Name – Saumya Bisht and Akshat Rastogi

S. No.	Model	Number of Parameters	Result	Decision
1	Conv3D :- 3 Conv3D layers, Image per sequence = 18, Image Size=120x120, Batch Size=36.	Total params: 1,914,565 Trainable params: 1,914,341 Non-trainable params: 224	Model Overfitting with Best Validation Accuracy of 0.34	The model is overfitting so we have to use more CNN layers with Dropouts to extract more features from the images better to reduce overfitting.
2	Conv3D :- 4 Conv3D layers with 3 Dropout layers, Image per sequence = 18, Image Size=120x120, Batch Size=36.	Total params: 1,113,925 Trainable params: 1,112,933 Non-trainable params: 992	Model Overfitting with Best Validation Accuracy of 0.28	The model is overfitting as it is learning too much on the training set but not on the validation set. So changing the number of images per sequence and the batch size.
3	Conv3D :- 4 Conv3D layers with 3 Dropout layers, Image per sequence = 30, Image Size=120x120, Batch Size=30.	Total params: 1,113,925 Trainable params: 1,112,933 Non-trainable params: 992	Model Overfitting with Best Validation Accuracy of 0.47	The model is still overfitting so changing the normalisation in the generator and using 20 images with a batch size of 40.
4	Conv3D :- 4 Conv3D layers with 3 Dropout layers, Image per sequence = 20, Image Size=120x120, Batch Size=40 , Mean normalisation.	Total params: 1,113,925 Trainable params: 1,112,933 Non-trainable params: 992	Model Overfitting slightly with Best Validation Accuracy of 0.93	The model is performing better overfitting slightly but it is giving a good validation accuracy. To reduce overfitting we are adding more dropouts layers.
5	Conv3D :- 4 Conv3D layers with 4 Dropout layers, Image per sequence = 20, Image Size=120x120, Batch Size=40, Mean normalisation.	Total params: 1,113,925 Trainable params: 1,112,933 Non-trainable params: 992	Model Overfitting slightly with Best Validation Accuracy of 0.84	The model does not improve that much from the previous model even after adding dropouts. So we are now reducing the image size to reduce the number of parameters.
6	Conv3D :- 4 Conv3D layers with 3 Dropout layers, Image per sequence = 20, Image Size=90x90, Batch Size=40 , Mean normalisation.	Total params: 720,709 Trainable params: 719,717 Non-trainable params: 992	Model Overfitting slightly with Best Validation Accuracy of 0.92	The model is still slightly overfitted but now we have reduced the number of parameters and are getting similar validation accuracy as model 4.
7	Conv2D + GRU :- 4 Time Distributed Conv2D layers with GRU layer and 2 Dropout layers, Image per sequence = 20, Image Size=120x120, Batch Size=40, Mean normalisation	Total params: 2,573,925 Trainable params: 2,573,445 Non-trainable params: 480	Model Overfitting slightly with Best Validation Accuracy of 0.82	The model is slightly overfitted so we are increasing the dropout ratio.
8	Conv2D + GRU:- 4 Time Distributed Conv2D layers with GRU layer and 2 Dropout layers (With increased ratio), Image per sequence = 20, Image Size=120x120, Batch Size=40, Mean normalisation	Total params: 2,573,925 Trainable params: 2,573,445 Non-trainable params: 480	Model Underfitting slightly with Best Validation Accuracy of 0.71	The model is slightly underfitted due to higher dropout ratio.

9	Transfer Learning (VGGnet16) + GRU:- VGGnet16 Image per sequence = 20, Image Size=120x120, Batch Size=40, Mean normalisation	Total params: 15,021,653 Trainable params: 306,965 Non-trainable params: 14,714,688	Model Overfitting slightly with Best Validation Accuracy of 0.87	The model is slightly overfitting but if we use early stopping we can get a decent generalizable model.

Final Remarks : -

These are the experiments that we have done so far on the given data set. If we had more time and computation power we could have improved further upon our models by implementing data augmentation and doing more experimentation.

Model 9 gives us a decent generalisable model with a training accuracy 0.883 and validation accuracy : 0.86, provided we do early stopping.

Since, the model which has given us the best results so far with the least amount of parameters is, Model 6 (16th epoch) we have chosen that as our Final Model. So, this meets the business requirements.