Gesture Recognition – Deep Learning

Problem Statement:

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

In this group project, you are going to build a 3D Conv model that will be able to predict the 5 gestures correctly. Please import the following libraries to get started.

- 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.

Experimental Tabular:

EXP.NO	Model Description	Result	Explanation + Decision
1	3D CNN Model without batch normalization, Drop out and regularization	Accuracy: 0.3650 Val_Accuracy: 0.3300	Accuracy is less than 50 percentage and model is underfit. Accuracy needs to improve. Decision to add batch normalization, dropout, and regularization
2	3D CNN Model with batch normalization, Drop out and regularization	Accuracy: 0.8582 Val_Accuracy: 0.4600	The accuracy of training increase to 0.94 and validation accuracy is 0.62. there is quite improvement in accuracy in the model but overfitted
3	3D CNN Model without batch normalization, Drop out and regularization with data augmentation	Accuracy: 0.3741 Val_Accuracy: 0.3400	Accuracy is less than 50 percentage and model is underfit with data augmentation there is not much improve
4	3D CNN Model with batch normalization, Drop out and regularization with data augmentation	Accuracy: 0.8115 Val_Accuracy: 0.6100	The Accuracy is quite good but it's also a overfitted model. did well on train and not good on validation even with data augmentation.
5	2D RNN with LSTM	Accuracy: 0.8356	The Accuracy is good, and model seems to be performed well on the validation. quite reliable model

		Val_Accuracy: 0.7100	
6	2d RNN with GRU	Accuracy: 0.6305 Val_Accuracy: 0.4900	Val_Accuracy is less than 50 percentage and model is underfit. There is not much improvement in model

Conclusion:

The 2D RNN with LSTM Model gives good accuracy in training around 83% and validation around 71% and it choose as final model (model-00030-1.36046-0.83560-1.65134-0.71000.h5)

 for predictions.