Initially we started filling in the code in the starter code file provided to us. Understood the problem statement and started adding code to Data generator. Resized images of both aspect to ratio to same dimension (120x120). Also added the code consider the images that could not fit in the batches.

As suggested by the professor, we initially tried experimenting with Conv3d and then went to leverage the benefits of transfer learning by using Resnet50, VGG16 models in combination with RNN models - GRU and LSTM.

Below table describes the experiments we tried before we finalised the model.

|  |  |  |  |
| --- | --- | --- | --- |
| **Experiment Number** | **Model** | **Result** | **Decision + Explanation** |
| **1** | **Conv3D** | **Throws Generator error** | **Crop the images correctly, try to overfit on less amount of data. Images not cropped.** |
| **2** | **Conv3D** | **Model not trainable as a lot of parameters, memory was full** | **Model parameters were too many as we added layers having 64,128,256 and 512 feature** |
| **3** | **Conv3D** | **Accuracy: 0.21** | **Accuracy for training and validation was not increasing as we were using 2 conv3d layers with 32 and 64 features with filter sizes of 3x3x3** |
| **4** | **Conv3D** | **Accuracy 0.53** | **Validation accuracy was fluctuating between 0.51 and 0.55, we used 4 conv3d layers with 8, 16, 32 and 64 sizes each** |
| **5** | **Resnet50 + GRU** | **Accuracy 0.6** | **This model was having too many parameters to train and was creating h5 files of size more than 400mb** |
| **6** | **VGG16 + GRU** | **Accuracy 0.66** | **With image resized to 80x80** |
| **7** | **VGG16 + GRU** | **Accuracy 0.72** | **With image resized to 120x120** |
| **8** | **VGG16 + GRU** | **Accuracy 0.82** | **Instead of resizing 120x160 images to 120x120 they are now cropped to 120x120** |
| **9** | **VGG16 + GRU** | **Accuracy 0.79** | **Image indices(frames) reduced to size 15, even number image indices considered** |
| **10** | **VGG16 + GRU** | **Accuracy 0.81** | **Added Dense layer with 256 neurons and Dropout of 0.5** |

**PLEASE NOTE: The H5 file has been been shared with a google link mentioned In h5\_link.txt**