Hand Gesture Recognition Assignment

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We have used one generator function with cropping and resizing images and on later models we introduce more augmentation using function generator_with_aug.

Experiment Number	**Experiment Setting**	**Type of Model**	**Result**	**Decision + Explanation**
1	batch_size=50 Image_size=160*160 Frames_to_sample=30	Conv3D (running on sample data)	Throws Resource Exhausted Error	Used 50 folders from training and 50 from validation
1	batch_size=40 Image_size=160*160 Frames_to_sample=20	Conv3D (running on sample data)	Accuracy: 68% Val Accuracy: 38%	We should add more data to see how it perform on full data
3	batch_size=40 Image_size=160*160 Frames_to_sample=20	Conv3D (Full data)	Accuracy: 98% Val Accuracy: 77%	Model Overfitted. Next we rewrite generator function with augmentation
4	batch_size=20 Image_size=160*160 Frames_to_sample=20	Conv3D (Full data aug)	Accuracy: 87% Val Accuracy: 77%	Overfitting reduced
5	batch_size=30 Image_size=140*140 Frames_to_sample=20	Conv3D (Full data aug)	Accuracy: 91% Val Accuracy: 80%	Trying different image size and reduced filter size
6	batch_size=30 Image_size=120*120 Frames_to_sample=16	Conv3D (Full data aug)	Accuracy: 84% Val Accuracy: 81%	This model is not overfitting and have good accuracy also.
7	batch_size=20 Image_size=120*120 Frames_to_sample=20	Conv3D (Full data aug)	Accuracy: 62% Val Accuracy: 65%	Added more convolution layers but performance not improved

8	batch_size=20 Image_size=100*100 Frames_to_sample=16	Conv3D (Full data aug)	Accuracy: 80% Val Accuracy: 74%	Reducing model parameters yet got reasonable accuracy
Now using Transfer Learning and RNN				
9	batch_size=20 Image_size=120*120 Frames_to_sample=16	VGG16+LSTM (Full data aug)	Accuracy: 97% Val Accuracy: 71%	Model is overfitting.
10	batch_size=20 Image_size=120*120 Frames_to_sample=16	mobilenet+GRU (Full data aug)	Accuracy: 97% Val Accuracy: 62%	Model is also overfitting
11	batch_size=5 Image_size=120*120 Frames_to_sample=16	mobilenet+GRU (Full data aug)	Accuracy: 97% Val Accuracy: 93%	Full weights trained model is giving good accuracy and validation accuracy
12	batch_size=10 Image_size=120*120 Frames_to_sample=16	mobilenet+GRU (Full data aug)	Accuracy: 92% Val Accuracy: 90%	We have increased dropout and added batch normalization on dense layes of previous model
Final Model	batch_size=20 Image_size=120*120 Frames_to_sample=16	mobilenet+GRU (Full data aug)	Accuracy: 97% Val Accuracy: 93%	*[model_init_2020-12-2712_11_26.467901/model-00017-0.08752-0.97511-0.25327-0.93000.h5]* with all weights trainable