Below experiments are conducted, details are provided as below.

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| --- | --- | --- | --- |
| **Experiment Number** | **Model** | **Result** | **Decision + Explanation** |
| **1** | **Conv3D** | **Max Training Accuracy 0.89**  **Max Validation Accuracy 0.38** | **Crop the images correctly, experiment with**    **batch\_size: 40**  **n\_frames: 20**  **num\_epochs: 20**    **The model is overfitting** |
| **2** | **Conv3D** | **Max Training Accuracy 0.40**  **Max Validation Accuracy 0.44** | **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 0.39**  **Max Validation Accuracy 0.47** | **Crop the images correctly, experiment with**  **Frames: 30**  **Epoch: 30**  **batch\_size: 30**  **The model is underfitting** |
| **4** | **Conv3D** | **Max Training Accuracy 0.90**  **Max Validation Accuracy 1.0** | **Crop the images correctly, experiment with**  **Frames: 30**  **Epoch: 30**  **batch\_size: 64**  **dropout: 0.25**  **The model is underfitting** |
| **5** | **Conv3D** | **Max Training Accuracy 0.94**  **Max Validation Accuracy 0.43** | **Crop the images correctly, experiment with**  **using dropout at each conv layer and reducing batch size**  **Frames: 30**  **Epoch: 30**  **batch\_size: 40**  **The model is overfitting** |
| **6** | **Conv3D** | **Max Training Accuracy 0.91**  **Max Validation Accuracy 0.46** | **Crop the images correctly, experiment with**  **Frames: 30**  **Epoch: 30**  **batch\_size: 40**  **dropout: 0.25**  **The model is overfitting** |
| **7** | **Conv3D** | **Max Training Accuracy 0.91**  **Max Validation Accuracy 0.5** | **Crop the images correctly, experiment with**  **Frames: 20**  **Epoch: 20**  **batch\_size: 64**  **Switching BatchNormalization before MaxPooling with padding same**  **The model is overfitting** |
| **8** | **Conv3D** | **Max Training Accuracy 0.82**  **Max Validation Accuracy 0.75** | **Crop the images correctly, experiment with**  **Frames: 30**  **Epoch: 30**  **batch\_size: 64**  **with different kernels**  **The model is overfitting** |
| **9** | **Conv2D+LSTM** | **Max Training Accuracy 0.91**  **Max Validation Accuracy 0.81** | **Crop the images correctly, experiment with**  **n\_frames = 20**  **num\_epochs = 30**  **batch\_size = 32**  **The model is overfitting** |
| **10** | **Conv2D+LSTM** | **Max Training Accuracy 0.86**  **Max Validation Accuracy 0.81** | **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-00040-0.46223-0.86555-0.55312-0.81250.h5** |
| **11** | **Conv2D+LSTM** | **Max Training Accuracy 0.93**  **Max Validation Accuracy 0.81** | **Crop the images correctly, experiment with**  **n\_frames = 20**  **num\_epochs = 40**  **batch\_size = 32**  **dropout = 0.2**  **adding droput in conv layer**  **l2 regularization**  **The model is overfitting** |
| **12** | **Conv2D+GRU** | **Max Training Accuracy 0.99**  **Max Validation Accuracy 0.75** | **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 0.86**  **Validation Accuracy 0.81** | **Experiment 10 is the final model.**  **The model file is model-00040-0.46223-0.86555-0.55312-0.81250.h5** |