Below are the summary of different models:

| **Model Name** | **Model Type** | **No. of parameters** | **Model Size (in MB)** | **Highest Training Accuracy** | **Corresponding Validation Accuracy** | **Observations** |
| --- | --- | --- | --- | --- | --- | --- |
| model\_conv3D\_1 | Conv3D | 1,933,765 | 22.3 | 93.97% | 80.00% | Used 30 frames in the model and 16+32+64+128 filters with 256 + 128 dense layers. Model is overfitting |
| model\_conv3D\_2 | Conv3D | 3,604,933 | 41.4 | 93.06% | 82.00% | Increased the image size from 120x120 to 160x160 after augmentation and reduced the no. of frames to 20.  Validation accuracy slightly increased. |
| model\_conv3D\_3 | Conv3D | 1,933,765 | 22.3 | 77.68% | 55.00% | Tried random data transformations with 30 frames. Accuracy went worse. |
| model\_conv3D\_4 | Conv3D | 911,973 | 10.6 | 94.57% | 75.00% | Tried 30 frames with 120x120 images. Training accuracy increased, but validation accuracy is still low. Model is overfitting. |
| model\_conv3D\_5 | Conv3D | 1,933,765 | 22.3 | 94.87% | 79.00% | Reduced the no. of frames to 20 with image resolution 120x120. Both training and validation accuracy increased compared to the previous model. Model is still overfitting. |
| **model\_retrain\_mobilenet\_gru** | **MobileNet Conv2D + GRU** | **3,693,253** | **42.5** | **99.40%** | **96.00%** | **Tried transfer learning with mobilenet conv2d and GRU. Both Training and validation accuracy increased significantly** |
| model\_retrain\_mobilenet\_gru\_batch\_30 | MobileNet Conv2D + GRU | 3,693,253 | 42.5 | 98.64% | 95.00% | Used random transformations with transfer learning. Accuracies slightly reduced. |
| model\_retrain\_mobilenet\_gru\_random | MobileNet Conv2D + GRU | 3,693,253 | 42.5 | 99.85% | 93.00% | Reduced the no. of to 20 and ran transfer learning. Training accuracy further increased, but the validation accuracy slightly reduced. |

## Summary:

Of all the models, the 6th model (**model\_retrain\_mobilenet\_gru**) seems to perform better. It has a training accuracy of **99.4%** and validation accuracy of **96%**. The model size is **42.5 MB**.

Overall, the transfer learning models are performing better than the normal models.