Gesture Recognition – Deep learning

Problem Statement:

We need to develop a cool feature in the smart-TV that can recognize five different gestures performed by the user which will help users control the TV without using a remote. The following table consists of the experiments done to build a model to predict the gestures from the given data set.

Exp	Model	Hyper params	Result	Explanation
1	Conv 3D	Batch size = 32 Dim = 100 X 100 Epochs = 15 No_of_frames = 16 Learning_rate = 0.0002 Dropout = 0.25	Training Accuracy =0.81 Validation Accuracy= 0.75	This is one of best experiment. Validation loss decreases continuously with every loop. During the final epoch it reaches to 0.71
2	**Conv3D model2 with more epochs and less batch size**	batch_size=20 Dim = 100 X 100 No of frames = 16 num_epochs=25 Dropout = 0.25 Learning_rate = 0.0008 Dropout = 0.25	Training Accuracy =0.93 Validation Accuracy 0.85	This best experiment in overall exercise. The validation loss is around 0.48. And the model is trained with a smaller number of trainable parameter compared to model 1

3	**Model3: Conv2D+LSTM**	batch_size=32 Dim = 100 X 100 No of frames = 16 num_epochs=15 Dropout = 0.25 Learning_rate = 0.0008 Dropout = 0.25	Training Accuracy 0.75 validation Accuracy 0.375	This model seems to be overfit model. Validation accuracy is less compared to training model
4	**CONV2D + LSTM with more layers**	batch_size=32 Dim = 100 X 100 No of frames = 16 num_epochs=25 Dropout = 0.25 Learning_rate = 0.0008 Dropout = 0.25	Training Accuracy 0.92 Validation Accuracy 0.56	This model seems to be overfit model. This is slightly better compared to model 3
5	**Conv2D + GRU**	batch_size=32 Dim = 100 X 100 No of frames = 16 num_epochs=25 Dropout = 0.25 Learning_rate = 0.0008 Dropout = 0.25	Training Accuracy 0.93 validation Accuracy 0.5	This model seems to be overfit model.

Conclusion:

The Model built with Time distributed Conv3D with less batch size (Experiment #2) gave better results compared to all the other models and also the model has very least number of parameters compared to other models.