Problem 1: Disparity Estimation using Block Matching

(i) The best estimated disparity map was obtained for a block size of 7. The disparity maps along with the calculated MSE are given below:

Disparity map taking left image as reference

MSE = 210.8177

Disparity map taking right image as reference

MSE= 292.6047

(ii) The disparity map after consistency checking along with MSE is:

MSE= 25.7398

MSE= 24.6252

Problem 2: Disparity Estimation using Dynamic Programming

The estimated disparity maps using dynamic programming are

MSE=232.3202

MSE=548.0771

Problem 3: Stereo Application - View Interpolation

Interpolated view3 image along with MSE:

MSE=109.8894

Problem 4: Evaluation

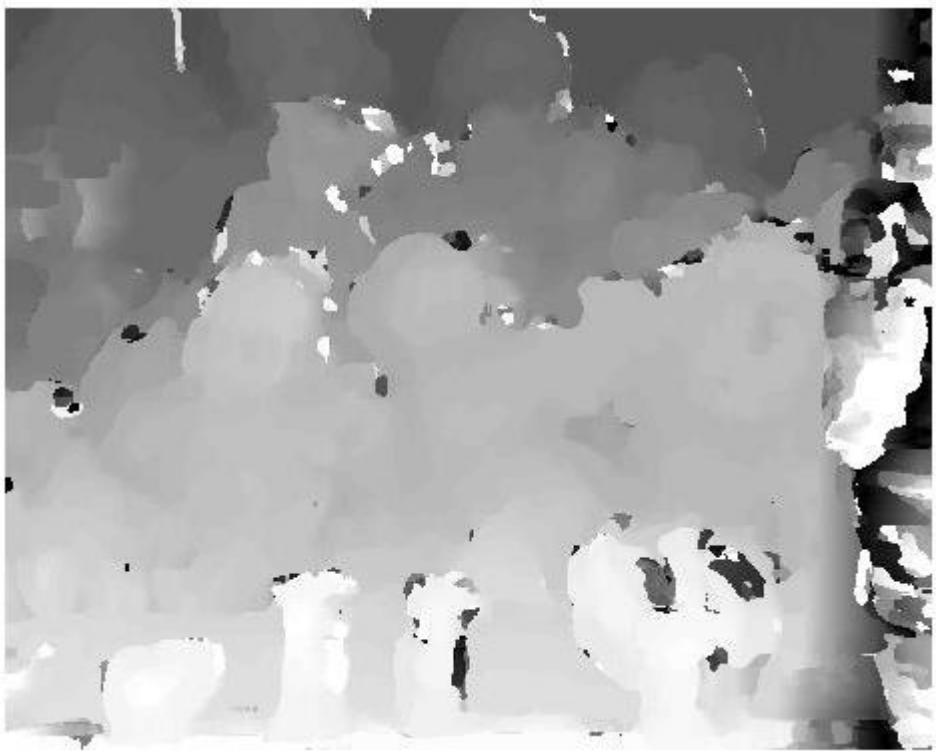
(a) BOOKS

MSE=391.6158

MSE= 413.6880

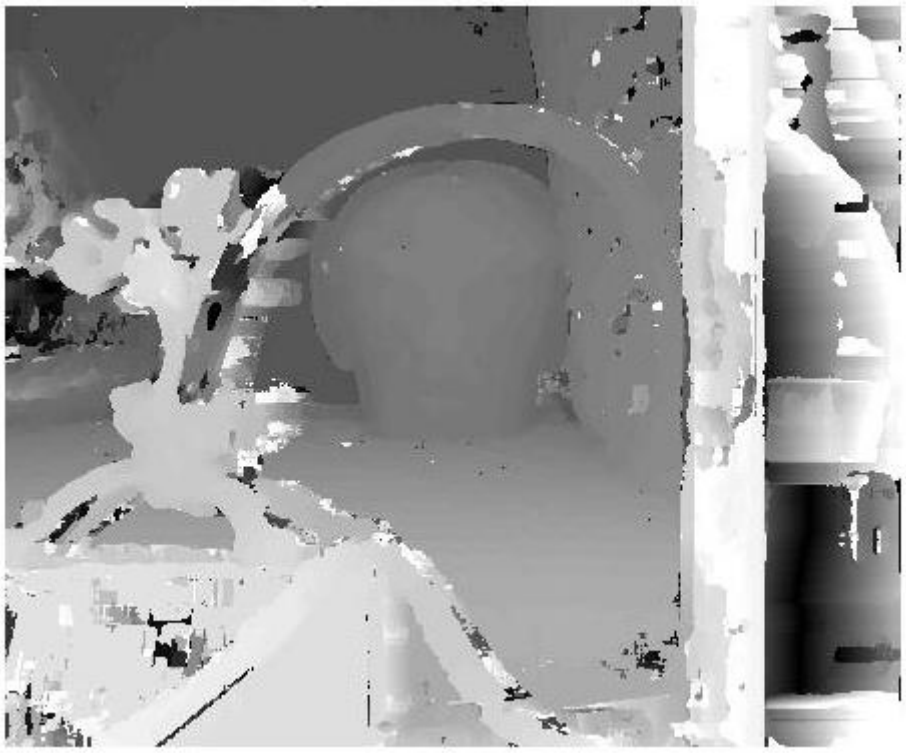
DOLLS

MSE=111.9348



MSE= 131.2567

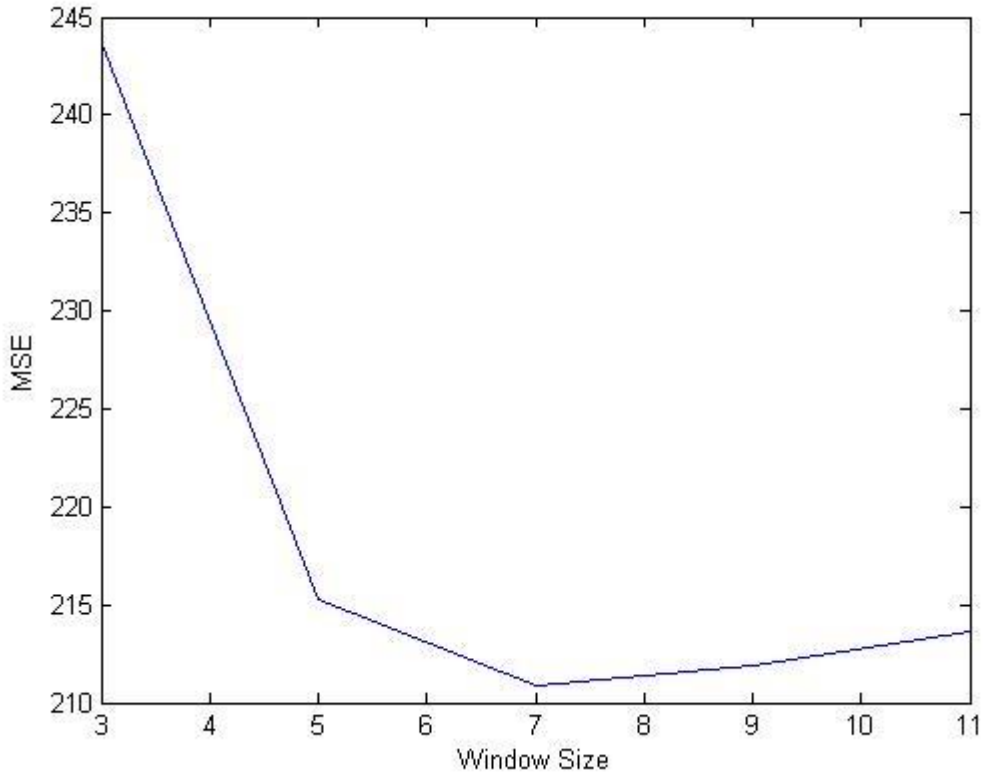
REINDEER



MSE=231.1735

MSE=170.8466

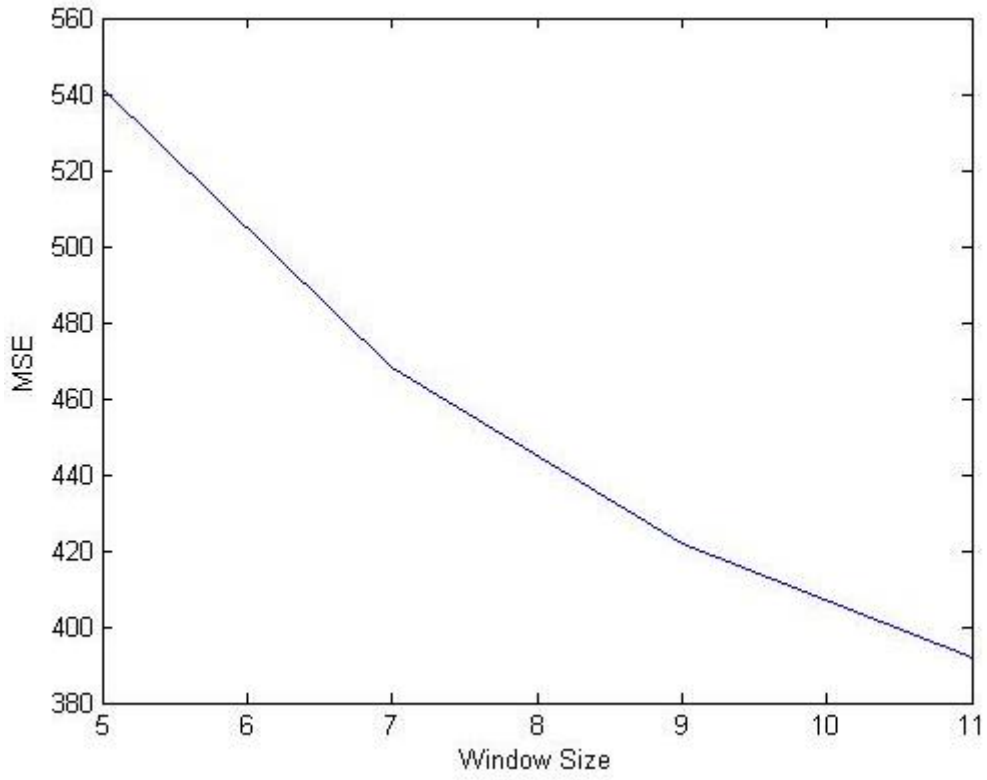
(C) Data:



plot ([3, 5, 7, 9, 11], [243.80, 215.22, 210.82, 211.86, 213.65]);

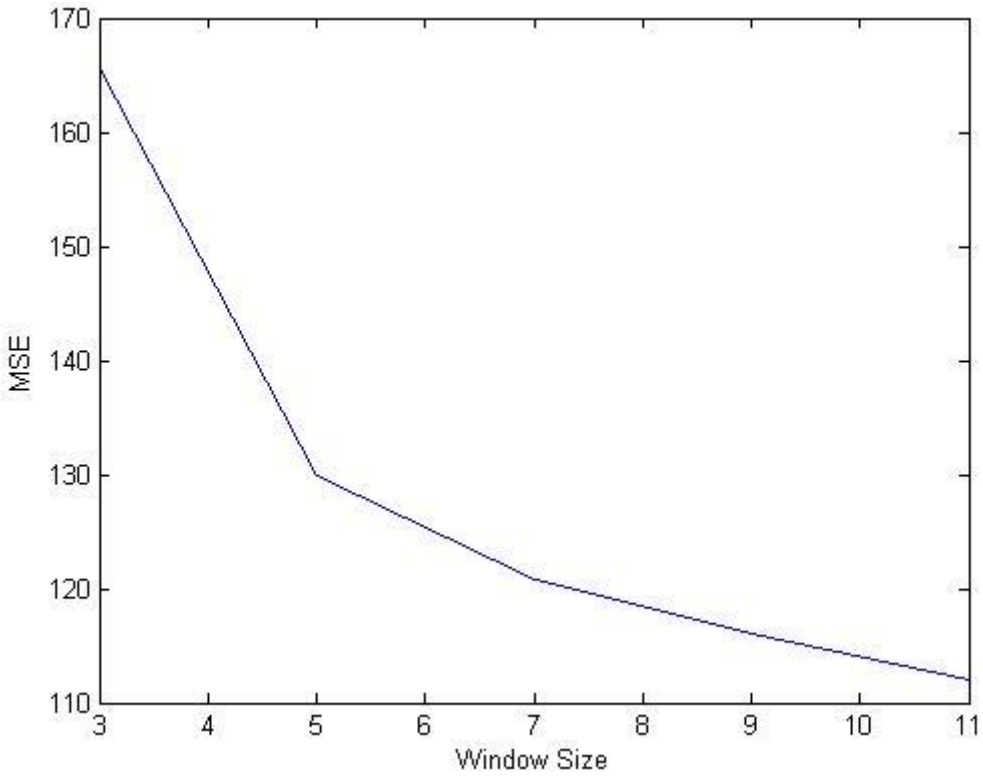
Evaluation

Books:



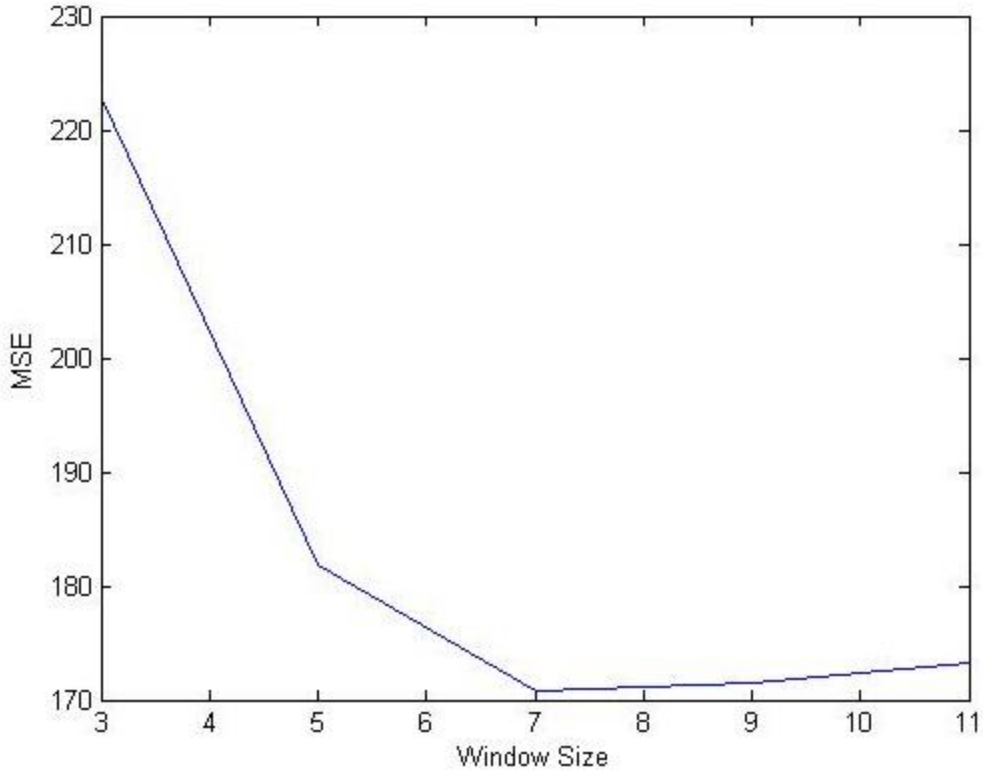
plot ([5, 7, 9, 11], [541.67, 468.14, 421.74, 391.62]);

Dolls:



plot ([3,5,7,9,11],[165.65,129.85,120.85,116,111.94]);

Reindeer:



plot ([3,5,7,9,11],[243.80, 215.22, 210.82,211.86,213.65]);

(b) The Books images have the least texture and the MSE is higher if the texture is lesser. One approach that can be used to generate disparity for texture less images is via a novel real-time color segmentation algorithm and subsequently fit planes to texture less segments and refine them using consistency constraints.

(d) I have used MATLAB sum(sum(X)) function to make my program more efficient.

(e) The run time increases with the image size and it decreases with the increase in window size.