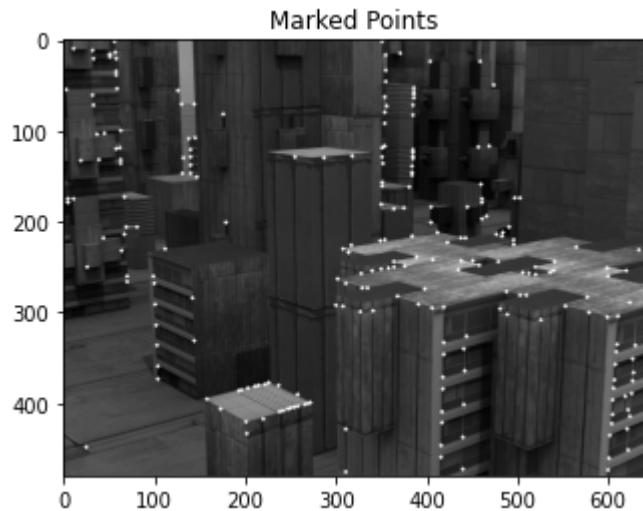


CV Assignment 2 Report

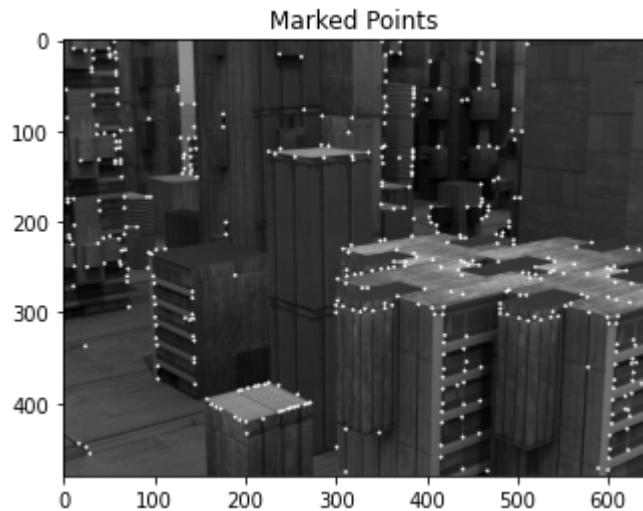
Harris Corner Detector

I used the value of $k = 0.0451$ as mentioned [here](#)

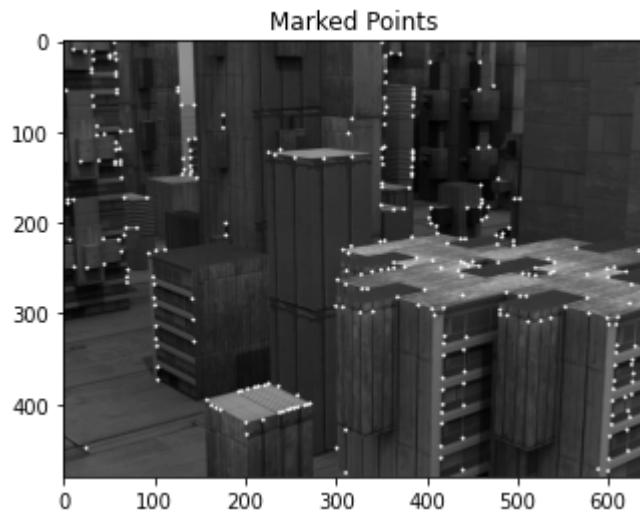
Threshold to be 0.02 of maximum



Threshold to be 0.01 of maximum

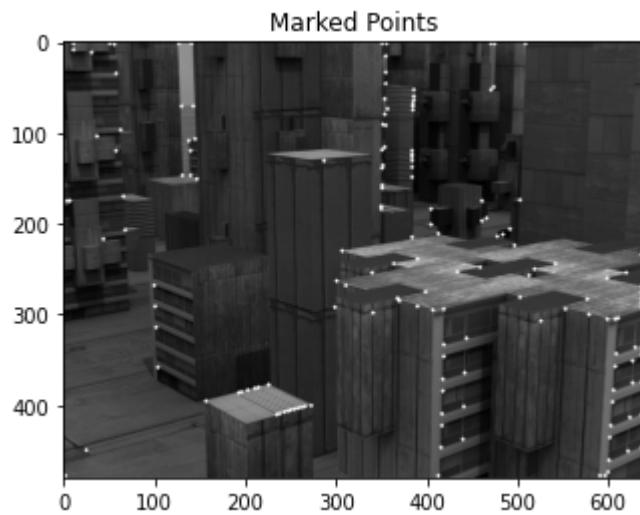


Threshold to be 0.015 of maximum

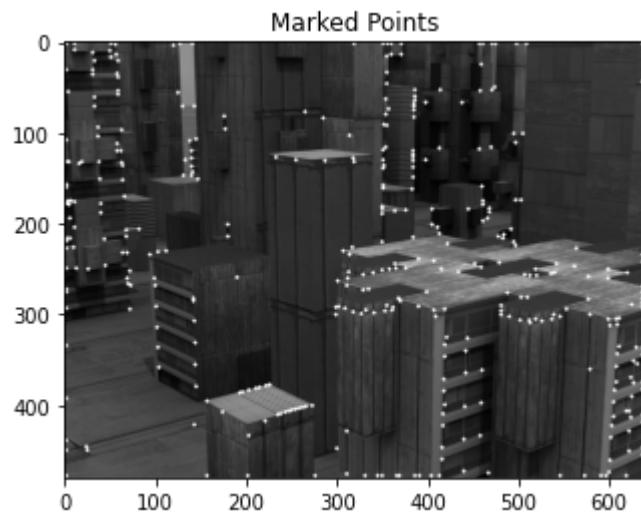


Shito-Masi Corner Detector

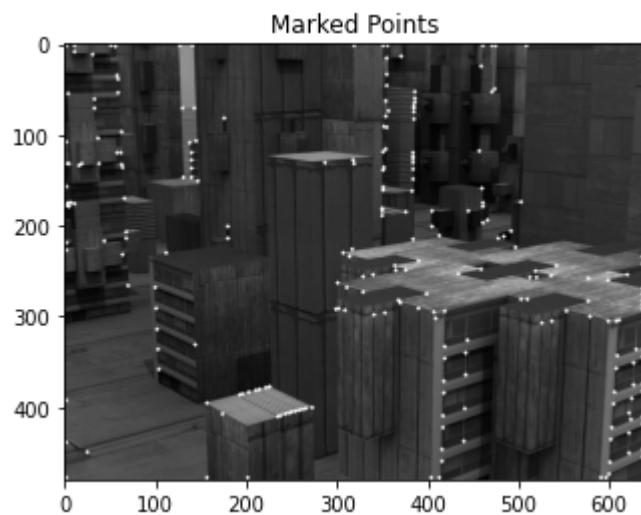
Threshold to be 0.2 of maximum



Threshold to be 0.2 of maximum

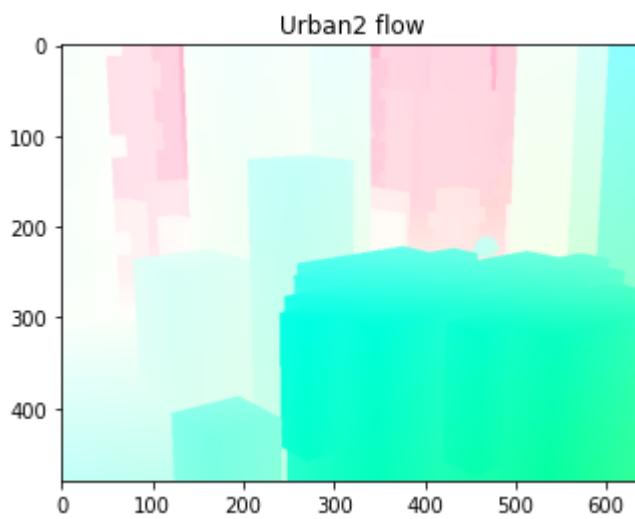
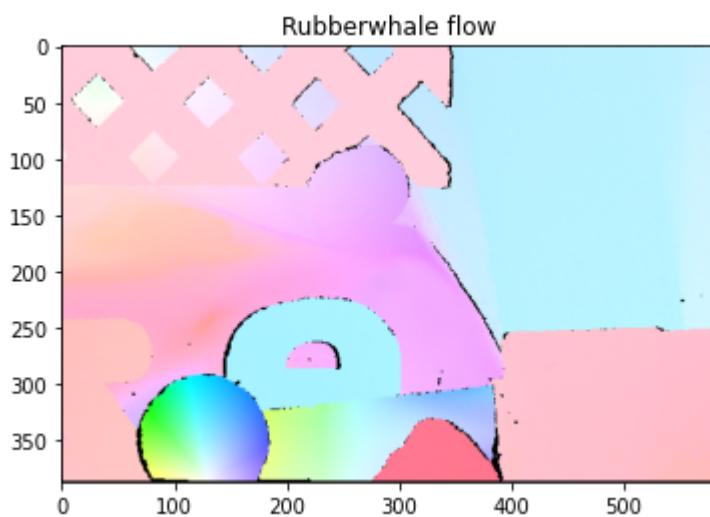
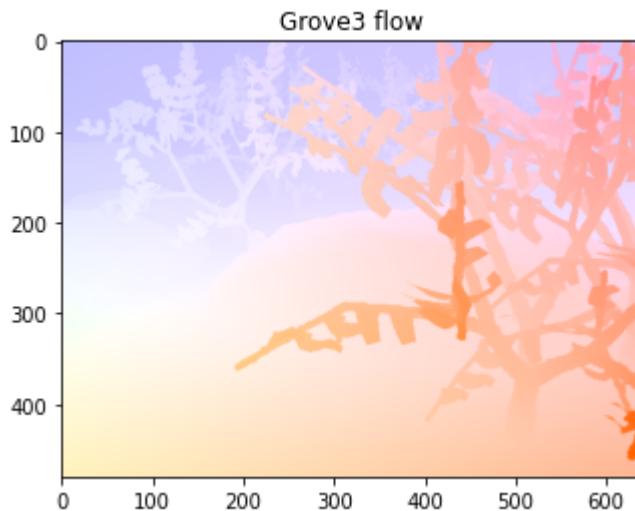


Threshold to be 0.14 of maximum



Forward-Additive Sparse Optical Flow

Visualizing Flow files



Lucas Kanade Algorithm Quantitative Analysis

EPE Error for `windowSize=3, tau=0.01`:

Dataset	Error
Urban2	10.30056941785085
RubberWhale	155408092.1484446
Grove3	3.09411965733505

Experiment with `windowSize=5, tau=0.01`

Dataset	Error
Urban2	10.280465324056696
RubberWhale	155408092.0448774
Grove3	2.9157314665210223

Experiment with `windowSize=10, tau=0.01`

Dataset	Error
Urban2	10.3135601779796
RubberWhale	160706095.15563983
Grove3	2.826169797566777

Observation We can see a reduction the EPE from 3 to 5 but then on increasing the windowsize even further the EPE increases

Reason For a neighborhood of 3 there was very less information about the movement around the point and with 5 that condition was improved but with 10 `windowSize` the assumption that the point moves like its neighbours is no longer true leading to large errors.

Experiment with `windowSize=5, tau=0.01`

Dataset	Error	No of points where flow was calculated
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Dataset	Error	No of points where flow was calculated
Urban2	10.280465324056696	226
RubberWhale	155408092.0448774	91
Grove3	2.9157314665210223	908

Experiment with `windowSize=5, tau=0.1`

Dataset	Error	No of points where flow was calculated
Urban2	10.280465324056696	226
RubberWhale	155408092.0448774	91
Grove3	2.9157314665210223	908

Experiment with `windowSize=5, tau=1`

Dataset	Error	No of points where flow was calculated
Urban2	10.691815318675792	73
RubberWhale	166378074.98122483	85
Grove3	2.915851013770831	899

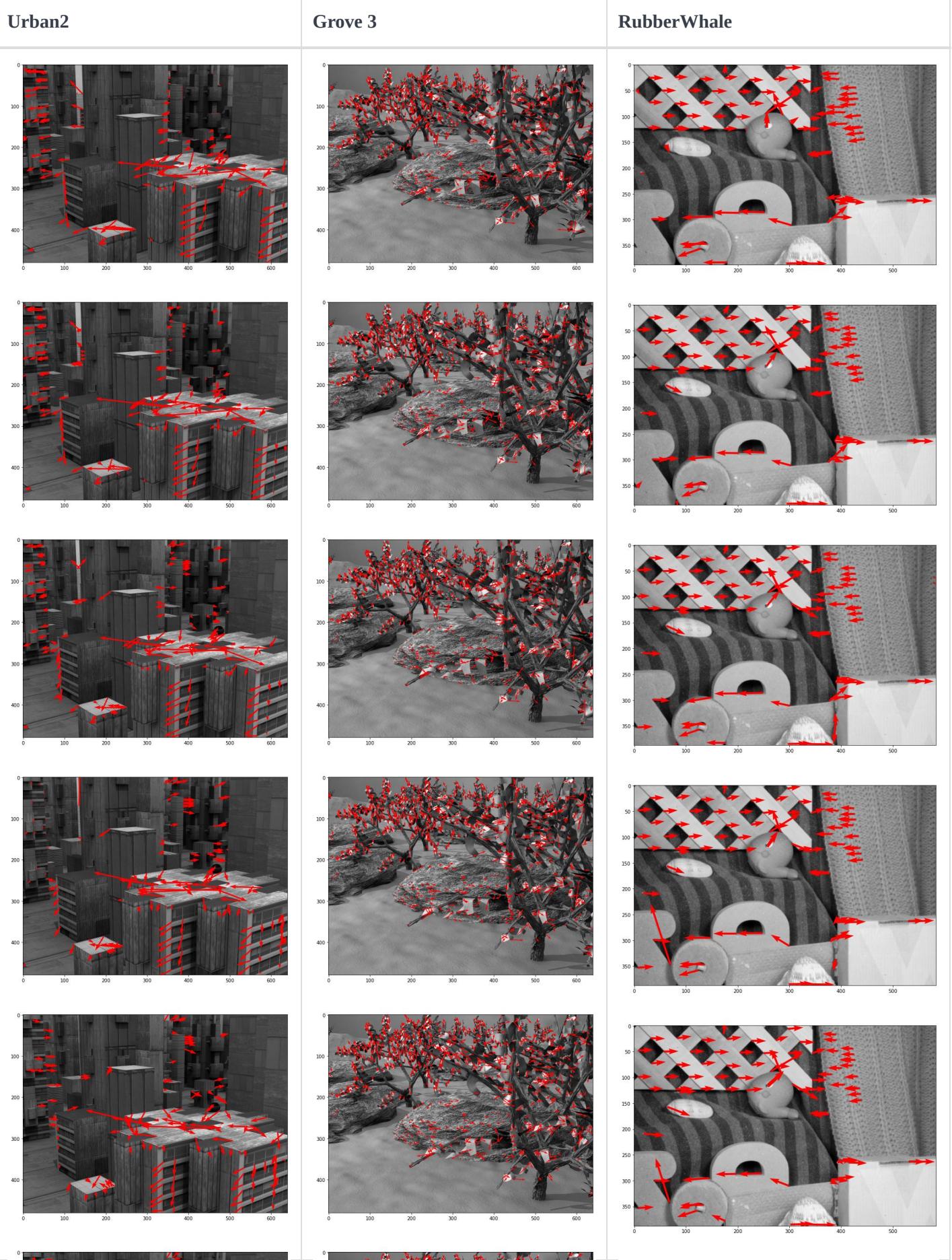
Experiment with `windowSize=5, tau=1`

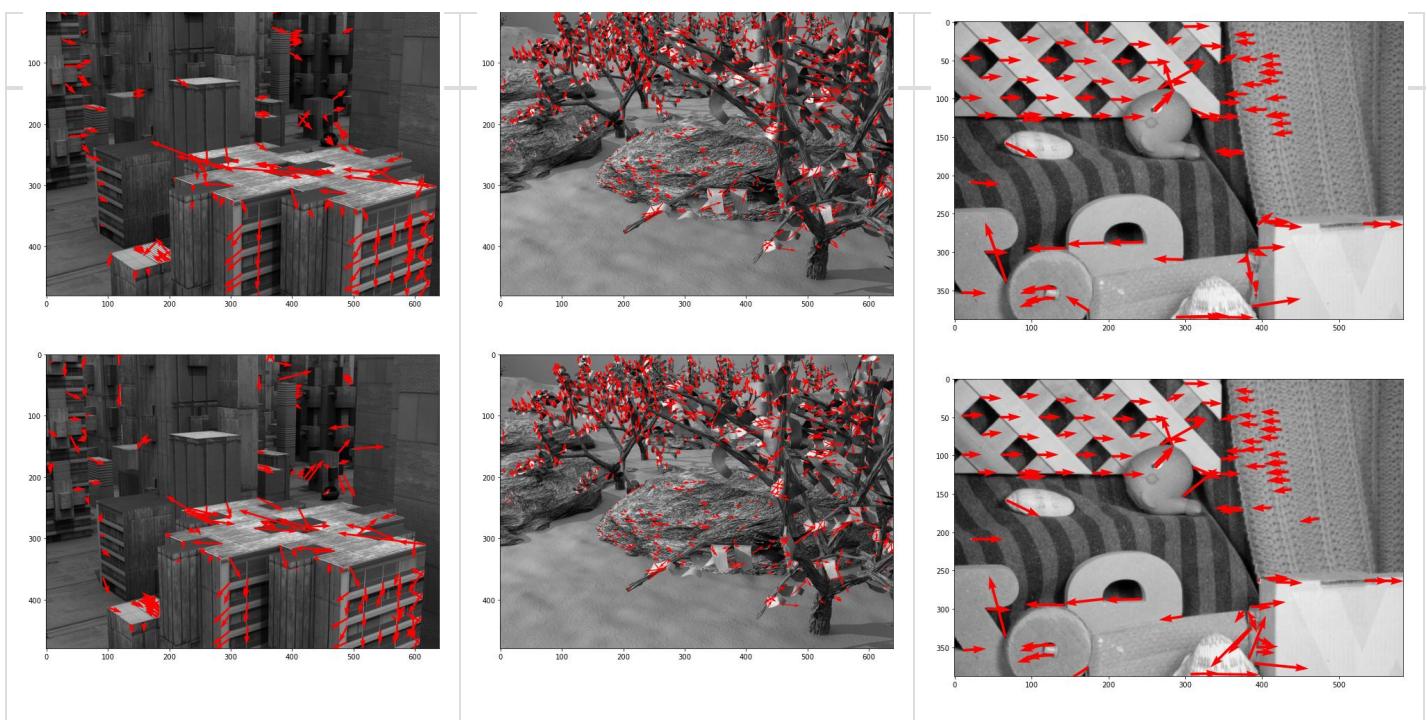
Dataset	Error	No of points where flow was calculated
Urban2	10.691815318675792	73
RubberWhale	166378074.98122483	85
Grove3	2.915851013770831	899

Observation The EPE errors aproxx remained the same for small change in tau

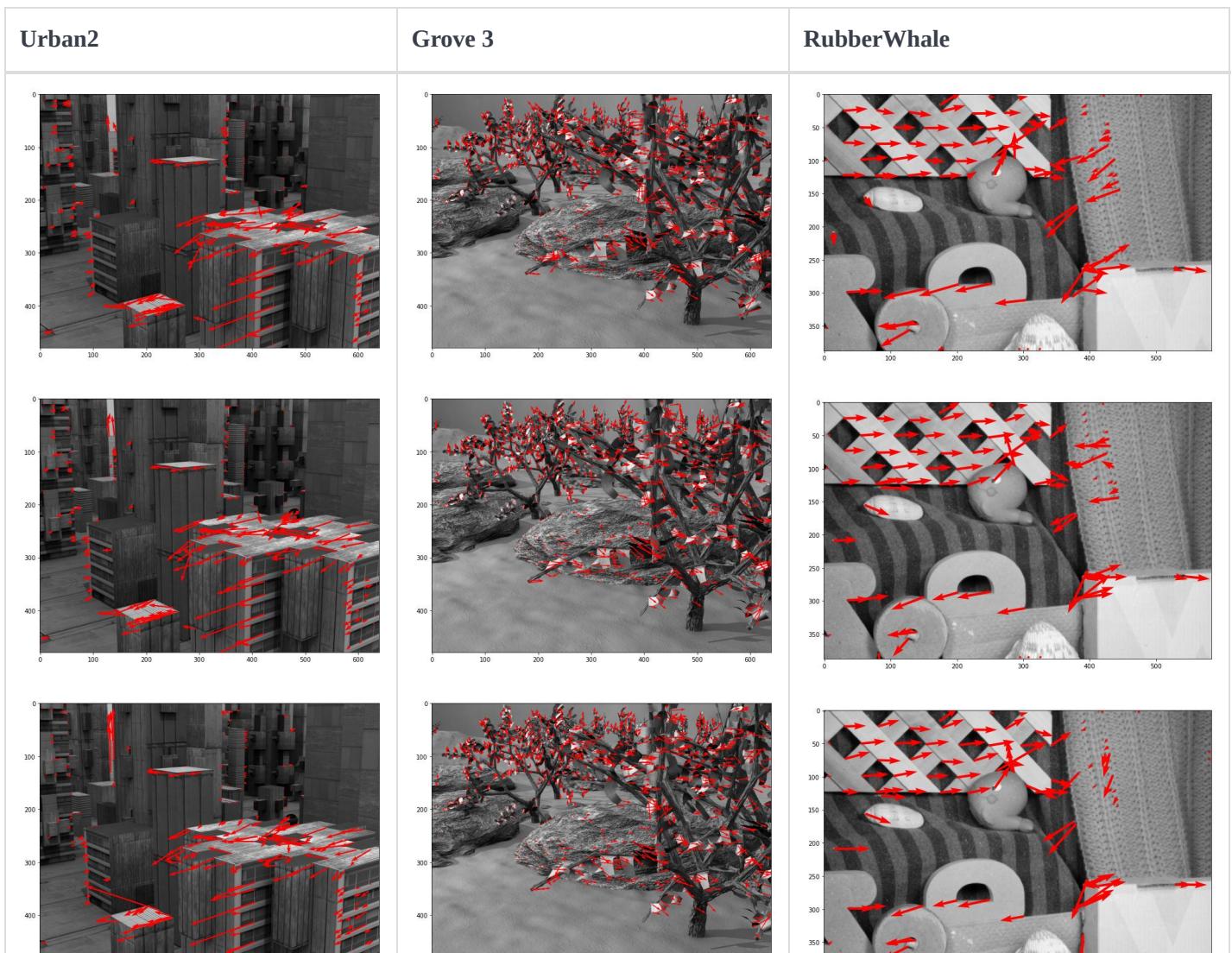
Reason This did not make any difference because the points given by the harris edge detector were already taken to be the highest responses out of all the detections.

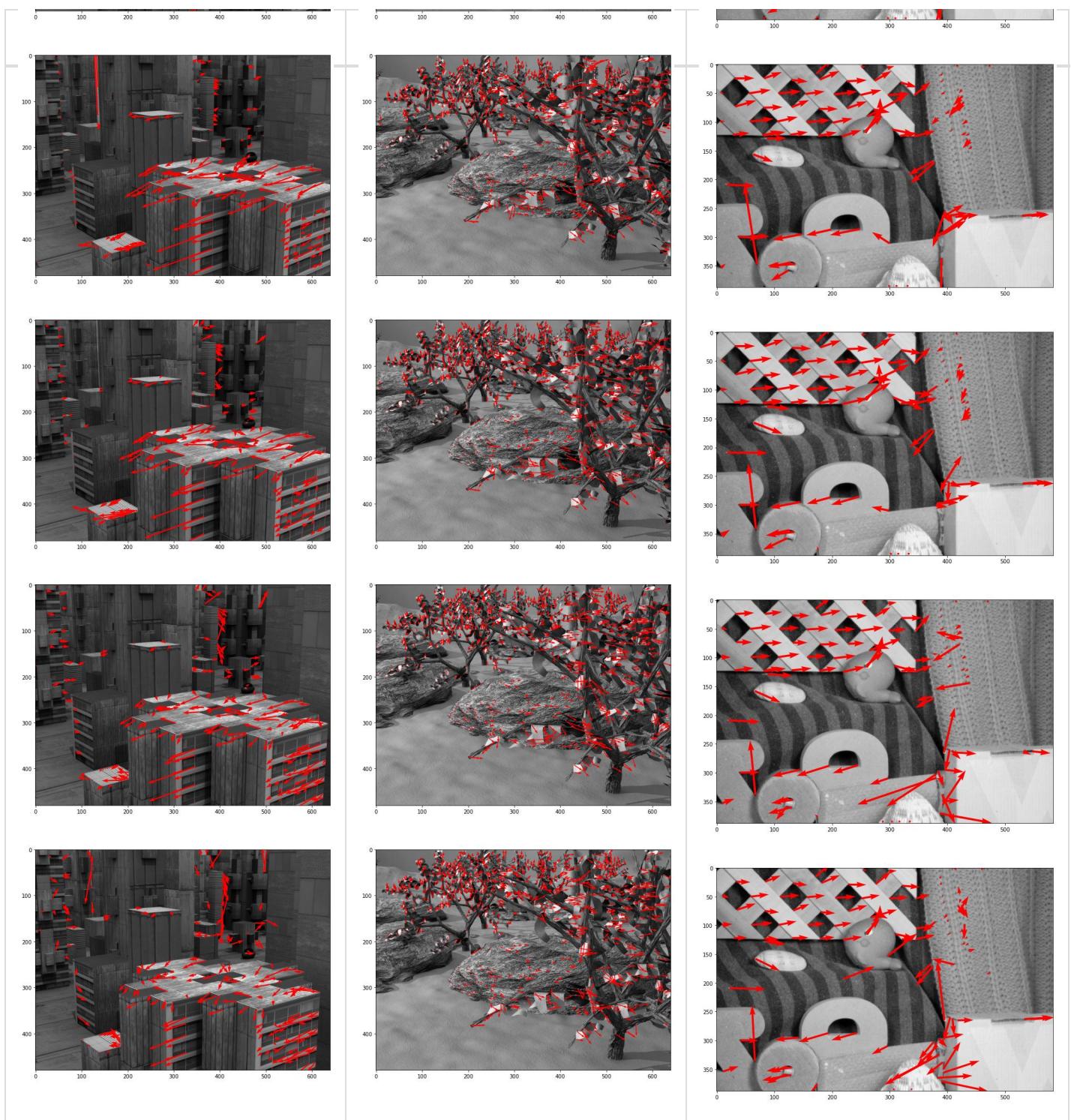
Output





MultiScale Lucas Kanade





EPE Errors

Dataset	Error	No of points where flow was calculated
Urban2	7.104378115777469	226
RubberWhale	155408093.1791269	91
Grove3	3.8301334463954064	908

The error decreased for both the Urban2 and the RubberWhale datasets. This was expected as they were the only ones which had large movements while grove3 had small movements and we know that multiscale performs better with large movements.

Effect of Iteratively refining flow

Level	EPE
1	152.5727958172217
2	82.40904683981887
3	43.34043832924144
4	22.37366896054953
5	11.69267855422483
Final	8.748847230678845