

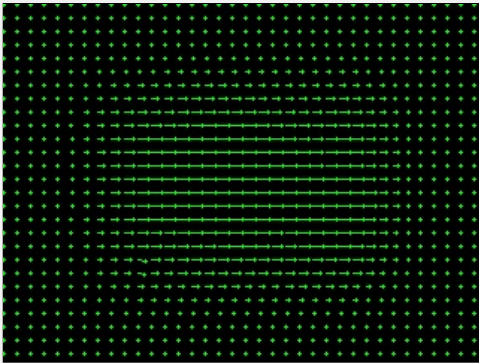
# Computer Vision

## Spring 2020

### Problem Set #4

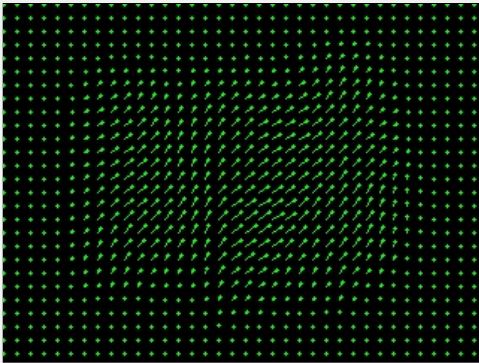
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aparmar32@gatech.edu

# 1a: Base Shift0 and ShiftR2



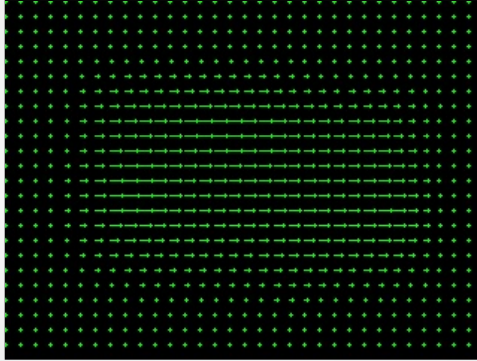
ps4-1-a-1

# 1a: Base Shift0 and ShiftR5U5



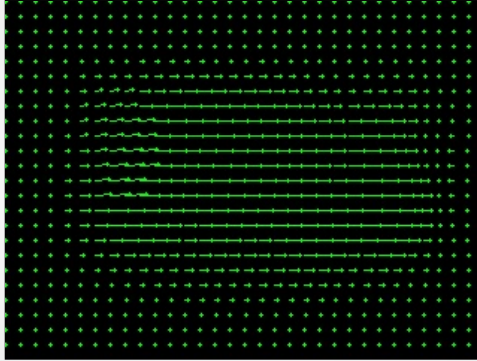
ps4-1-a-2

# 1b: Base Shift0 and ShiftR10



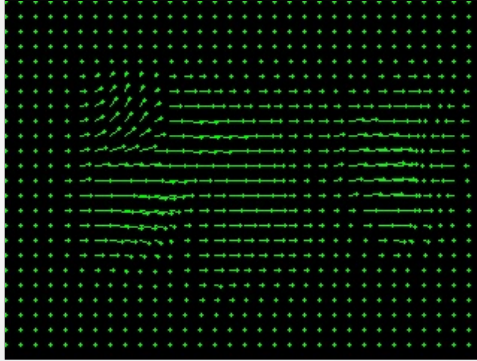
ps4-1-b-1

# 1b: Base Shift0 and ShiftR20



ps4-1-b-2

# 1b: Base Shift0 and ShiftR40



ps4-1-b-3

# 1b: Text Response

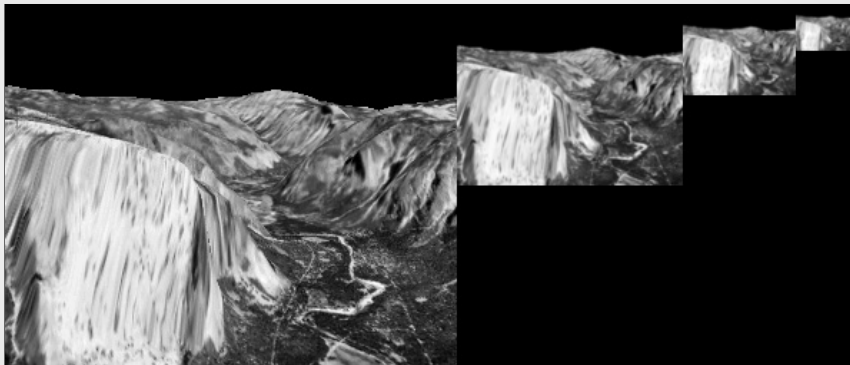
Does LK still work? Does it fall apart on any of the pairs? Try using different parameters to get results closer to the ones above.

Describe your results and what you tried.

LK seems to start performing poorly for large displacements, and seems to get progressively worse the larger the displacement gets.

My Lukas-Kanade optic flow implementation already included a derivative blurring step. This blur used a gaussian kernel. I had to double the sigma value for this kernel (double compared to part 1a) to generate a smoother quiver plot.

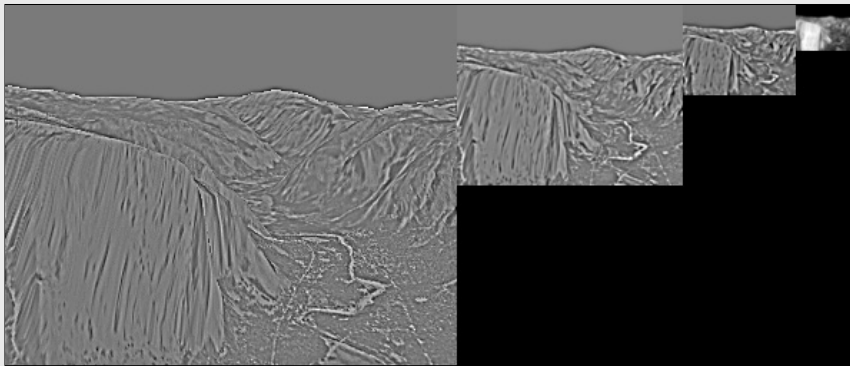
## 2a: Gaussian Pyramid



ps4-2-a-1

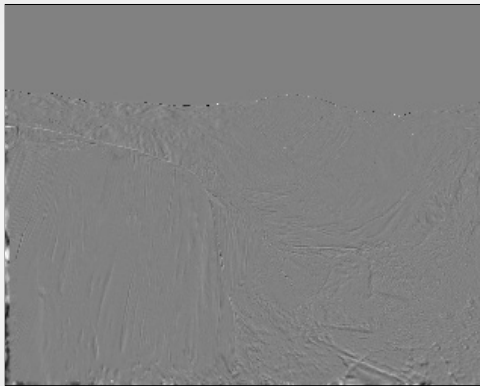


## 2b: Laplacian Pyramid



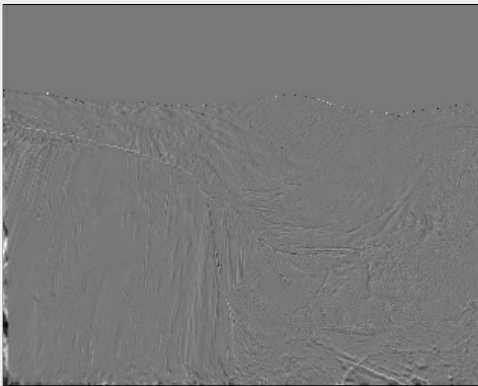
ps4-2-b-1

# 3a: Difference images



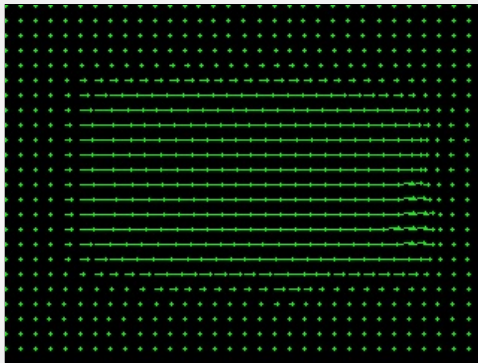
ps4-3-a-1

# 3a: Difference images (cont.)



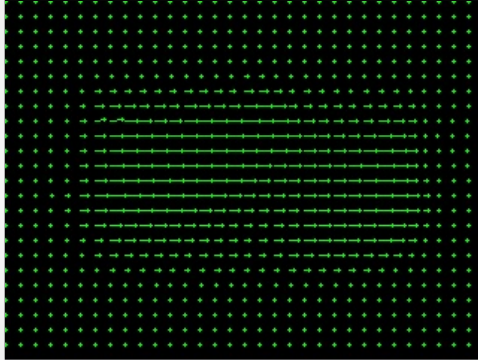
ps4-3-a-2

# 4a: Hierarchical LK



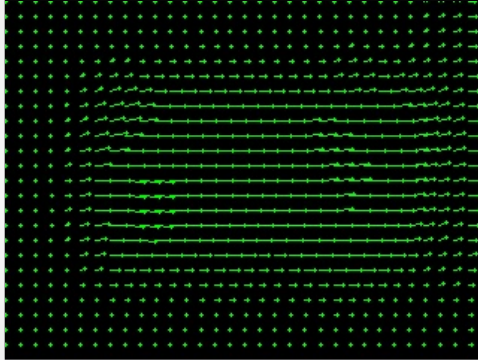
ps4-4-a-1

# 4a: Hierarchical LK (cont.)



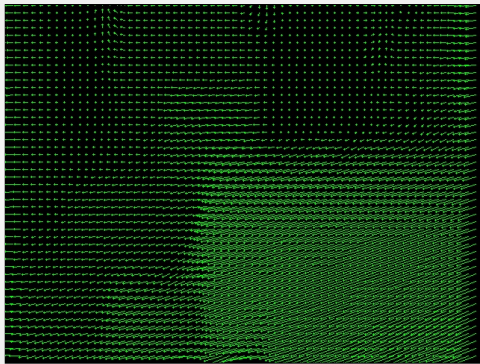
ps4-4-a-2

# 4a: Hierarchical LK (cont.)



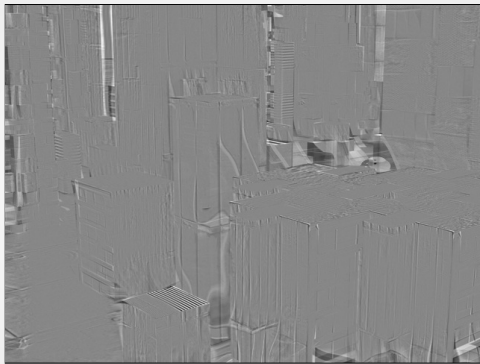
ps4-4-a-3

## 4b: Hierarchical LK (cont.)



ps4-4-b-1

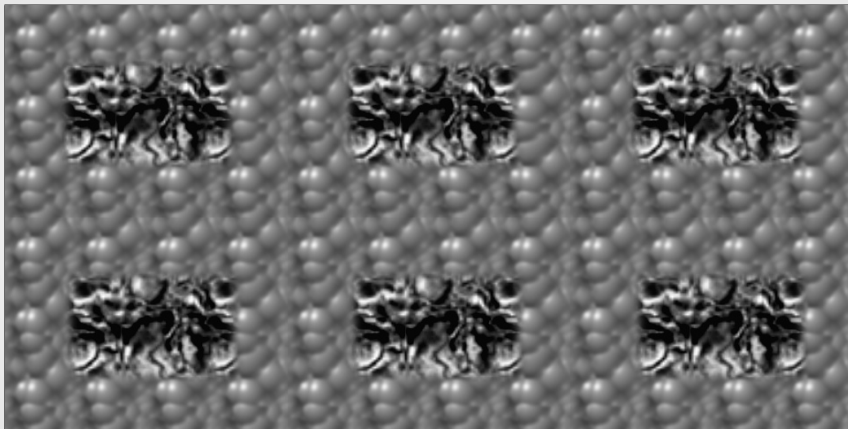
## 4b: Hierarchical LK (cont.)



ps4-4-b-2



# 5a: Frame Interpolation



ps4-5-a-1

# 5b: Frame Interpolation



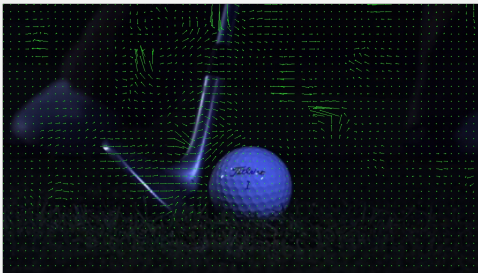
ps4-5-b-1

# 5b: Frame Interpolation



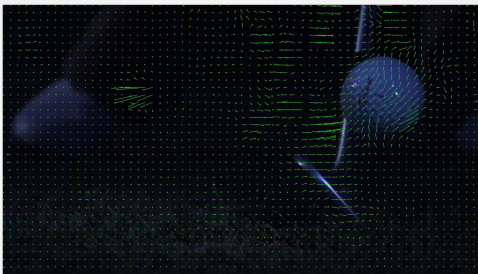
ps4-5-b-2

# 6: Challenge Problem



ps4-6-a-1

## 6: Challenge Problem (cont.)



ps4-6-a-2

# 6: Challenge Problem (cont.)

Video link:

[https://youtu.be/QNr6ey\\_qVgA](https://youtu.be/QNr6ey_qVgA)

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