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Approach

In this assignment we have used Conv3D model along with Conv2D+LTSM. According to the accuracy metric, we have varied batch sizes and filter sizes with epoch fixated at 25 to attain best results. We observed that initially the model overfits but as epoch keeps increasing the accuracy tends to be on par with train. Model 5 was chosen as the final model with accuracy for both train and val being >85% at 24th epoch.

Model Number	Model	Result	Decision + Explanation
1	Conv3D	Training accuracy = 85.29% Validation accuracy= 77%	**Batch size = 20, filter size = (3,3,3)** **Total params: 2,556,533** Overfits initially, later improves. Loss and val loss keeps reducing with every epoch.
2	Conv2D+LSTM	Training accuracy = 97.35% Validation accuracy= 67.44%	**Batch size = 20, filter size = (3,3)** **Total params: 3,050,597** Model 2 overfits more compared to model 1. There is significant gap between training and val accuracy. Validation loss is lower only to an extent.
3	Conv3D	Training accuracy = 88.15% Validation accuracy= 79.05%	**Batch size is reduced to 15** **Batch size = 15, filter size = (3,3,3)** **Total params: 2,556,533** Reduction in batch size sees significant improvement in accuracy. Even the loss reduces considerably with every epoch.

4	Conv2D+LSTM	Training accuracy = 98.22% Validation accuracy= 73.33%	**Batch size is reduced to 15** **Batch size = 15, filter size = (3,3)** **Total params: 3,050,597** Even after reducing batch size for the above 2Dconv and LTSM model, overfitting still exists. But accuracy does improve a bit.
5	Conv3D	Training accuracy = 86.3% Validation accuracy= 88.57%	**Batch size is reduced to 15. Filter size is changed as well.** **Batch size = 15, filter size = (2,2,2)** **Total params: 1,937,893** The parameters have reduced significantly. Model 5 seems like a perfect model. After the 15th epoch, the val acc overlaps with train acc. The loss and validation loss keeps reducing with epoch.
6	Conv2D+LSTM	Training accuracy = 98.22% Validation accuracy= 76.19%	**Batch size is reduced to 15. Filter size is changed as well.** **Batch size = 15, filter size = (2,2)** **Total params: 2,832,757** The parameters have reduced significantly. But the model overfits.
7	Conv2D+GRU	Training accuracy = 72.89% Validation accuracy= 72.38%	**Batch size = 15, filter size = (2,2)** **Total params: 1,145,581** The parameters have reduced significantly. The model overfits initially, but with increasing epoch the accuracy improves significantly.

Model 5 is chosen as the best model. The .h5 file corresponding to the 24th epoch is taken as the best metric/model.