**Conv3D Model Building:**

1. We started with setting up Random seed value to 30 as the Random seed matters because it can affect the results of our model. If we don't set the seed, TensorFlow will use a default seed, which means that we could get different results each time we run our code. This can make it difficult to reproduce results or compare the performance of different models.

2. We read the folder names for training and validation.

3. The most important part of the code is Generator, out of 30 sample video frames in batch, we started with 18 frames first and changing the batch side increasing from 30 till we get best accuracy (say 64), later we used alternate frames (12 frames) with different batch sizes increasing from 30 till 64.

4. Cropped the images and resized them to (84, 84) making 18 set (18, 84, 84, 3) and 12 set (12, 84, 84, 3).

5. Number of epochs fixed to 30.

Below experiments are conducted, details are provided as below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Experiment Number** | **Model** | **Result** | **Decision + Explanation** |
| **1** | **Conv3D** | **Max Training Accuracy 0.93**  **Max Validation Accuracy 0.40** | **Crop the images correctly, experiment with**    **batch\_size: 40**  **n\_frames: 20**  **num\_epochs: 20**    **The model is overfitting** |
| **2** | **Conv3D** | **Max Training Accuracy 0.45**  **Max Validation Accuracy 0.49** | **Crop the images correctly, experiment with**  **Frames: 20**  **Epoch: 25**  **batch\_size: 20**  **changing dropout: 0.5**  **The model accuracy is poor** |
| **3** | **Conv3D** | **Max Training Accuracy 0.38**  **Max Validation Accuracy 0.37** | **Crop the images correctly, experiment with**  **Frames: 30**  **Epoch: 30**  **batch\_size: 30**  **The model is underfitting** |
| **4** | **Conv3D** | **Max Training Accuracy 0.88**  **Max Validation Accuracy 0.62** | **Crop the images correctly, experiment with**  **Frames: 30**  **Epoch: 30**  **batch\_size: 64**  **dropout: 0.25**  **The model is underfitting** |
| **RNN Model Building-->>**  1. We started with setting up Random seed value as 30.  2. We read the folder names for training and validation.  3. The most important part of code is Generator, out of 30 sample video frames in batch, we started with 18 frames first and considering the batch side as 30.  4. Cropped the images and resized them to (84, 84) making 18 set (18, 84, 84, 3).  5. Number of epochs fixed to 40.  6. Used the model VGG16 and trails of ConvGRU for 18 set data video frames.  7. used the model VGG16 and 2 trails of Conv2D+LSTM for 18 set data video frames. | | | |
| **5** | **Conv2D+LSTM** | **Max Training Accuracy 0.93**  **Max Validation Accuracy 1.0** | **Crop the images correctly, experiment with**  **n\_frames = 20**  **num\_epochs = 30**  **batch\_size = 32**  **The model is overfitting** |
| **6** | **Conv2D+LSTM** | **Max Training Accuracy 0.89**  **Max Validation Accuracy 0.75** | **Crop the images correctly, experiment with**  **n\_frames = 20**  **num\_epochs = 40**  **batch\_size = 32**  **dropout = 0.2**  **adding dropout in conv layer**  **The accuracy is good.**  **The model file is: model-00040-0.39902-0.89076-1.14504-0.50000.h5** |
| **7** | **Conv2D+GRU** | **Max Training Accuracy 0.96**  **Max Validation Accuracy 0.81** | **Crop the images correctly, experiment with**  **n\_frames = 20**  **num\_epochs = 30**  **batch\_size = 32**  **dropout = 0.5**  **The model is overfitting** |
| **Final Model** | **Conv2D+LSTM** | **Training Accuracy 0.89**  **Validation Accuracy 0.75** | **Experiment 6 is the final model.**  **The model file is model-00040-0.39902-0.89076-1.14504-0.50000.h5** |