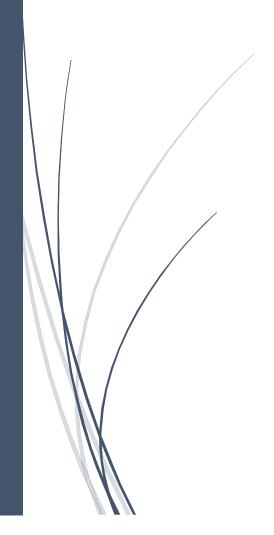
8/17/2022

Write Up

- 1. Results of All the model experiments which was done for two architectures
 - a. Conv3D
 - b. Con2D with RNN
 - i. RNN GRU
 - ii. RNN LSTM



Gesture Recognition – Deep Learning

Problem Statement

You want to develop a cool feature in the smart-TV that can recognise five different gestures performed by the user which will help users control the TV without using a remote

The gestures are continuously monitored by the webcam mounted on the TV. Each gesture corresponds to a specific command:

• Thumbs up: Increase the volume

• Thumbs down: Decrease the volume

• Left swipe: 'Jump' backwards 10 seconds

• Right swipe: 'Jump' forward 10 seconds

• Stop: Pause the movie

Model No	Model Name	Result	Decision + Explanation		
Architecture 1 – Using Conv3D					
1 & 2	Conv3D	Model 1 threw out of memory	Batch size to be used as 32.		
		error for batch size 128. So, we	Image resolution would be used at		
		decided to stick with batch size 32	120*120 to see the image size has		
		and 64.	clear visibility & improves accuracy.		
		Model 2 Throws Generator error			
3	Conv3D with	Model 3 is the 1 st model which got	Model is overfitting now. So going to		
	Epoch = 20	results.	increase the epoch size to 50 and		
		Train Accuracy - 0.90	train the model		
		Validation Accuracy – 0.27			
4	Conv3D with	Model 4 is the 2nd model which	Model is still overfitting, but the		
	Epoch = 50	got results better than model 3	validation accuracy is increased due		
		Train Accuracy - 0.90	to increase in epoch. So, let us try		
		Validation Accuracy – 0.71	with adding some dropouts		
5	Conv3D with	Model 5	So, by adding some dropouts as 0.2,		
	Dropout = 0.2	Train Accuracy - 0.98	both the train and validation		
		Validation Accuracy – 0.76	accuracy is increased. Again, going to		
			try with increase in dropouts' values		
6	Conv3D with	Model 6	By increasing the dropouts to 0.5, it		
	Dropout = 0.5	Train Accuracy - 0.97	proved that it will not be suited.		
		Validation Accuracy – 0.51	Both the values are decreased and		
			still the model is overfitting. Now		
			going to use average polling instead		
			of flatten layer.		
7	Conv3D using	Model 7	Now it is the best model in		
	Global Average	Train Accuracy - 0.95	architecture 1 (using CONV3D). But		
		Validation Accuracy – 0.90	the training parameters are little		
			high. So let's try with different		
			architectures using Conv 2D and		
			RNN.		

	Architecture 2 – Using Conv2D & RNN				
8	Time Distributed	Model 8	The model is performing good with		
	Conv 2D + GRU	Train Accuracy - 0.95	less parameters. Let us add some		
	(without Dropouts)	Validation Accuracy – 0.82	dropouts so that we can make both		
			the train and validations scores close		
			to each other		
9	Time Distributed	Model 9	Validation Accuracy is again lowered,		
	Conv 2D + GRU	Train Accuracy - 0.87	and overfitting happened. So, we are		
	(with Dropouts)	Validation Accuracy – 0.60	going to remove the dropouts and		
			add Dense layer instead of GRU		
10	Time Distributed	Model 10	This is the good model with both the		
	Conv 2D + Dense	Train Accuracy - 0.87	values with less parameters like		
	(without Dropouts)	Validation Accuracy – 0.87	(128517). Again, trying with different		
			parameters like LSTM instead of GRU		
11	Time Distributed +	Model 11	This is the final model with good		
	ConvLSTM2D	Train Accuracy - 0.96	amount of train accuracy and		
		Validation Accuracy – 0.93	validation accuracy and even the		
			parameters are very less (13589).		