Computer Vision
Spring 2021
Problem Set #4

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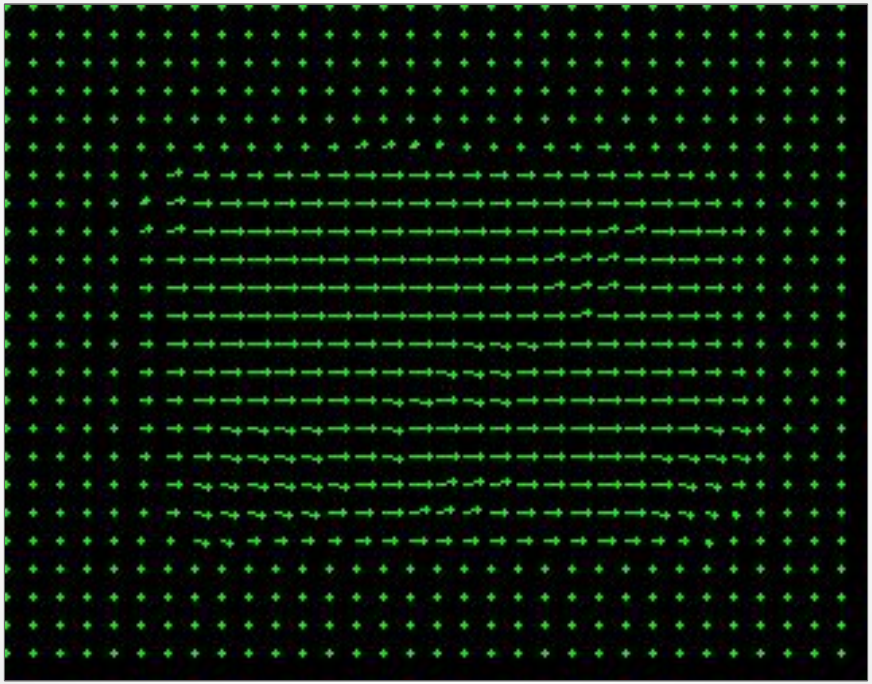
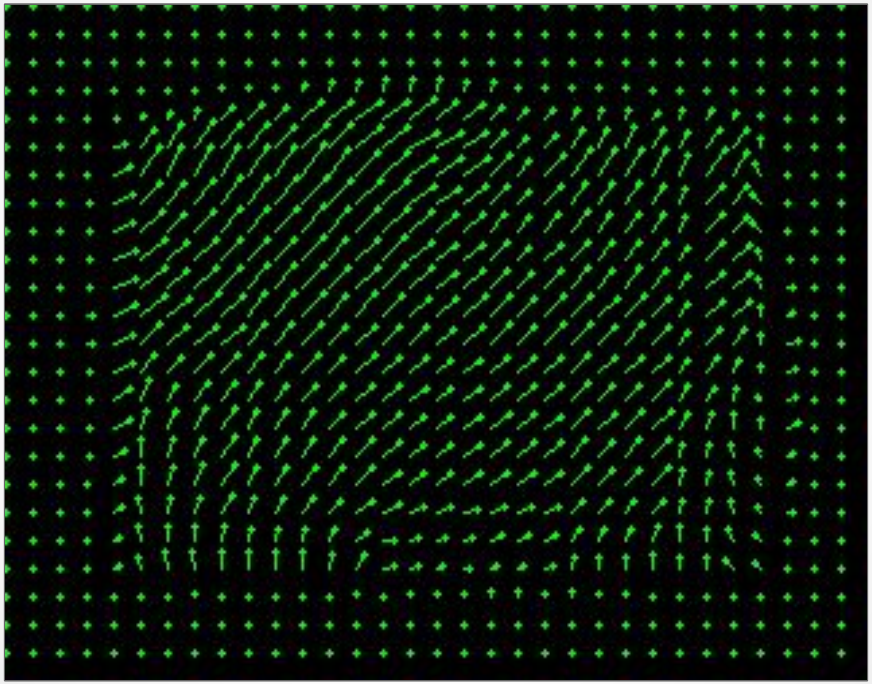
1a: Base Shift0 and ShiftR2



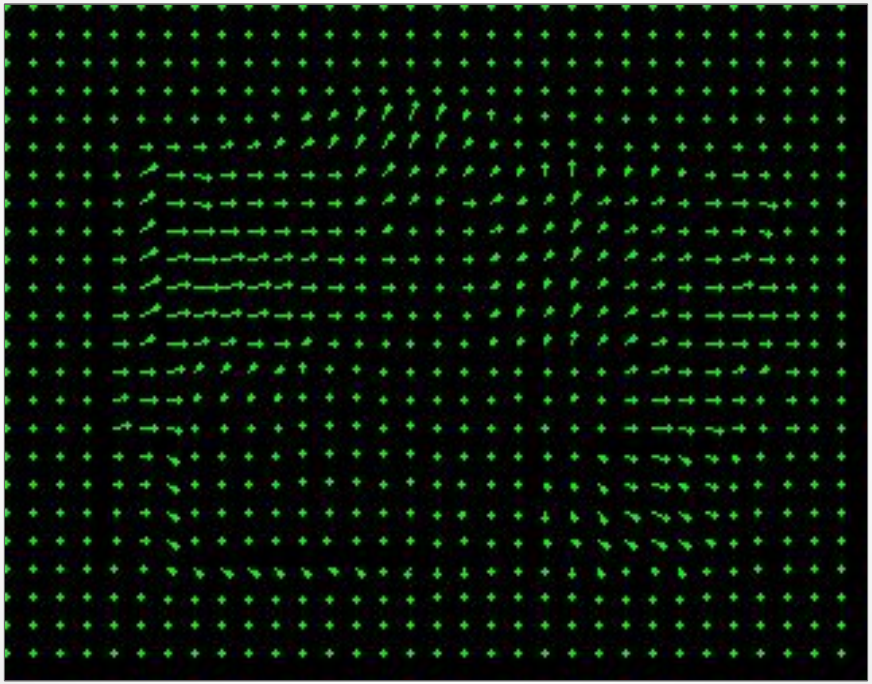
ps4-1-a-1

1a: Base Shift0 and ShiftR5U5



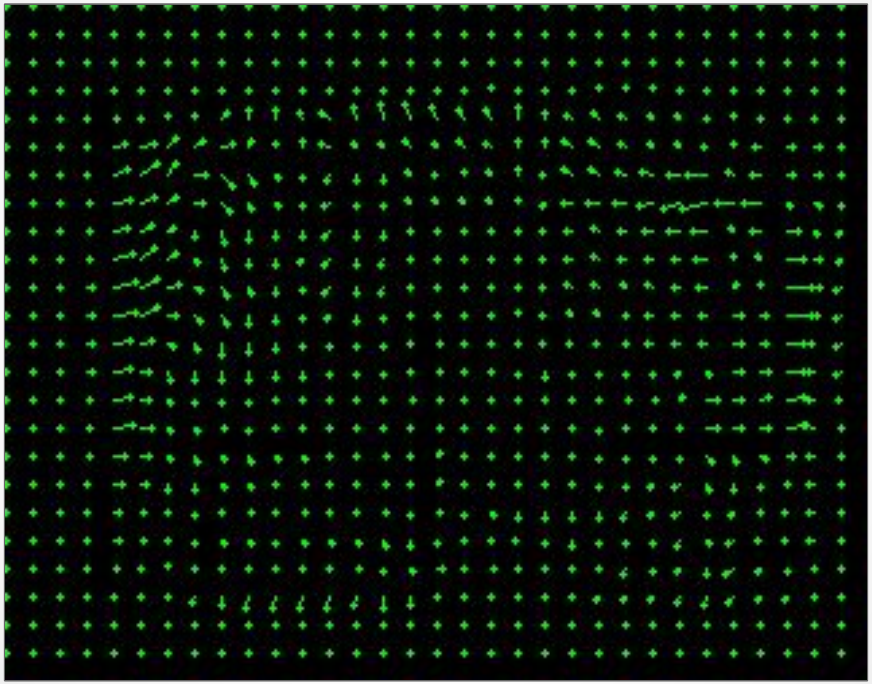
ps4-1-a-2

1b: Base Shift0 and ShiftR10



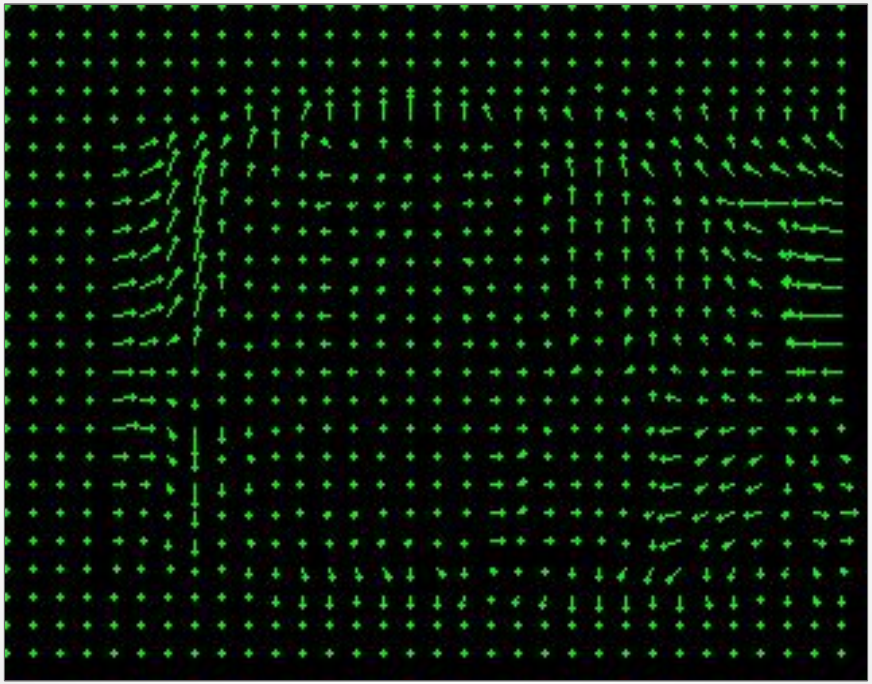
ps4-1-b-1

1b: Base Shift0 and ShiftR20



ps4-1-b-2

1b: Base Shift0 and ShiftR40



ps4-1-b-3

1b: Text Response

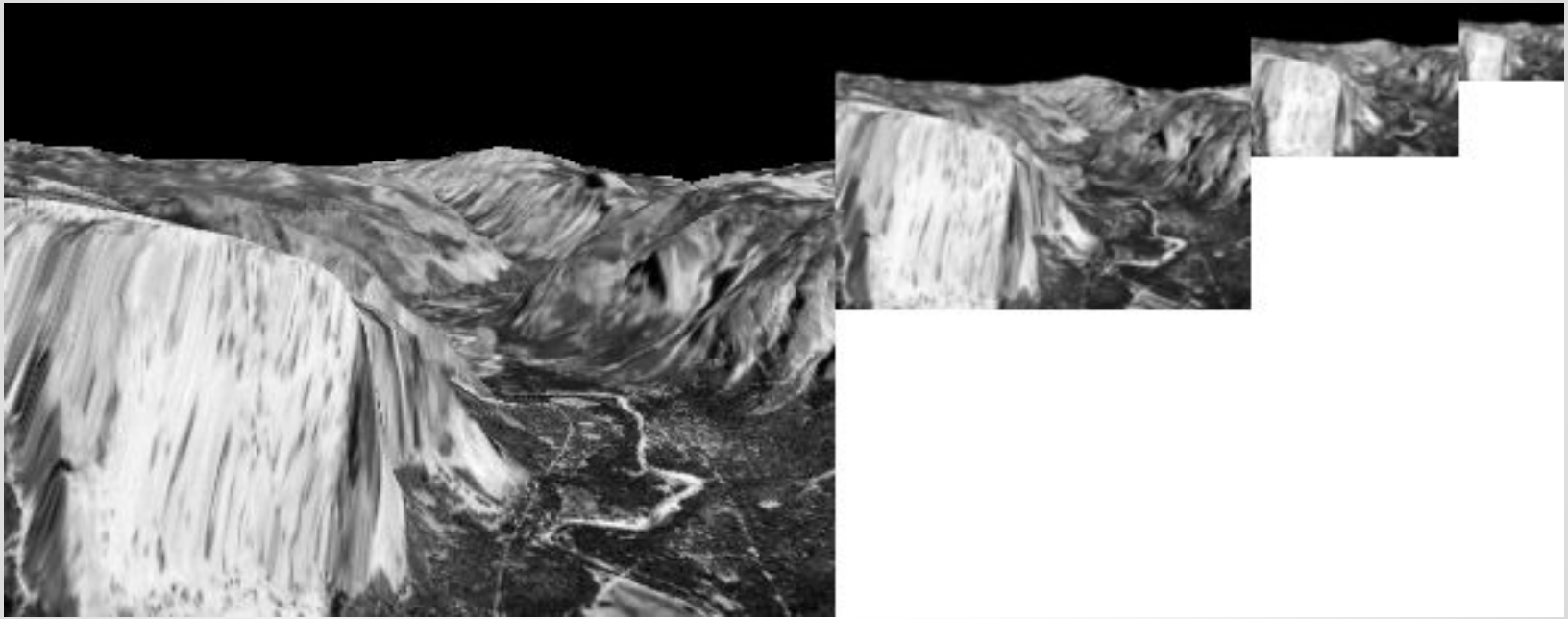
Does LK still work? Does it fall apart on any of the pairs? Try using different parameters to get results closer to the ones above. Describe your results and what you tried.

Results are not good, It falls apart for both Shift0-ShiftR20 and Shift0-ShiftR40, because LK works better when the flow vector between two frames is small enough for the differential equation of the optical flow to hold, which is often less than the pixel spacing. In 1b the flow vectors between image frames are too high

I tried different kernel size , increasing the kernel size was able to get the optical flow vectors right at around the edges for Shift0-Shift10, but didn't have any impact for the other two pairs

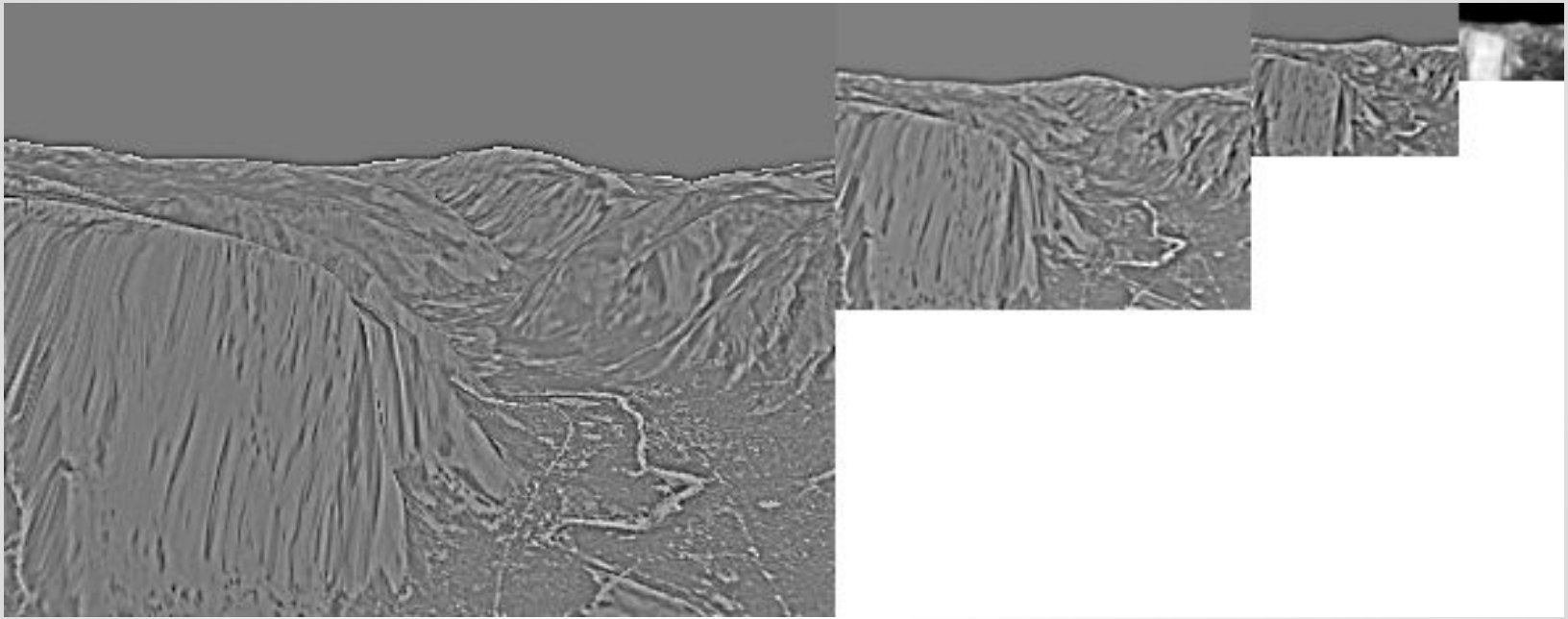
I also tried Gaussian Kernel for summation but that didn't improve the results for any of the pairs

2a: Gaussian Pyramid



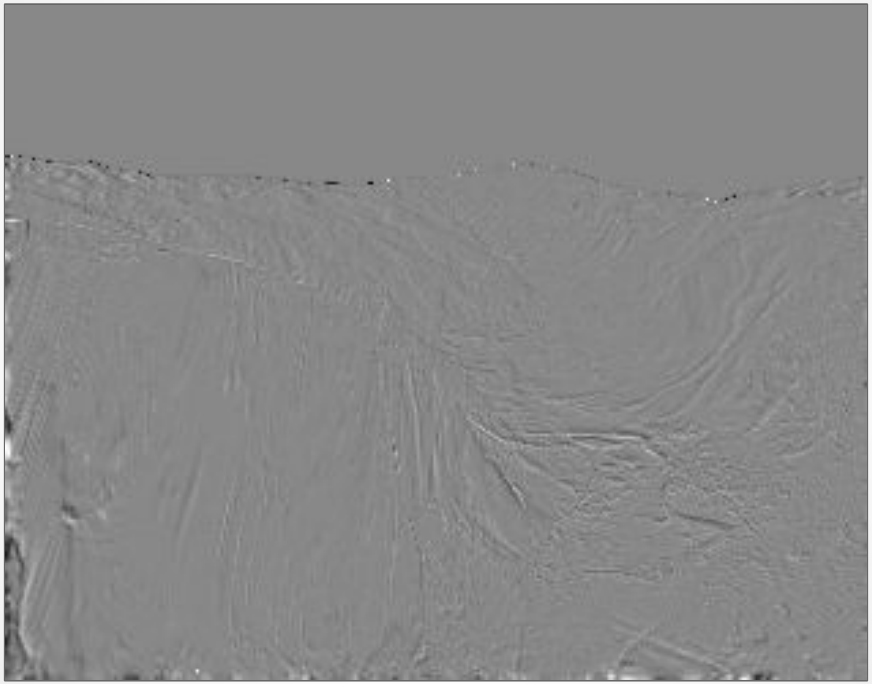
ps4-2-a-1

2b: Laplacian Pyramid



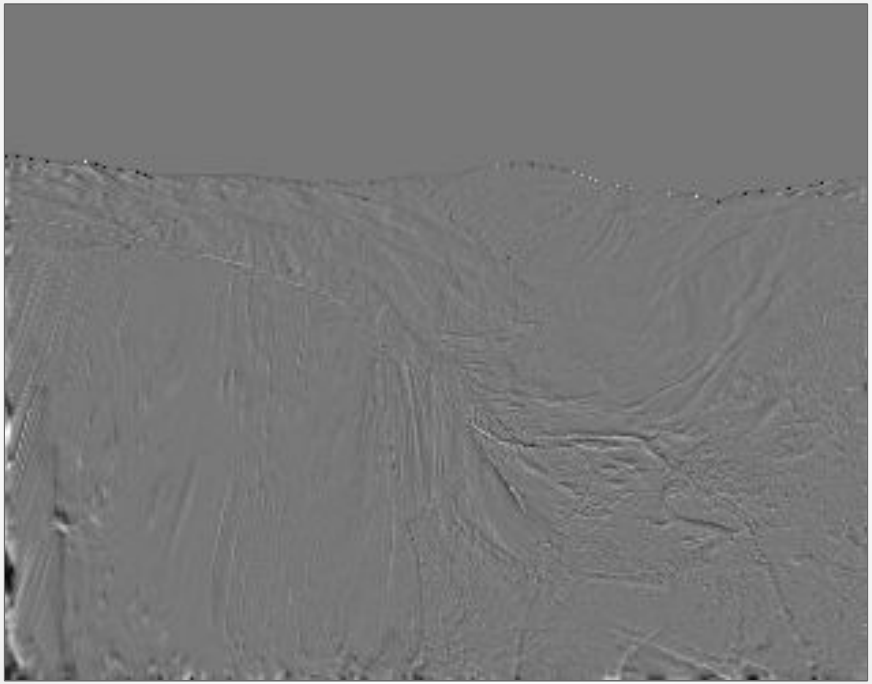
ps4-2-b-1

3a: Difference images



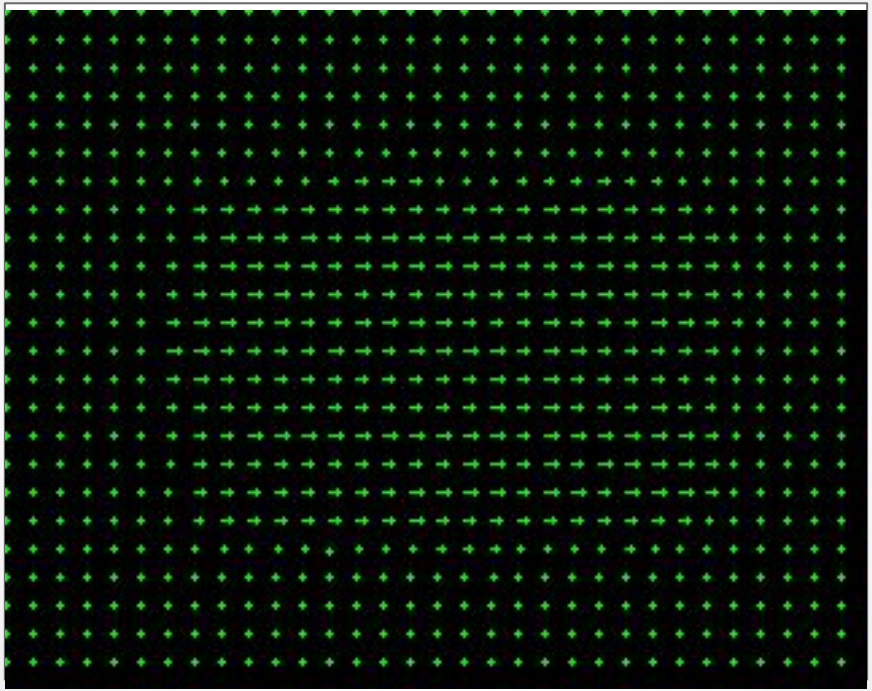
ps4-3-a-1

3a: Difference images (cont.)



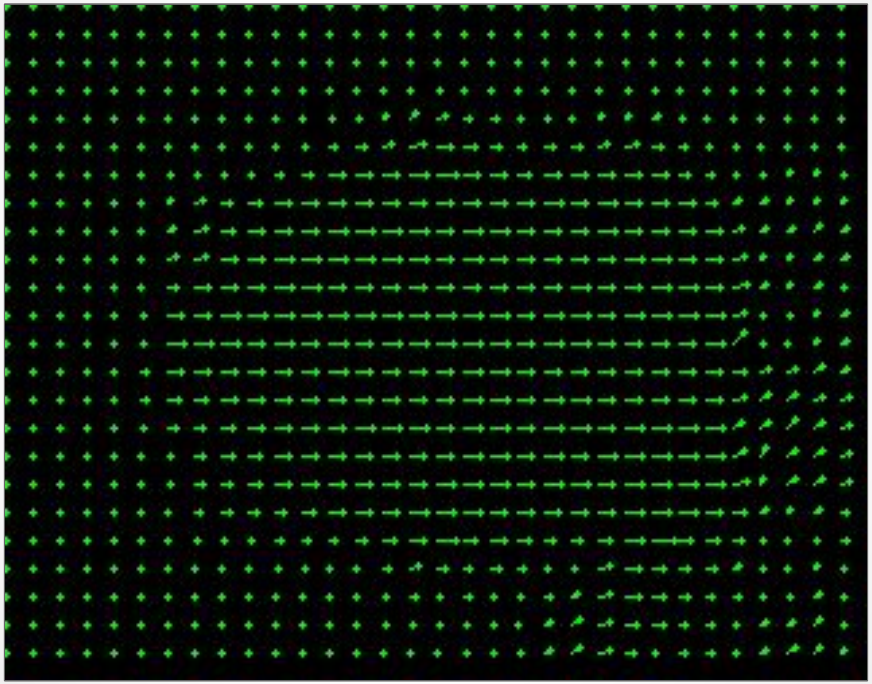
ps4-3-a-2

4a: Hierarchical LK



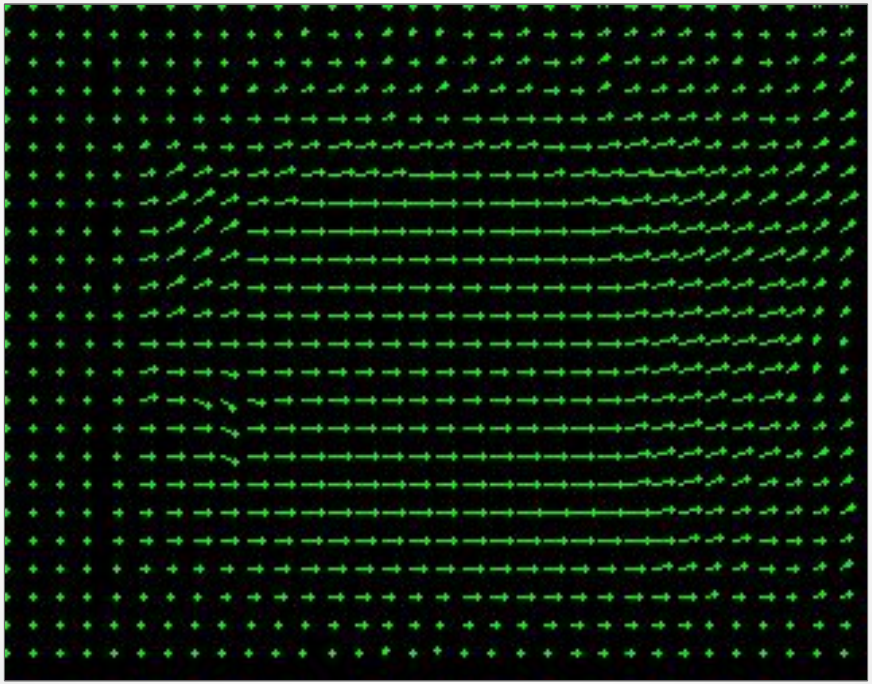
ps4-4-a-1

4a: Hierarchical LK (cont.)



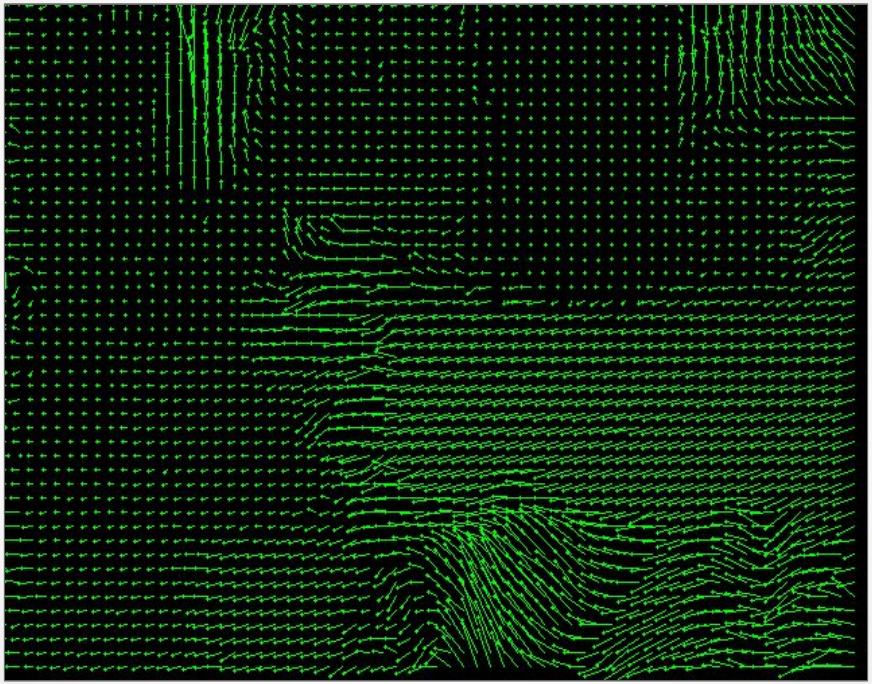
ps4-4-a-2

4a: Hierarchical LK (cont.)



ps4-4-a-3

4b: Hierarchical LK (cont.)

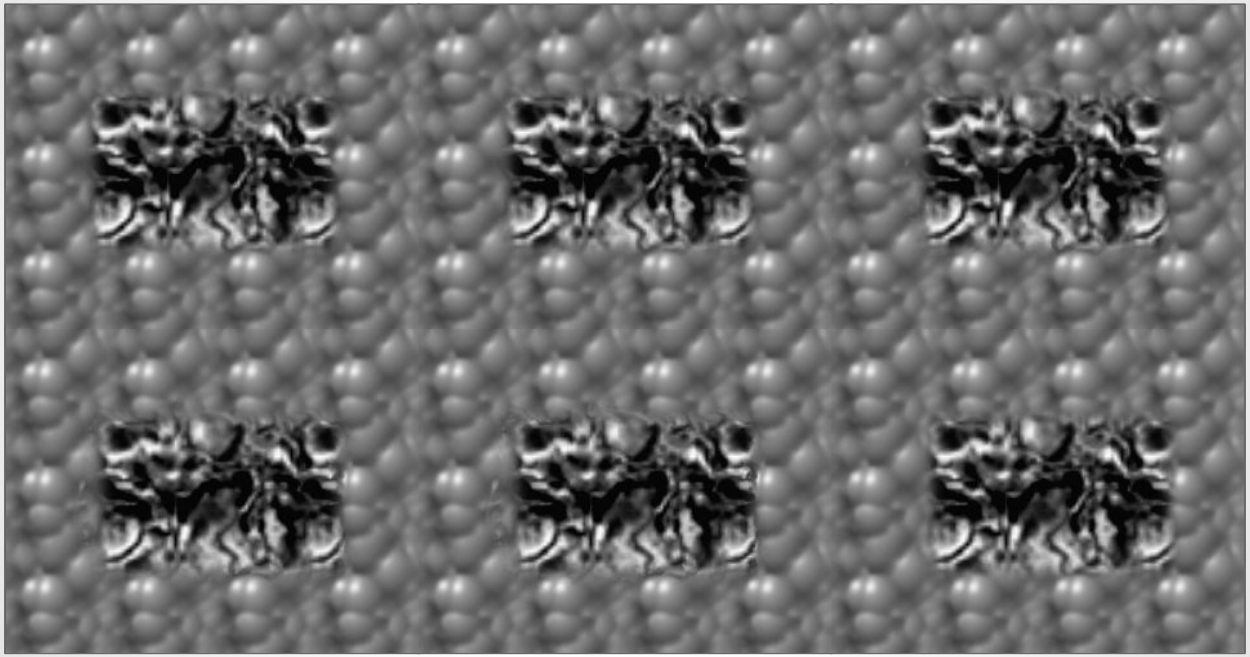


ps4-4-b-1

4b: Hierarchical LK (cont.)

ps4-4-b-2

5a: Frame Interpolation



ps4-5-a-1

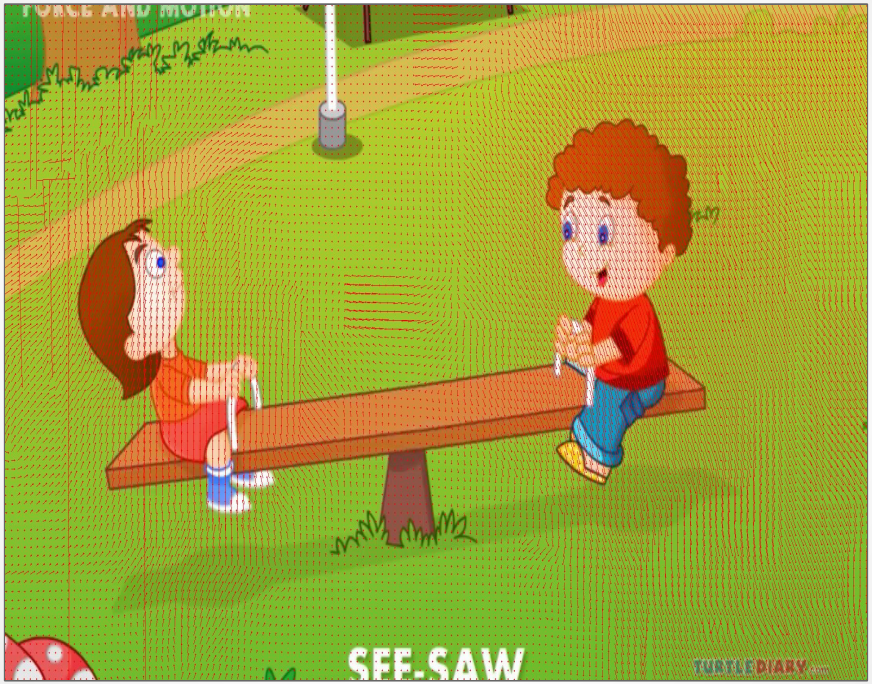
5b: Frame Interpolation

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/ag5rf2hq841cpzp23r1mvlfgfo6dwnuv