Model Experiments and Observations

Experiment Number	Model	Architecture	Input Shape	Parameters	Batch Size	Steps per Epoch	Epochs	Result	Observations/Decision
1	Conv3D Ablation Experiment	Conv Layers -3 FC - 1 Softmax-1	25,100,100,3 Sampled from 250 folders	3,819,781	32	8	10	Train Accuracy:100% Val Accuracy : 20%	Clear Overfitting.
2	Conv3D	Conv Layers -4 FC - 1 Softmax	25,100,100,3 Sampled from 500 folders	588,357	32	16	20	Train Accuracy:100% Val Accuracy : 28%	. Increase Sample Size . Increase the layers . Slight improvement in accuracy
3	Conv3D	Conv Layers -4 FC - 2 Softmax	25,100,100,3	892,101	20	34	20	Train Accuracy:83% Val Accuracy : 72%	1.Increase the Dense layers 2.Decrease the Batch Size 3. Overfitting is handled to some extent
4	Conv3D	Conv Layers -4 FC - 3 Softmax	25,100,100,3	1,515,973	10	67	30	Train Accuracy:86% Val Accuracy : 78%	1. Reducing the batch_size 2.Increasing the Convolution Layers 3.Overfitting is primarily addressed
5	Conv3D	Conv Layers -4 FC - 3 Softmax	25,100,100,3	1,515,973	10	67	15	Train Accuracy:76% Val Accuracy : 68%	1.Increasing the kernel Size 2.Reducing the time taken by reducing the epochs 3. Dip in val accuracy
Conv2D + LSTM									
7	Conv2D + LSTM	Conv Layer -1 LSTM-256 FC-2 Softmax	25,100,100,3		16	42	15	Train Accuracy:99% Val Accuracy : 67%	1.Overfitting Observed
8	Conv2D + LSTM	Conv Layer -2 LSTM-256 FC-2 Softmax	25,100,100,3	17,644,965	16	42	25	Train Accuracy:95.5% Val Accuracy :55.33%	1.Overfitting Observed 2. Dip in accuracy
9	Conv2D + GRU	Conv Layer -3 GRU-256 FC-2 Softmax	25,100,100,3		16	42	25	Train Accuracy:95% Val Accuracy :73%	1. Conv Layer added 2. Jump in val accuracy observed
10	Conv2D + BiDirectional GRU	Conv Layer -3 Bidirectional-GRU-256 Softmax	25,100,100,3	10,325,733	16	42	25	Train Accuracy:97% Val Accuracy : 65% (at 19th epoch)	1. Decrease in Val Accuracy 2. Overfitting
11	Conv2D +	Conv Layer -3	25,100,100,3		16	42	25	Train Accuracy:95%	1. Decrease in Val Accuracy

	Model	Architecture	Input Shape	Parameters				Results	Observations
	BiDirectional Stacked GRU	Bidirectional-GRU-256-2 Softmax						Val Accuracy : 66% (at 20th epoch)	2. Overfitting
12	Conv2D + BiDirectional Stacked LSTM	Conv Layer -4 Bidirectional-LSTM-256-2 Softmax	25,100,100,3		16	42	25	Train Accuracy:97% Val Accuracy :69%	1.Increased Number of Conv Layers 2. Slight increase in Val accuracy 3. Still overfitting
				Transfer Learning					
13	Mobile Net + LSTM	MobileNet + Softmax	25,100,100,3	14,359,877	16	42	25	Train Accuracy:89% Val Accuracy : 71%	Large number of training parameters
15	ResNet 50 + LSTM	ResNet50 + Softmax	25,100,100,3	57,447,557	16	42	25	Train Accuracy:88% Val Accuracy :73% (19th epoch)	Large number of training parameters
Final Model	Model4 Conv3d	Conv3d -4L, FC- 3L Softmax	25,100,100,3	1,515,973	10	67	30	Train Accuracy:86% Val Accuracy : 78%	1.More Validation Accuracy 2. Less number of training Parameters 3. Relatively Simple Model