

## Gesture Recognition By Sandipan Pramanik

We want 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.

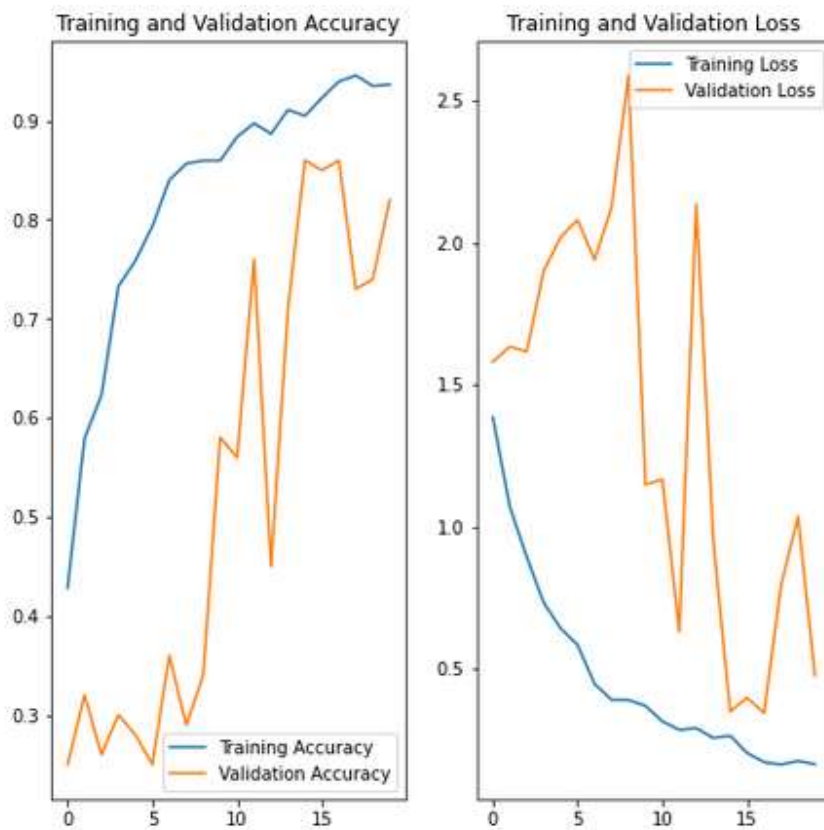
Below table consist of different experiment done during model building:

Experiment Number	Model	Result	Decision + Explanation
1	Conv3D	Model is not trained and was giving accuracy 0.12 around	Image normalization process is wrong and yielding a tensor having all 0's
2	Conv3D	Model got trained but not with good accuracy	Image cropping code and code for leftover images for training was not there
3	Conv3D	Model got trained but not with good accuracy	MaxPooling and dropout layer added
4	Conv3D	Accuracy: 0.35 Val Accuracy : 0.22	Not able to increate epoch size beyond 15 due to time constraint and resource constraint. Now trying ConvLSTM model.
5	ConvLSTM	Accuracy: .80 Val accuracy : .31	Model is overfitting as the validation accuracy is as low as .34
6	ConvLSTM	Accuracy: .84 Val Accuracy : 0.42	Added dropout layer. But still over fitting. Need to go for more epoch and see if validation accuracy increases.
Final Model	ConvLSTM	Accuracy : 0.93 Val Accuracy : 0.86	Fairly good accuracy. Overfitting problem is overcome. Here 14 images per folder is taken and model trained with 20 epoch.

**CNN – RNN : Best Accuracy and Val\_Accuracy combination ( epoch 17/20 ) is**

**Accuracy : 0.9397**

**Val\_Accuracy : 0.86**



```
Epoch 14: saving model to model_init_2023-03-0722_45_49.323131\model-00014-0.25710-0.91101-0.95588-0.71000.h5
42/42 [=====] - 154s 4s/step - loss: 0.2571 - accuracy: 0.9110 - val_loss: 0.9559 - val_accuracy: 0.
7100 - lr: 0.0010
Epoch 15/20
42/42 [=====] - ETA: 0s - loss: 0.2649 - accuracy: 0.9050
Epoch 15: saving model to model_init_2023-03-0722_45_49.323131\model-00015-0.26494-0.90498-0.34965-0.86000.h5
42/42 [=====] - 157s 4s/step - loss: 0.2649 - accuracy: 0.9050 - val_loss: 0.3497 - val_accuracy: 0.
8600 - lr: 0.0010
Epoch 16/20
42/42 [=====] - ETA: 0s - loss: 0.2041 - accuracy: 0.9231
Epoch 16: saving model to model_init_2023-03-0722_45_49.323131\model-00016-0.20409-0.92308-0.39855-0.85000.h5
42/42 [=====] - 153s 4s/step - loss: 0.2041 - accuracy: 0.9231 - val_loss: 0.3986 - val_accuracy: 0.
8500 - lr: 0.0010
Epoch 17/20
42/42 [=====] - ETA: 0s - loss: 0.1721 - accuracy: 0.9397
Epoch 17: saving model to model_init_2023-03-0722_45_49.323131\model-00017-0.17213-0.93967-0.34502-0.86000.h5
42/42 [=====] - 153s 4s/step - loss: 0.1721 - accuracy: 0.9397 - val_loss: 0.3450 - val_accuracy: 0.
8600 - lr: 0.0010
```