Gesture Recognition

We have experimented on lot of Hyperparameters, as we cannot tabulate all the experiments, we have listed a few in an aggregate manner.

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| **Experiment Number** | **Model** | **Result** | **Decision + Explanation** |
| **1** | **Conv3D** | **Throws Generator error when we try to handle remaining sequences after complete batches.** | **Crop the images correctly, try to overfit on less amount of data** |
| **2** | **Conv3D** | **Resource constraint error in Colab due to more trainable parameters** | **Experimented by reducing the size of the image to 150\*150, 120\*120, 84\*84 and got good results for 84\*84** |
| **3** | **Conv3D** | **Resource constraint error in Colab due to higher batch size.**  **When batch size of 30 is used the accuracy was around 0.42** | **Experimented with different batch size like 20, 30, 40 and 60. High batch size gave errors and low batch size performance was poor, so we considered 25 as optimal number.** |
| **4** | **Conv3D** | **For 15 images are able to get good results with considerable number of parameters** | **We tried on various number of images to consider per sequence – 15,20,25.**  **For 25 images per sequence we get more parameters and to get optimal number of parameters we have used 15 images** |
| **4** | **Conv3D** | **Accuracy: .35**  **With “RMSProp” we were able to achieve good results, hence keeping this in our final model.** | **We experimented with various optimizers like “SGD”,” Adam”,” AdaDelta”,” RMSProp”**  **We got good results for “RMSProp”** |
| **5** | **Conv3D** | **Accuracy: .45**  **With ‘Relu’ we were able to achieve good accuracy, but the model is overfitting** | **Experimented with activation functions like ‘Relu’, ‘elu’ and ‘Selu’.**  **For ‘elu’ and ‘selu’ the model was not able to learn and accuracy was not good** |
| **6** | **Conv3D** | **Accuracy: 0.32** | **We increased the hidden layer from 2-3, but the model did not perform well.**  **So, we finalized on keeping 2 hidden layers.** |
| **7** | **Conv3D** | **Accuracy: 0.47** | **Experimented with different number of epochs like 20, 25, 30 and 40.**  **Observed that after 25 epochs there is no much increase in validation accuracy.** |
| **8** | **Conv3D** | **Accuracy: 0.48** | **We have observed the model was overfitting, to overcome that we have added dropouts and batchnormalization layers** |
| **9** | **Conv3D** | **Accuracy: 0.22** | **Even after adding Dropouts and batchnormalization, we observed that the model was overfitting. Hence, we added regularization(L1)** |
| **10** | **Conv3D** | **Accuracy: 0.62** | **As L1 regularization decreased accuracies drastically, hence we tried L2 with different alpha values like 0.01, 0.02 and 0.03, 0.04** |
| **Final Model** | **Conv3D** | **Accuracy: 0.70** | **After experimenting on various hyperparameters we have achieved 0.62 accuracy. To get much better results we can try different Neural network architectures.** |