

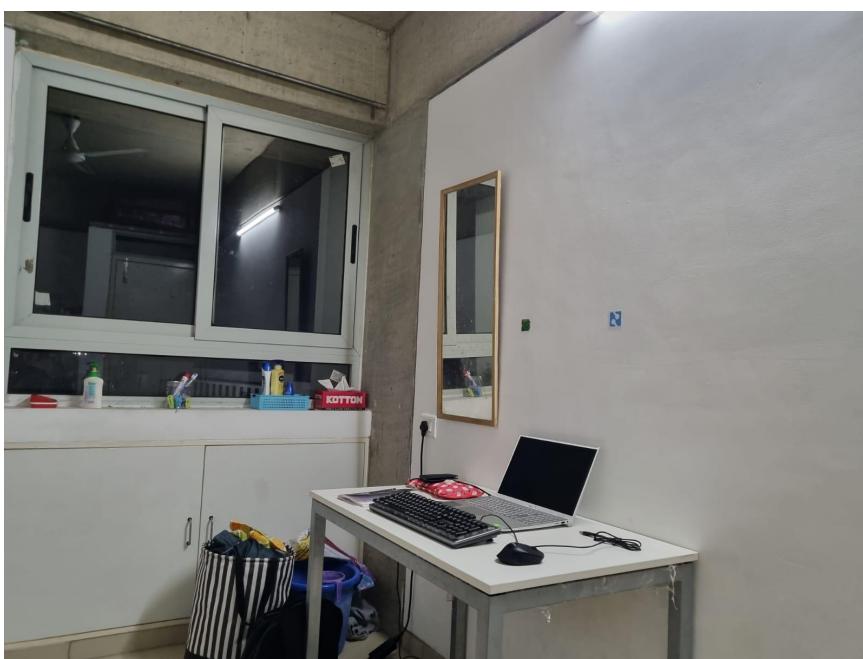
ASSIGNMENT 2

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Play With Panorama

I made use of the following images:



Approach:

Step 1: Detect keypoints (DoG, Harris, etc.) and extract local invariant descriptors (SIFT, SURF, etc.) from the two input images.

Step 2: Match the descriptors between the two images.

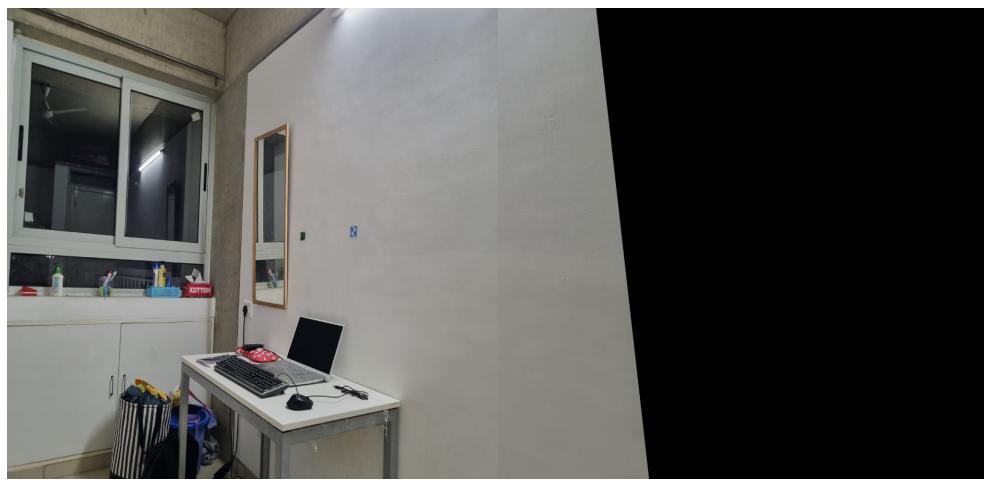


I made use of BFMatches and used `bf.knnMatch(k=2)` to match the interest point of both the images.

Step 3: Use the RANSAC algorithm to estimate a homography matrix using our matched feature vectors.

Step 4: Apply a warping transformation using the homography matrix obtained earlier.

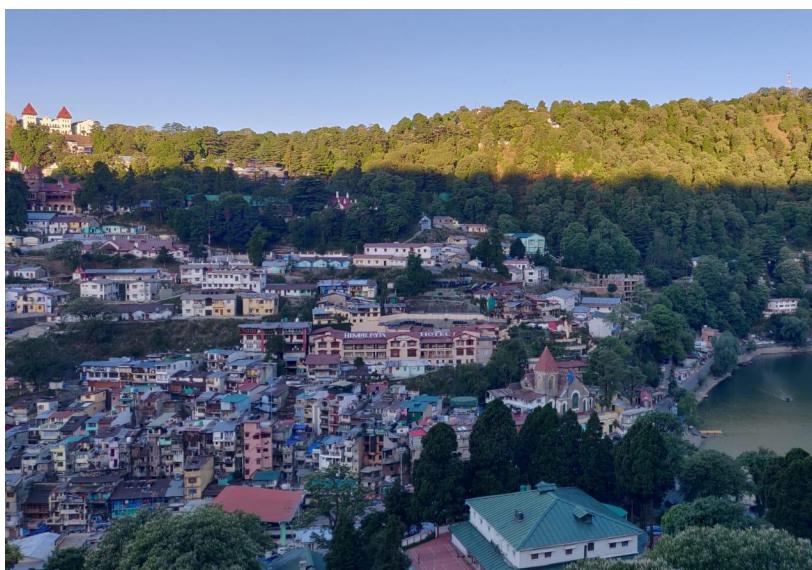
The final image obtained is as follows:

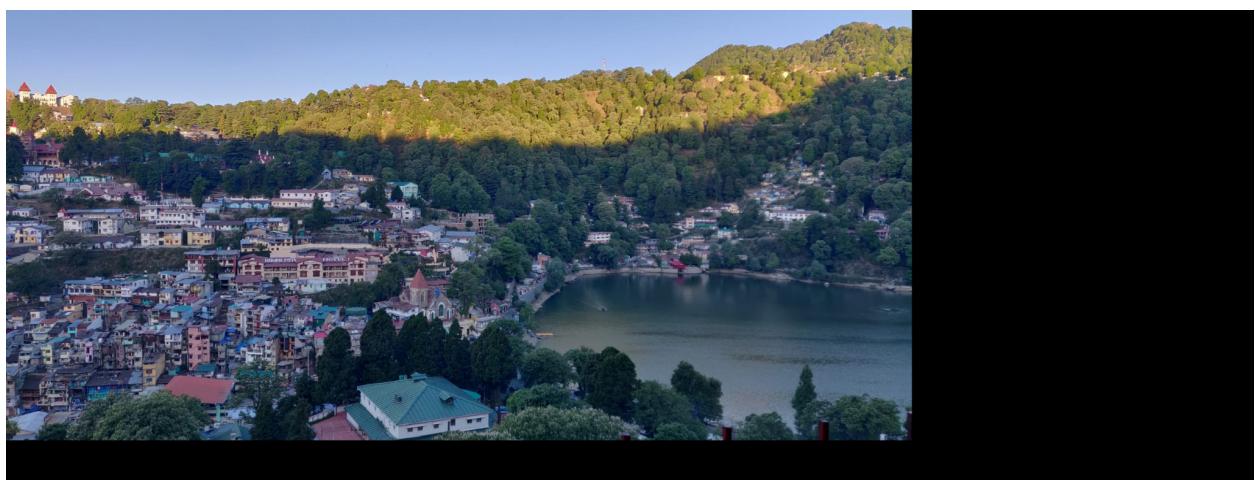
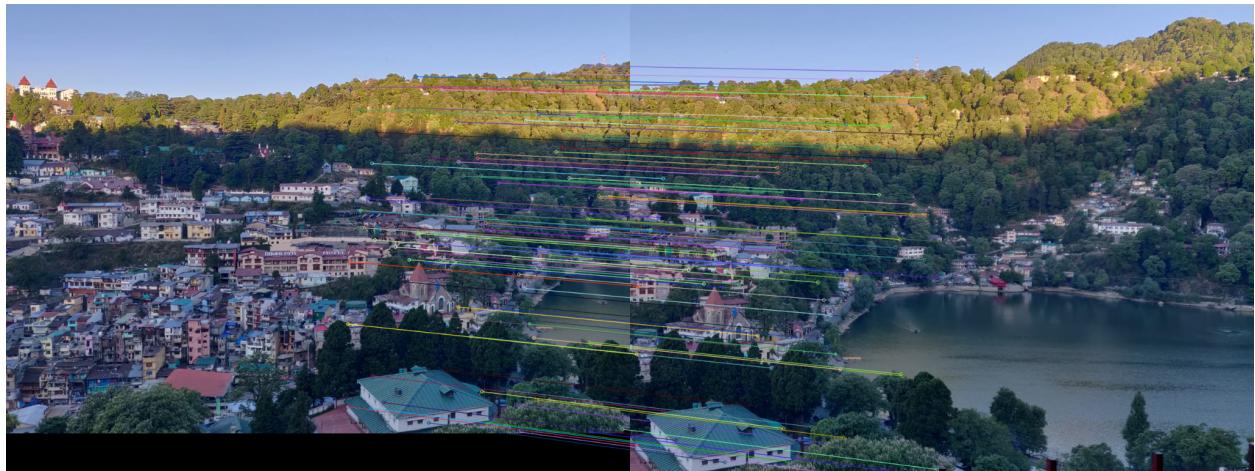


I also wrote a function to remove all non-zero rows and columns(i.e. crop) the unwanted black pixels and got the final output:



I tried this on another set of images and got the following images:





Bike vs Horse Classification

I have made use of Bag of Visual Words(BoVW) to classify the images.

Approach:

Step 1: Split the data into train and test datasets along with the labels.

Step 2: Iterate over all images and detect the interest points and descriptors using SIFT.

Step 3: Apply K-means over all the descriptors of the train dataset's images and cluster them into k clusters.

Step 4: Now iterate over each image's descriptors and assign them to a cluster and keep a track of the assignment inorder to create a histogram.

Step 5: Make use of this created histogram as a feature and make use of Logistic Regression(for horse and bike) and Softmax Regression(for the CIFAR-10) dataset.

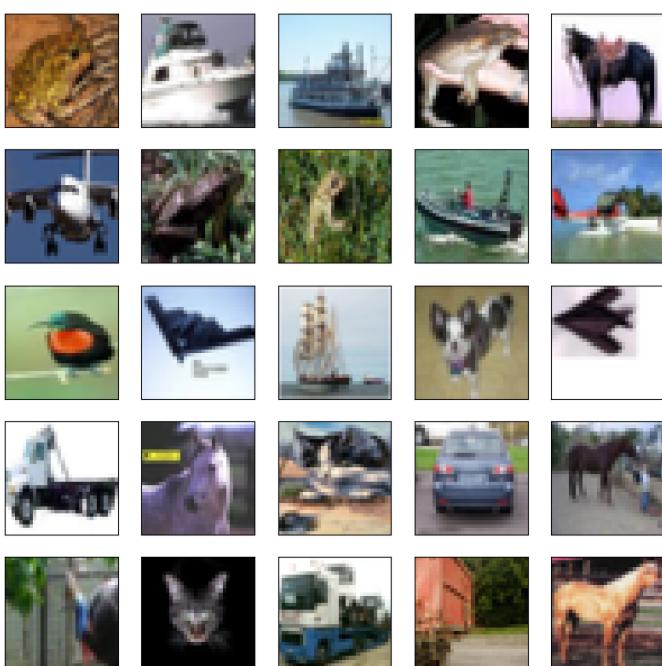
The results obtained are as follows:

Bike/Horse Classification:

Test Accuracy: 97.22

For the CIFAR-10 dataset the images were not given directly so additional preprocessing had to be done to resize the data inorder to recreate the images.

The reconstructed images are as follows:



After resizing the data, the same approach was followed. The following results were obtained:

Test Accuracy : 27.415

The accuracy is quite less because this is a very large dataset and the images are not very clear. Softmax Regression underfitted and gave such accuracy. On using Deep Neural Networks, the accuracy is around 50% and so those will be a better option for making predictions.