Gesture Recognition- Deep Learning

Problem Statement:

We need to develop a cool feature in a Smart Tv that can recognize five different gestures performed by the user control on TV without using a remote.

The following table contains the experiment done to build a model.

SR NO	MODEL	HYPERMETERS	RESULT	DECISION+EXPLANATION
1	Conv3D	Batch size = 128, Ablation = 20, Augmentation = False, LR = 0.01, Seq Length = 10, Epoch = 20, Dim = 120x120	Train Accuracy: 0.15 Validation Accuracy:0.15	The model is not learning anything through the epochs, the loss is not decreasing. Reducing the batch size further
2	Conv3D	Batch Size = 32	Train Accuracy: 0.15 Validation Accuracy:0.20	No Improvements in the model, lets add more layers to the model
3	Conv3D		Negative Dimension Error	The new CNN kernel size are not compatible with the output of pervious layer
4	Conv3D		Train Accuracy: 0.20 Validation Accuracy:0.20	Still there is no improvement in the model
5	Conv3D		Train Accuracy: 0.50 Validation Accuracy:0.28	Model is over fitting on less data
6	Conv3D	Ablation = None Each = 50	Train Accuracy: 0.48 Validation Accuracy:0.2	Model is over fitting as there is huge gap between training and validation accuracies

SR NO	MODEL	HYPERMETERS	RESULT	DECISION+EXPLANATION
7	Conv3D	Dropout = 0.2	Train Accuracy: 0.55 Validation Accuracy:0.40	There is a bit of increase in the model validation accuracy and training also
8	Conv3D	Dropout = 0.5	Train Accuracy: 0.60 Validation Accuracy:0.55	After Increase the dropout the model validation scores further reduced and the model is over fitted.
9	Conv3D	Dropout = 0.2	Train Accuracy: 0.652 Validation Accuracy:0.5572	Still the model is over fitting let's use a Global average Polling
10	Conv3D		Train Accuracy: 0.72 Validation Accuracy:0.78	The model is wonderful and the training and validation scores are good
11	Time Distributed + GRU		Train Accuracy: 0.70 Validation Accuracy:0.70	The model is working quite well
12	Time Distributed + GRU	Dropout = 0.2	Train Accuracy: 0.68 Validation Accuracy:0.65	The model accuracy further deterioated
13	Time Distributed + GRU		Train Accuracy: 0.70 Validation Accuracy:0.69	This is a good model but we can still make it better
14	Time Distributed + GRU		Train Accuracy: 0.735 Validation Accuracy:0.75	This is the best model so far we can get.