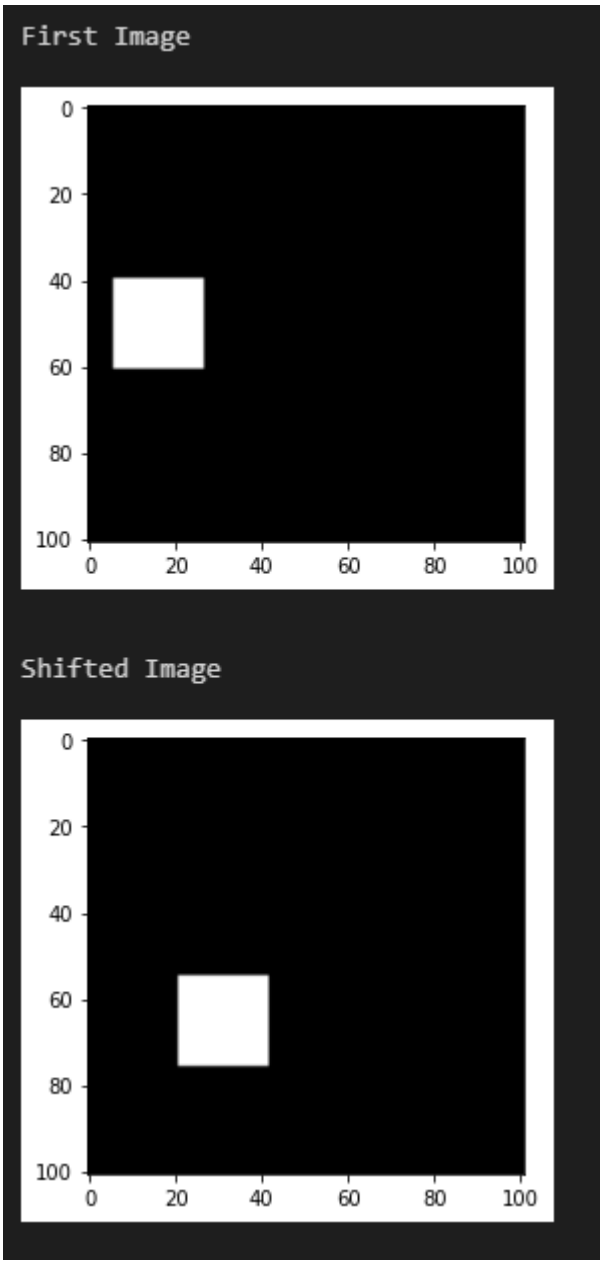
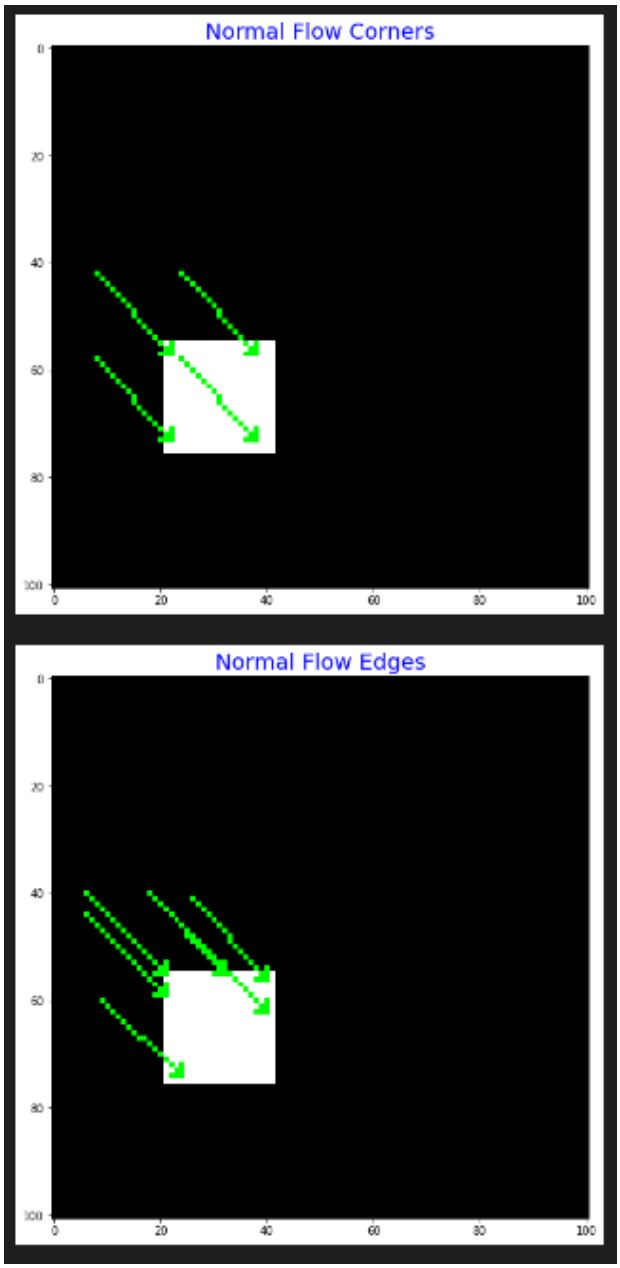
Normal Optical Flow

Image shifted by 15 pixels



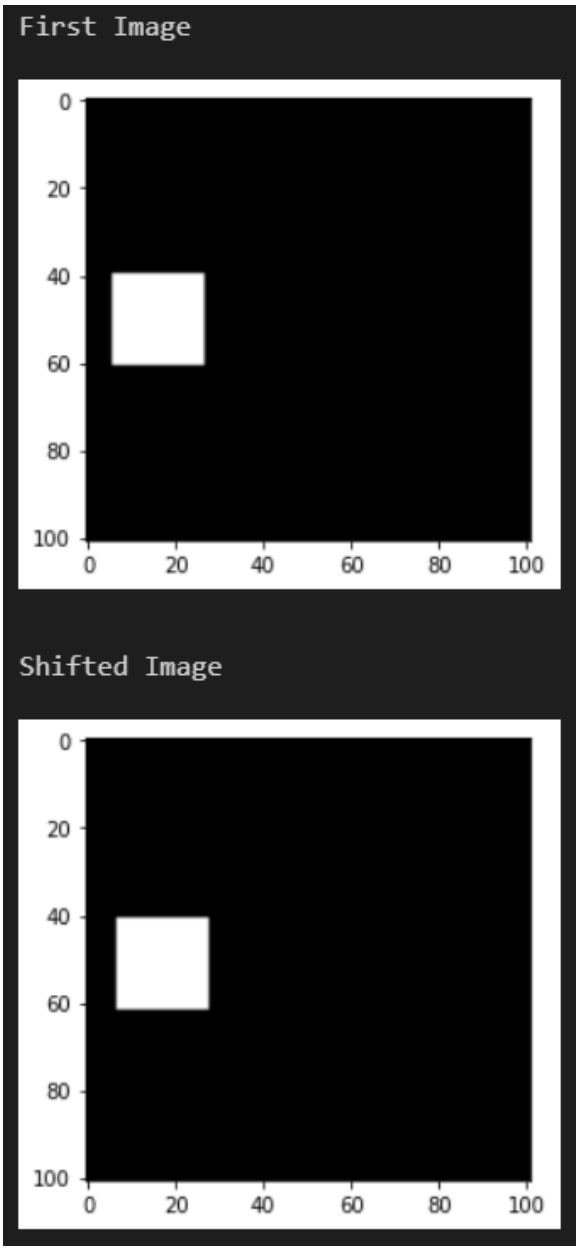


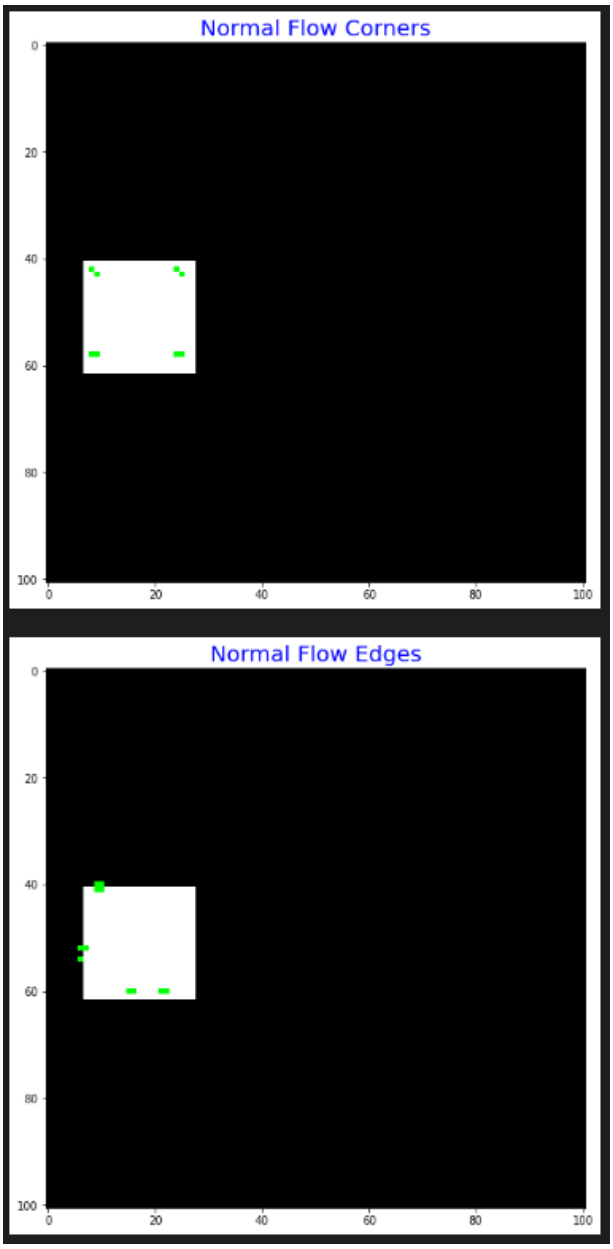
First Image – 101x101 image with 21x21 white box

Shifted Image – White box shifted by 15 pixels

Normal Optical flow denoted by arrows

Image shifted by 1 pixel





First Image – 101x101 image with 21x21 white box

Shifted Image – White box shifted by 1 pixel

Normal Optical flow denoted by arrows

Summary

Considering the given code and the concept of the aperture problem, the flow estimates on the four sides of the box may not accurately represent the true motion vector. This is because the sides of the box are relatively long and straight, and the window-based approach used for optical flow estimation may not capture the entire motion along the direction perpendicular to the side of the box. As a result, the estimates may be inaccurate, especially for motion patterns that are parallel to the sides of the box.

Actual Result: Similarly, the corners of the box can also be affected by the aperture problem. The corners are typically areas of high gradient and may exhibit complex motion patterns. The window-based approach may not accurately capture the true motion vector, particularly for motion patterns that are parallel to one of the edges of the window. This can lead to ambiguous estimates of the true motion vector, further affecting the accuracy of the optical flow estimates.

Expected Result: The expected result would be that the flow vectors on the four sides of the box are aligned with the edges of the box, indicating that the motion is parallel to the edges. The flow vectors on the corners of the box should also be aligned with the direction of the box's motion, which is 1 pixel to the right and 1 pixel down. However, due to the aperture problem, the flow vectors may not perfectly match the true motion direction and magnitude in both the experiments.