### Observations of running the Gesture Recognition using Conv2D + RNN and Convolutional 3D models:

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| **Experiment Number** | **Model** | **Parameters** | **Result** | **Decision + Explanation** |
| **1** | **CNN+RNN (GRU)** | **Image\_height=100**  **Image\_width=100**  **Filter\_size1=8**  **Filter\_size2=16**  **Filter\_size3=64**  **Dropout=True**  **BatchNormalization=True**  **GRU=128**  **Number of Epochs =25** | **Accuracy:**  **Train: 67.48**  **Test: 37.00** | **Model is overfitting. Test accuracy is too low.** |
| **2** | **CNN+RNN (GRU)** | **Image\_height=100**  **Image\_width=100**  **Filter\_size1=8**  **Filter\_size2=16**  **Filter\_size3=64**  **Dropout=True**  **BatchNormalization=True**  **GRU=128**  **Number of Epochs =25** | **Accuracy:**  **Train: 23.18**  **Test: 21.00** | **Model is underfitting. Train and Test accuracy are both low.** |
| **3** | **CNN+RNN** | **Image\_height=120**  **Image\_width=120**  **Filter\_size1=8**  **Filter\_size2=16**  **Filter\_size3=64**  **Dropout=True**  **BatchNormalization=True**  **GRU=128**  **Number of Epochs =25** | **Accuracy:**  **Train: 20.28**  **Test: 23.00** | **Model is underfitting. Train and Test accuracy are both low.** |
| **4** | **Conv3D Without dropout** | **Image\_height=84**  **Image\_width=84**  **Filter\_size=64**  **Number of layers=5**  **Batch Normalization=True**  **Dropout=False** | **Accuracy:**  **Train: 100.00**  **Test: 76.00** | **Model is overfitting. Need to add dropout.** |
| **5** | **Conv3D Without dropout** | **Image\_height=100**  **Image\_width=100**  **Number of layers=4**  **Filter\_size\_layer1=64**  **Filter\_size\_layer2=128**  **Filter\_size\_layer3=256**  **Filter\_size\_layer4=256**  **Batch Normalization=True**  **Dropout=False**  **Number of Epochs= Stopped at 11** | **Accuracy:**  **Train: 100.00**  **Test: 71.00** | **Need to interrupt this model at 11th epoch as the Train accuracy was achieved to 100 % and the test accuracy revolved around 70-71 %. So model is overfitting.** |
| **6** | **Conv3D with Dropout** | **Image\_height=100**  **Image\_width=100**  **Number of layers=3**  **Filter\_size\_layer1=64**  **Filter\_size\_layer2=128**  **Filter\_size\_layer3=256**  **Batch Normalization=True**  **Dropout=True**  **Epochs 30** | **Accuracy:**  **Train:50.00**  **Test: 40.00** | **increase layers and minimize filter size of initial layers** |
| **7** | **Conv3D with Dropout** | **Image\_height=84**  **Image\_width=84**  **Filter\_size\_layer1=64**  **Filter\_size\_layer2=128**  **Filter\_size\_layer3=256**  **Filter\_size\_layer4=256**  **Number of layers=4**  **Batch Normalization=True**  **Dropout=True**  **Epochs = 25** | **Accuracy:**  **Train: 55.26**  **Test:56.00** | **Model seems to be good and working** |
| **Final Model** | **Conv3D with Dropout** | **Image\_height=84**  **Image\_width=84**  **Filter\_size\_layer1=64**  **Filter\_size\_layer2=128**  **Filter\_size\_layer3=256**  **Filter\_size\_layer4=256**  **Number of layers=4**  **Batch Normalization=True**  **Dropout=True**  **Epochs = 25** | **Accuracy:**  **Train: 55.26**  **Test:56.00** | **Best model with good train\_accuracy and val\_accuracy.** |

**Conv3D:**

Best Conv3D model achieved with the following parameters

* Image Resolution: 84 X 84
* Batch size: 20
* Number of frames / images per video : 20
* Number of layers = 4, (64, 128, 256, 256)
* Batch Normalization =True,
* Dropout=True.

categorical\_accuracy: 0.55.26 -

val\_categorical\_accuracy: 56.00

**LINK TO H5 FILE:**

[**https://drive.google.com/file/d/1OpDGf19vHvLVHH8mlcPOCxlgOzijJ-bG/view?usp=sharing**](https://drive.google.com/file/d/1OpDGf19vHvLVHH8mlcPOCxlgOzijJ-bG/view?usp=sharing)

NOTE: AS our h5 file size was 75 MB so we were not able to upload. We have uploaded on the drive and here is the link.