REFLECTION ESSAY

Task-2a

The objective of this assignment was to strengthen our understanding of affine transformations and their applications in computer vision. The task involved undistorting an image with the help of affine transformations. We learnt that in order to transform the image, we would need the current and transformed coordinates of three points to generate the transformation matrix. The transformation matrix was obtained through linear matrix operations on the coordinates. The output image obtained was an undistorted view of the chess board.

In order to make us understand when affine transformation will work and when it will not, the task had the third image. The third image was an example of a perspective projection. The objective was to undistort it, such that angles looked right, and parallel lines looked parallel. We realized that since affine transformation has a limited scope, thus the image distortion in the third case cannot be removed with affine transformation only. Thus, despite trying affine transformation, we were unable to get the desired undistortion.

Task-2b

Similar to the objective of the previous assignment, this assignment is also based on the transformations but here we explored perspective transformation that is more powerful than affine transform. However, in this assignment we went the other way, i.e. instead of undistorting an image we transformed the image into different perspectives and overlaid it on a frame. We also understood that if we have three images namely image-1, image-2, and image-3. Also, we have the perspective transformation matrix for image-2 to image-3, then we can transform image-1 to image-3 if we have the perspective transformation matrix of image-1 to image-2. Also, this can easily be achieved by using simple matrix multiplication of both the transformation matrices.

We also got to learn that we can use more than 4 points to find out the homography matrix. This can give better results if the points on the two images used to compute the homography are found perfectly. In our case, we did not have any reference points except the corners for finding the adequate pair of points in two images. Thus, we did not get better results using more than 4 points for computing the homography, but we believe that if the points and their correspondences are taken perfectly, then we will have a better transformation. We also got a better understanding of how we can compare two images using Relative Mean Squared Error (RMSE).

This was the first assignment we did as a team. We realized how much we can learn during the discussions when we do an assignment in a group, rather than doing it individually. Overall, the assignment was a fun experience, where we got the opportunity to play with images.