**Conclusions from model experiments**

| **No** | **Model** | **Error** | **Loss (cat, val)** | **Accuracy (cat, val)** | **Next Steps** |
| --- | --- | --- | --- | --- | --- |
| 1 | Conv3D (without image resize) | Throws Generator error |  |  | Crop the images with appropriate padding and dimensions **Why:** The images belong to 2 dimensions 360x360 & 160x120. For training and minimizing the loss of content the images were resized and padded |
| 2 | Conv3D  (model with Conv3D and MaxPooling layers) resize = (224, 224) frames = 16  batch\_size = 20 num\_epochs = 50 | No Error | (0.7569, 0.9521) | (0.6667, 0.5900) | change batch\_size & epochs **Why:** Effects of batch\_size & epochs on loss and accuracy of the model (Objective is that Loss should be minimised in the training) |
| 3 | Conv3D  (model with Conv3D and MaxPooling layers)  resize = (224, 224)  frames = 16  batch\_size = 30 num\_epochs = 30 |  | (0.9992, 0.8568) | (0.5264, 0.6000) | **Outcome:** increasing the batch size and reducing the epochs caused reduced accuracy and an increas in the loss |
| 4 | Conv3D  (model with Conv3D and MaxPooling layers and BatchNormalization)  resize = (224, 224)  frames = 16  batch\_size = 10 num\_epochs = 50 |  | (0.2909,0.3160 ) | (0.9065, 0.8700) | Added BatchNormalization **Why:** BatchNormalization helps in faster convergence and acts as a regularization technique **Outcome:** Higher accuracy and minimized loss |
| 5 | ConvLSTM3D | Throws ValueError for dimensions and depth |  |  | ConvLSTM3D layer in the model is required in case of capturing spatial and temporal depth and requires the videos to have that dimension which is missing currently in the dataset. This model is more suitable for 3dVideos **Outcome:** use ConvLSTM2D instead |
| 6 | ConvLSTM2D  (model with ConvLSTM2D and BatchNormalization)  resize = (224, 224)  frames = 16  batch\_size = 10 num\_epochs = 30 | Throws RESOURCE\_EXHAUSTED  OOM error |  |  | **Why:** High memory demand due to frames, image size and batch\_size **Outcome:** Reduce frames, image size and batch\_size |
| 7 | ConvLSTM2D  (model with ConvLSTM2D and BatchNormalization)  resize = (128, 128)  frames = 10  batch\_size = 5 num\_epochs = 30 |  | (0.5509, 0.4025) | (0.7677, 0.8800) | **Outcome:** Increased time for convergence compared to Conv3D but increased accuracy and minimized loss |
| *8* | *ConvLSTM2D*  *(model with ConvLSTM2D and BatchNormalization and MaxPooling2D)*  *resize = (128, 128)*  *frames = 10*  *batch\_size = 20 num\_epochs = 50* |  | ***(0.1663, 0.2793)*** | ***(0.9593, 0.9300)*** | ***Why:*** *Add TimeDistributed with MaxPooling2D to keep the time dimension intact* ***Outcome:*** *Increased accuracy and minimized loss* |
| 8 | ConvLSTM2D  (model with ConvLSTM2D and BatchNormalization and MaxPooling2D and Dropout 0.3)  resize = (128, 128)  frames = 10  batch\_size = 40 num\_epochs = 60 |  | (0.2902, 0.4536) | (0.9035, 0.8600) | **Why:** Add Dropout layer to TimeDistributed with MaxPooling2D **Outcome:** Decreased accuracy and loss values also increased therefore concluding dropout layer is not required in this model |

**Conclusion:  
Model with following params achieves the highest accuracy for training and validation set***ConvLSTM2D*

*(model with ConvLSTM2D and BatchNormalization and MaxPooling2D)*

*resize = (128, 128)*

*frames = 10*

*batch\_size = 20  
num\_epochs = 50*