Gesture Recognition:

The different experiments details that carried are as follows:

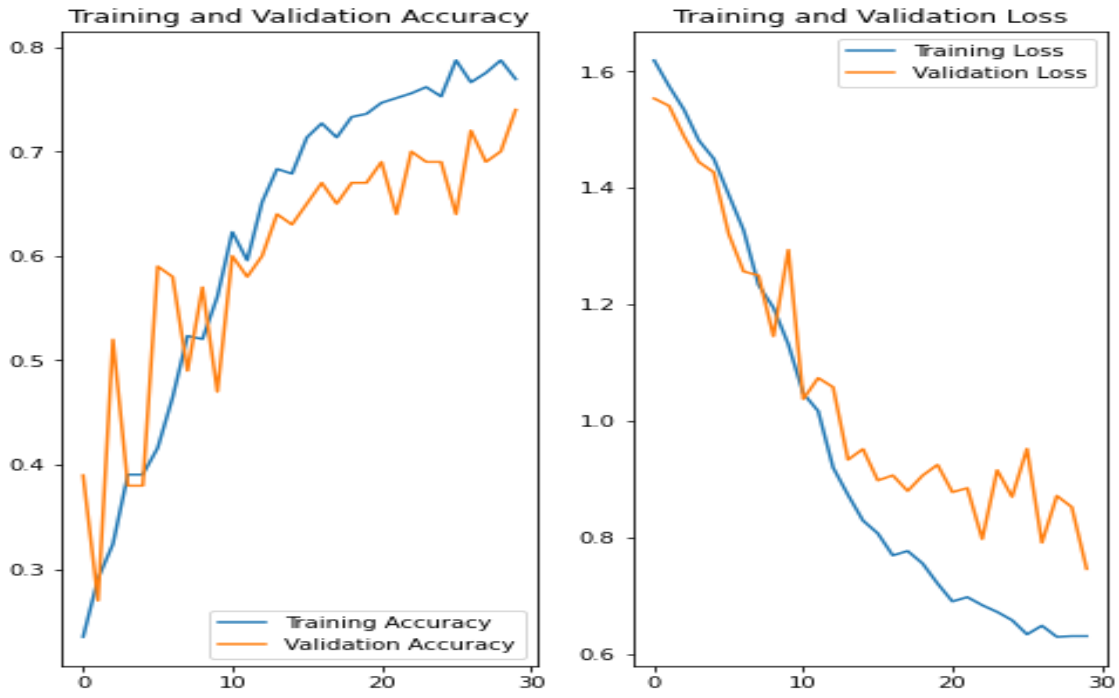
Experiment Number	Model	Result	Decision + Explanation
1	Conv3D	Throws Generator error	Images are not of same size hence images to be resized.
2	Conv3D	Throws Stop Iteration Error	Generator for last batch images where total images is not multiple of batch size to be mapped correctly.
3	Conv3D	Model unable to learn.	Reduce the number of images per video
4	Conv3D	Model unable to learn.	Reduce the size of the image
5	Transfer learning VGG16 + GRU	Train accuracy: 0.52 Val_accuracy: 0.31	As the accuracy did not increase added the Conv3d still the accuracy didn't improve. Hence dropped transfer learning.
6	Conv3D	Train_accuracy: 0.18 Val_accuracy: 0.19	Reduce image pixel values by subtracting with values 117, 112, 120 and reduce cropping.
7	Conv3D	Train_accuracy: 0.23 Val_accuracy: 0.21,	Change optimizer SGD to Adagrad
8	Conv3D	Train_accuracy: 0.36 Val_accuracy: 0.32.	Instead of subtracting the pixel values, Normalize the image by dividing with 255.0
9	Conv3D	Train_accuracy: 0.46 Val_accuracy: 0.38.	Increase another NN layer with 256 Neurons
10	Conv3D	Train_accuracy: 0.93 Val_accuracy: 0.63.	Huge difference between train and valuation accuracy reflecting overfitting. Use Dropout and change optimizer to SGD
11	Conv3D	Train_accuracy: 0.6387 and Val_accuracy: 0.61	Trying optimizer Adam, but not getting acceptable accuracy.
12	Conv3D	Train_accuracy: .8317 Val_accuracy: 0.73	Getting acceptable accuracy for train and validation set at epoch 27/30 using adagrad optimizer.

13	Conv3D	Train_accuracy: 0.7795 Val_accuracy: 0.75	Getting acceptable accuracy for train and validation set at epoch 35/40. Using SGD optimizer.
Final Model	Conv3D	Train_accuracy: 0.769 and Val_accuracy: 0.74	Decided final model with optimizer as SGD, saved .h5 file.

Final Model:
After trying different Architecture and Model Optimizers the SGD with no Batch Normalization and one dropout after flatten layer, one dropout before the final SoftMax layers works best with the Hand Gesture Recognition Dataset.

Model Parameters:

- 4 Convo3D layers with 64, 128, 256, 256 neurons respectively.
- 2 Dense layers with 512 and 5 for classification
- Input and hidden layer activation function = 'elu' to keep negative gradients.
- Optimizer = SGD with momentum
- Loss function = Categorical_Crossentropy
- Metrics = Categorical accuracy



Model .h5 file:

https://drive.google.com/file/d/1j2LvklSGoul7GHzjiKFc0rGuGq0zKTZA/view?usp=sharing