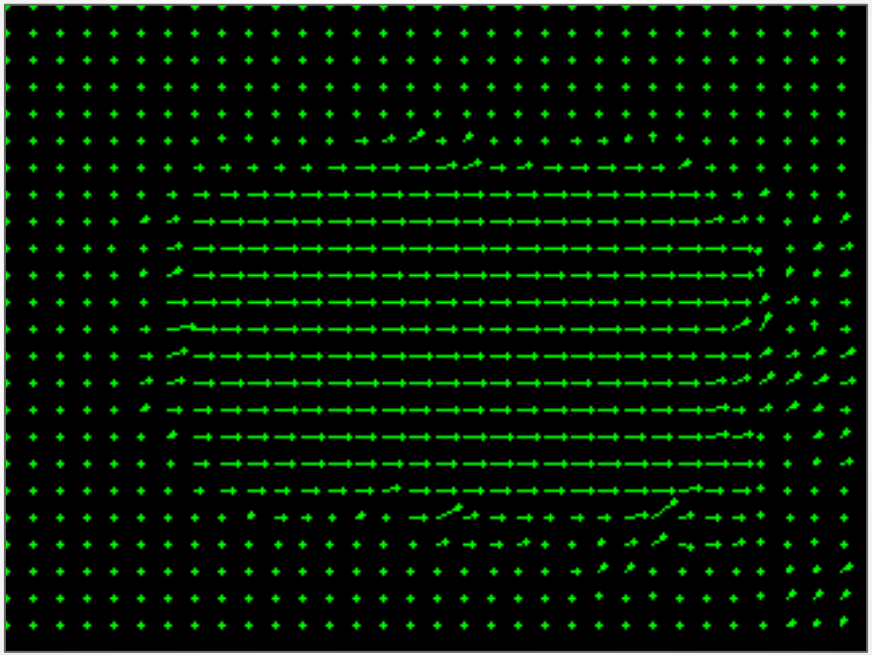
ps4-3-a-2

4a: Hierarchical LK



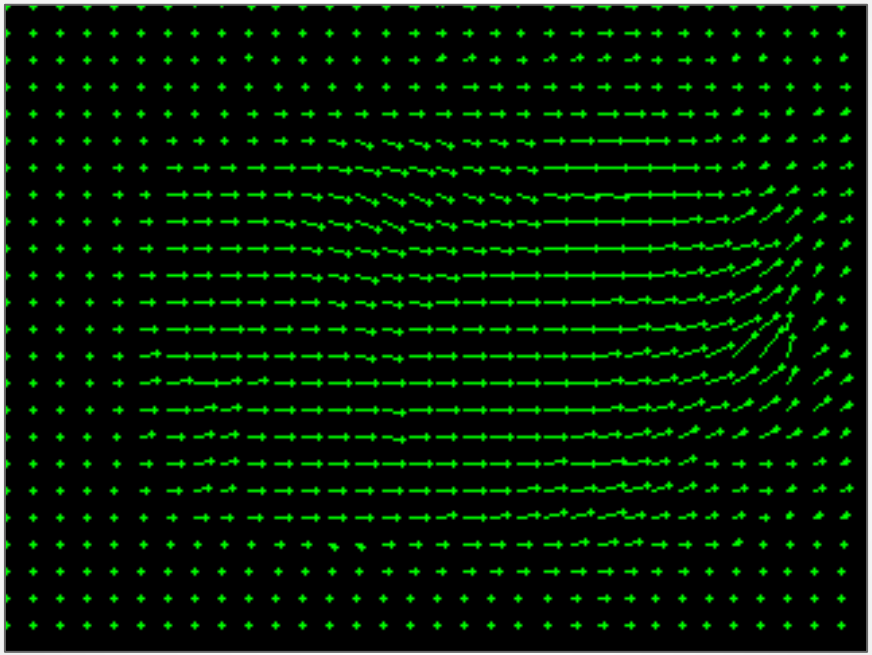
ps4-4-a-1

4a: Hierarchical LK (cont.)



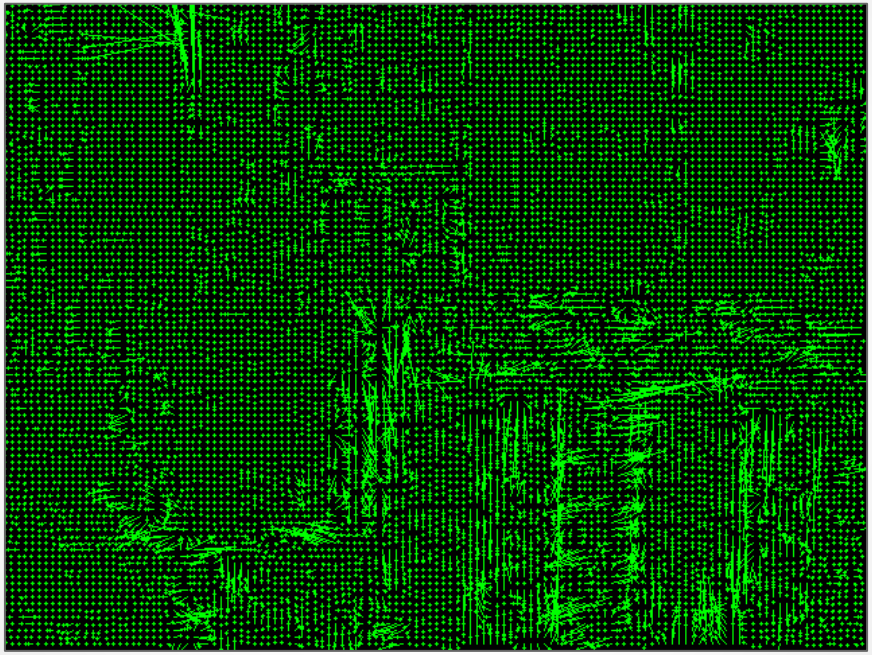
ps4-4-a-2

4a: Hierarchical LK (cont.)



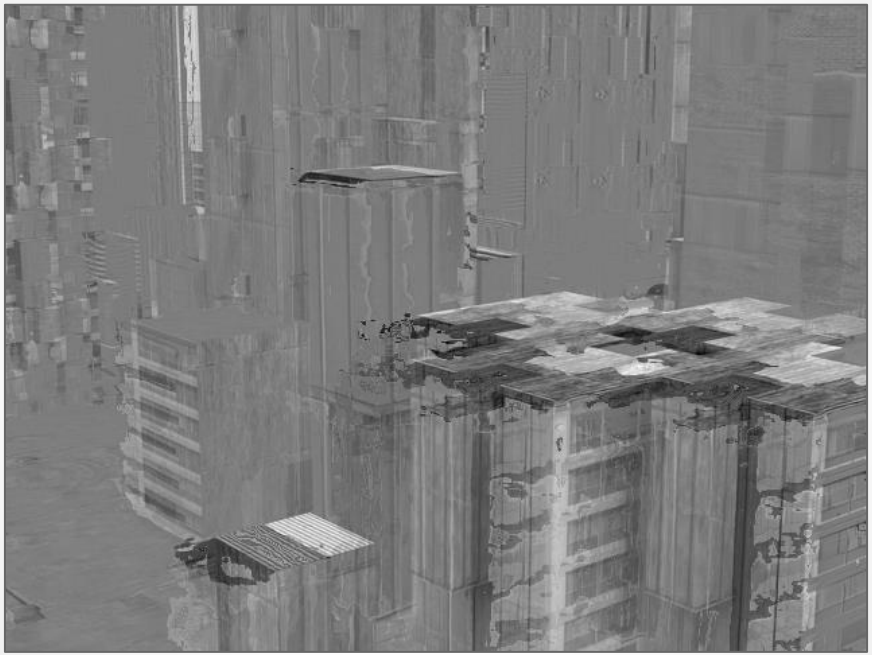
ps4-4-a-3

4b: Hierarchical LK (cont.)



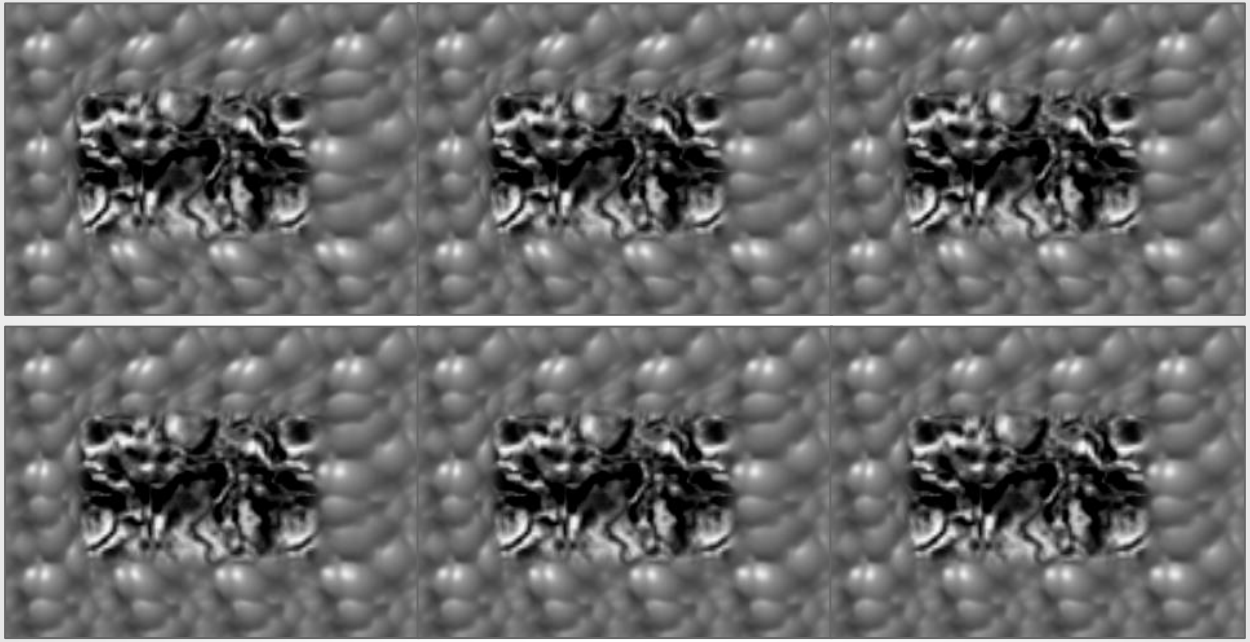
ps4-4-b-1

4b: Hierarchical LK (cont.)



ps4-4-b-2

5a: Frame Interpolation



ps4-5-a-1

5b: Frame Interpolation

ps4-5-b-1

5b: Frame Interpolation

ps4-5-b-2

6: Challenge Problem

ps4-6-a-1

6: Challenge Problem (cont.)

ps4-6-a-2

6: Challenge Problem (cont.)

Video link:

https://gatech.box.com/s/b8jtjbmz3dg5q9r86par1n0cc6oh80f8