Block Matching Algorithm for stereo images

By,
Jaisil Rose Dennison

CONTENTS:

AIM:

The objective of this project is to find the difference between images based on block matching algorithms using the SAD(Sum of Absolute Difference).

INTRODUCTION:

The depth information between two images of the stereo vision is based on the difference between two images. So we calculate the difference between the two images for each respective block of the left image(the reference image) and the right image. Here, the sum of absolute difference has been used.

STEPS:

1. The left image is taken as the reference after converting the right and left image to grey images.
2. Then we choose the sub region for the right image to be 30(in our case) and the search window size to be 12(in our case).
3. We find the normalized correlation for each block of the next image. Each block is of the same size as the template.
4. We subdivide the image into blocks based on the subregion size and find the absolute difference for each block.
5. Then the sum of those absolute differences are calculated for each block based on the search region space.
6. Thus the different image is calculated but also disparity map can be calculated.
7. Then we find the direction based on the disparity map and can be plotted as the difference that shows the shift between x and y axis.

.

RESULTS:

The algorithm gave a successful output. The disparity map and the difference of shift has been obtained from it.

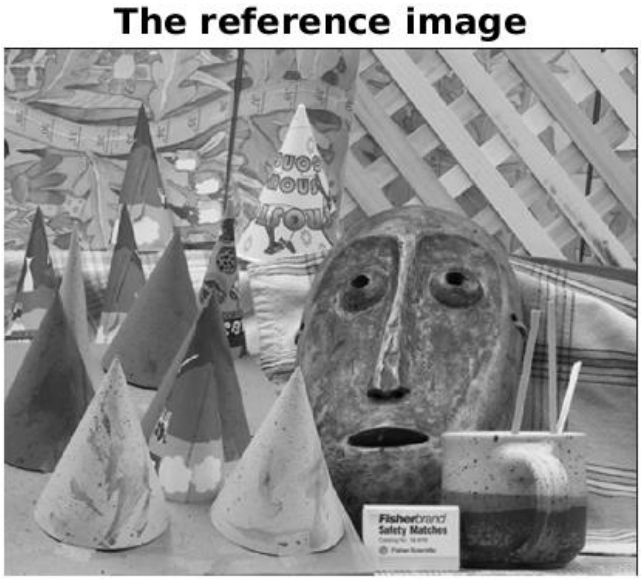

Fig 1: The reference image(left)

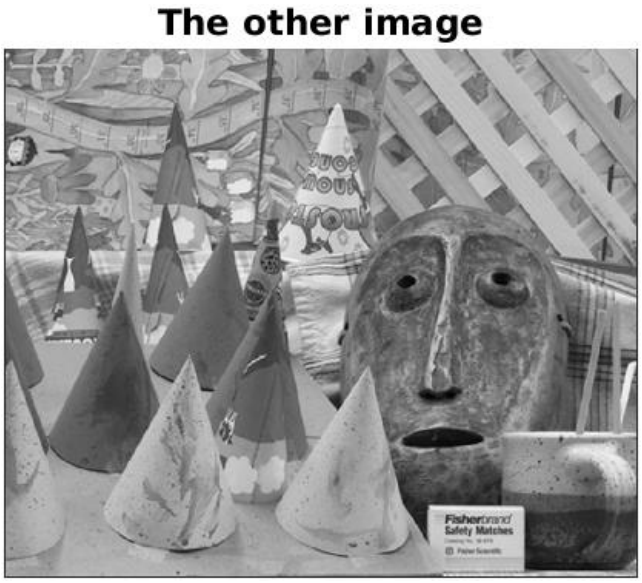

Fig 2: The right image

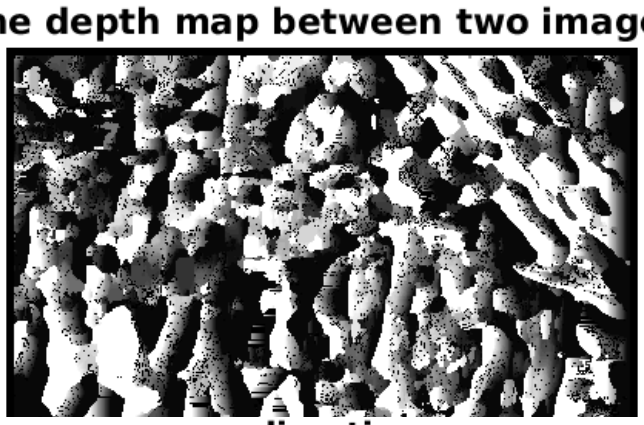

Fig 3: The depth image obtained

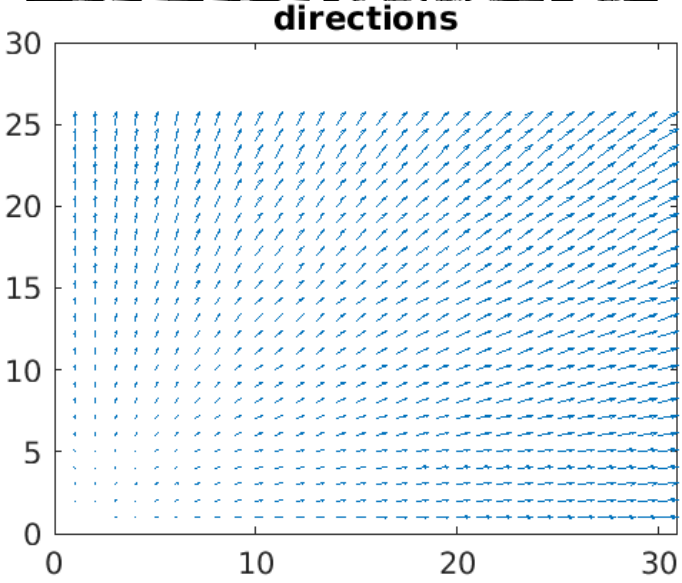

Fig 4: The quiver plot representing the direction of shift

CONCLUSION:

The difference between stereo pairs of images are very important as they play majorly giving the information about the depth value. This could help us to calculate the depth map for a robot or robot surgeon to perform the given task with much accuracy.

REFERENCES:

1. https://www.programmersought.com/article/82724473658/
2. https://www.mathworks.com/matlabcentral/answers/370158-help-with-block-matching-full-search-algorithm