Gesture Recognition Case study

Team Member:

- Sunita Saraf

Problem Statement

Imagine you are working as a data scientist at a home electronics company which manufactures state of the art smart televisions. You want to develop a cool feature in the smart-TV that can recognise five different gestures performed by the user which will help users control the TV without using a remote.

The gestures are continuously monitored by the webcam mounted on the TV. Each gesture corresponds to a specific command:

Gesture	Corresponding Action
Thumbs Up	Increase the Volume
Thumbs Down	Decrease the Volume
Left swipe	'Jump' backwards 10 seconds.
Right swipe	'Jump' forward 10 seconds
Stop	Pause the movie.

Objectives:

1. **Generator**: The generator should be able to take a batch of videos as input without any error. Steps like cropping, resizing and normalization should be performed successfully.

2. **Model**: Develop a model that can train without any errors which will be judged on the total number of parameters (as the inference(prediction) time should be less) and the accuracy achieved.

3. **Write up**: This should contain the detailed procedure followed in choosing the final model. The write up should start with the reason for choosing the base model, then highlight the reasons and metrics taken into consideration to modify and experiment to arrive at the final model.

MODELS:

Sample model used for initial experiments.

The sample model provides a starting point for the experiments to understand various hyperparameters. Based on the results of the models, we can optimize the hyperparameters and get the better accuracies and reduce the loss.
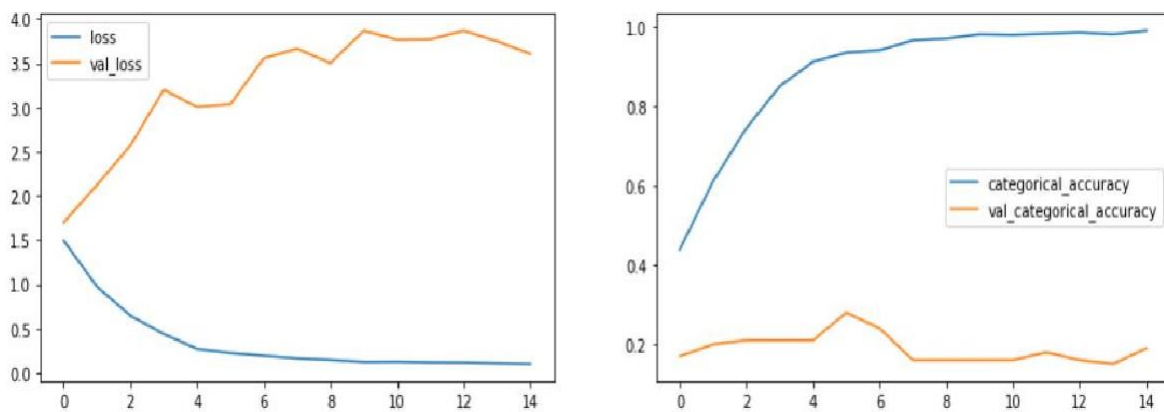
MODEL – 1

No Data Augmentation:

Batch Size = 40

Epoch = 15

Image Size = 160*160

Training and Validation Accuracy/Loss Plot

Here, we can observe the model is clearly overfitting and there is no improvement in increase of epochs so we now try for CNN LSTM model and see the train and validation accuracies for them so that we can increase or decrease the augmentation accordingly and we try to include the dropout of 25% to address overfitting of model and increase the epochs for better results.

The observations from this model are:

1. Total No. of Parameters = 1,117,061

2. Categorical Accuracy = 99.19%

3. Validation Accuracy = 19.00%