**Research paper title: Bangla Sign language Detection using SIFT and CNN- 2018\_ IEEE-43488**

For the detection of Bangla hand signs they have taken the images manually. They took a total of 7600 images of 51 Bangla letters for training and testing. Before they used the images on CNN they pre-processed the images by Skin Masking and SIFT (Scale-Invariant feature Transform).

The images are first in RGB color space which is converted to HSV. The upper and lower boundary was set to do skin masking so all the colour except the skin colour is removed from the images. Then these images are converted to grayscale. The skin masking techniques was used to crop the Region of Interest that has only the image of the hand.

Before passing the images to CNN they address another major problem in training that is the rotation, scaling and resolution and illumination changes that can hamper training. They used SIFT (Scale-Invariant feature Transform) for solving it. SIFT was implemented using the following steps:

1. Key point detection
2. Key point descriptor generation

Then the feature vectors from SIFT was clustered using K-means clustering because CNN takes a set amount of features as input. Then they converted each images as a histogram where in x- axis they put the features and in y-axis they put the frequency of each features in an image. This is what they call Bag of Feature set and this was used it to train and test the CNN.

Finally when comparing the results between only using CNN and using SIFT along with CNN their results show that there is an increase in accuracy for using SIFT. Since, in our project we haven’t done enough preprocessing but adding preprocessing such as SIFT we can get a higher accuracy for Bangla sign detection.

**Reference-**

S. S. Shanta, S. T. Anwar and M. R. Kabir, "Bangla Sign Language Detection Using SIFT and CNN," 2018 9th International Conference on Computing, Communication and Networking Technologies (ICCCNT), 2018, pp. 1-6, doi: 10.1109/ICCCNT.2018.8493915.

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