**Write up for Gesture Recognition Assignment**

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| **Experiment Number** | **Model** | **Result** | **Decision + Explanation** |
| **1** | **Conv3D** | **Resource Error** | **Batch size of 50 is too large. Changed to 40** |
| **2** | **Conv3D** | **Resource Error** | **Batch size of 50 is too large. Changed to 30** |
| **3** | **Conv3D** | **Resource Error** | **Number of images chosen is too high (30). Reduced to 20** |
| **4** | **Conv3D** | **Train Accuracy: 0.60**  **Val Accuracy: 0.47** | **Accuracy too low. Reducing image size to 100X100 for faster learning.** |
| **5** | **Conv3D** | **Train Accuracy: 0.71**  **Val Accuracy: 0.59** | **Accuracy seems to be better. Increasing # of epochs to 20** |
| **6** | **Conv3D** | **Train Accuracy: 0.80**  **Val Accuracy: 0.60** | **Train accuracy has increased but val accuracy hasn't. Signs of overfitting. Adding Dropouts after MaxPooling Layers** |
| **7** | **Conv3D** | **Train Accuracy: 0.82**  **Val Accuracy: 0.63** | **Model still showing signs of overfitting. Reducing image size to 90X90 and adding Kernel L2 Regularizer** |
| **8** | **Conv3D** | **Train Accuracy:**  **0.78**  **Val Accuracy: 0.63** | **Overfitting has dropped but still no increase in accuracy. Model params is too high and model size is reaching 463 MB. Reducing # of images to 15** |
| **9** | **Conv3D** | **Train Accuracy: 0.80**  **Val Accuracy: 0.64** | **Model size changed to 300MB which is still large. Not much increase in accuracy. Changing filter size of 1st Conv3D layer from (3,3,3) to (3,3,5)** |
| **10** | **Conv3D** | **Train Accuracy: 0.80**  **Val Accuracy: 0.64** | **No increase in the accuracy but model size is now 15.5 MB. Adding additional layer and modifying MaxPooling size. Overall there are now 3 layers of size 8, 16 and 32 with a pool size of (3,3,3), (3,3,3) and (1,1,1)** |
| **11** | **Conv3D** | **Train Accuracy: 0.83**  **Val Accuracy: 0.58** | **Drastic decrease in val accuracy although the model size has reduced to 6MB.**  **Signs of overfitting.**  **Unable to increase accuracy any further. Proceeding with CNN + GRU.** |
| **12** | **CNN + GRU** | **Error: This model has never been called, thus its weights have not yet**  **been created** | **Tried to have both the models in the same notebook. But since there was an error and unable to find the iPYNB checkpoints on Nimble Box, replacing the 3D Conv model with the CCN + GRU model.** |
| **13** | **CNN + GRU** | **Train Accuracy: 0.45**  **Val Accuracy: 0.40** | **Starting with 2 layers of Conv2D 32 and 64 each and one layer of GRU of size 256.**  **10 Epochs** |
| **14** | **CNN + GRU** | **Train Accuracy:**  **Val Accuracy: 0.32** | V**ery low accuracy and huge model due to the fact that number of trainable parameters is close to 18 million. Reducing layer size to 16 and 32 and GRU size to 64.** |
| **15** | **CNN + GRU** | **Train Accuracy: 0.85**  **Val Accuracy: 0.60** | **Model size has reduced drastically. But there is severe signs of overfitting. Adding dropouts after the Conv2D layers.** |
| **16** | **CNN + GRU** | **Train Accuracy: 0.76**  **Val Accuracy: 0.60** | **Seems to be no improvement in the val accuracy but the train accuracy has gone down. Proceeding to add batch normalization in each of the Conv2D layers.** |
| **17** | **CNN + GRU** | **Train Accuracy: 0.8**  **Val Accuracy: 0.59** | **No further improvement in the val accuracy and it has in fact reduced compared to before. Adding additional layer. The model now has 3 layers of size 16, 32 and 64** |
| **18** | **CNN + GRU** | **Train Accuracy: 0.65**  **Val Accuracy: 0.58** | **Adding new layers did not achieve the desired accuracy in the selected number of epochs which is 30. It plateaued towards the end where the loss and the val\_loss did not reduce. This was probably because the model was too complex and could not generalize well on the data-set.** |

**Summary**:

The Conv3D was able to perform better than the CNN+GRU model although both were brought down to very simple models of around 15MB. Overall the model was able to achieve a decent, if not very high, accuracy on the validation data-set and a good accuracy on the training data-set.