

Deep Learning Course Project – Gesture Recognition

Final Submission

Model Download

<https://drive.google.com/file/d/1ARIfphgOL68I-P4eHvT0pWtsbQUESV1N/view?usp=sharing>

Summary of Experiments

Expt No	Model	Experiment Details	Result	Decision + Explanation
1	All Models	Image Selection	[6,8,10,11,12,13,14,16,18,20,22,24]	Images in the beginning and end are not very useful
2	All Models	Image Cropping	Remove 25% portion from all sides	Zoom the centre part where the action take place
3	Conv2D + RNN using ResNet 50	50 Epocs, Batch Size 30	Takes a long time. Hangs	Bigger machines are required
4	Conv2D + RNN using VGG16	50 Epocs, Batch Size 100, 50	Out of Memory	Reduce Batch Size
5	Conv2D + RNN using VGG16	50 Epocs, Batch Size 30 TimeDistributed Base Model with GRU 64 units without Dropouts	Training Accuracy: 0.3275 Val Accuracy: 0.3300	Pre Trained Model
6	Conv2D + RNN using VGG16	50 Epocs, Batch Size 30 TimeDistributed Base Model with GRU 64 units TimeDistributed GlobalAveragePooli	Training Accuracy: 0.2224 Val Accuracy: 0.1800	GlobalAverage Pooling is not helpful. It seems to be taking away the feature information. Also the model seems to be highly overfitting

		ng2D on the top of base model		
7	Conv3D	2 Conv3D layers + BatchNormalization with every later + MaxPooling with every layer + L1 Regularization Dropout of 0.5 before final dense layer	Training Accuracy: 0.2878 Val Accuracy: 0.3000	Training accuracy improve with epocs. Pre Trained continues to be better
8	Conv3D	2 Conv3D layers + BatchNormalization with every later + MaxPooling with every layer + L1 Regularization + Drop out of 0.25 at CNN layer + Dropout of 0.5 before final dense layer	Training Accuracy: 0.1786 Val Accuracy: 0.1600	Dropouts at each level are not working. Looking like there is information loss becaue of Dropouts
9	Conv3D	2 Conv3D layers + BatchNormalization with every later + MaxPooling with every layer + L1 Regularization + Dropout of 0.25 before final dense layer	Training Accuracy: 0.2718 Val Accuracy: 0.2400	Reduction in the Dropouts is causing overfitting.
10	Conv2D + RNN using VGG16	50 Epocs, Batch Size 30 TimeDistributed Base Model with GRU 64 units + 0.5 Dropout	Training Accuracy: 0.2224 Val Accuracy: 0.1800	With Dropout the model is not performing.
11	Conv2D + RNN using VGG16	50 Epocs, Batch Size 30 TimeDistributed Base Model with	Training Accuracy: 0.3008 Val	L1 Regularization works better than Dropout

		GRU 64 units + L1 Regularizaion	Accuracy: 0.3200	
12	Conv2D + RNN without VGG16	50 Epocs, Batch Size 15 TimeDistributed	Training Accuracy: 0.2309 Val Accuracy: 0.1800	Transferred Learned model works much better than a completely new model.
Final Model	Conv2D + RNN using VGG16	50 Epocs, Batch Size 30 TimeDistributed Base Model with GRU 64 units without Dropouts and without L1 Regularization	Training Accuracy: 0.3304 Val Accuracy: 0.3400	Transferred learned model performs the best. Model Name: model-00050-1.52472-0.33032-1.52612-0.34000.h5 File Download: https://drive.google.com/file/d/1ARIfphgOL68I-P4eHvT0pWtsbQUESV1N/view?usp=sharing