

**Problem Statement:** Develop a model which can identify the gestures shown in the webcam mounted on the TV.

The gestures are continuously monitored by the webcam. 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

Each video is a sequence of 30 frames (or images).

**Observations:**

- It is observed that the models with 20-25 epochs yields the best models out of all. With more than 25 epochs the training and validation accuracy starts decreasing.
- Also decreasing the batch\_size also increased the accuracy by lot. And also resolves overfitting a bit.
- Removing the dropouts after conv layer, using it only after dense layer has also improved the accuracy.
- The final model we can see cropping the images also helped increasing the accuracy of the model.

Experiment Number	Model	Result	Decision + Explanation
1	Conv3D	Trainable parameters: 4,820,830 categorical accuracy: 0.6207 Val categorical accuracy: 0.2891	Batch size of 64 and batch normalization after every conv layer with dropout added after the conv layers and after the dense layers, run for 30 epochs Optimizer-SGD We can see there is lot of diff between the train and val accuracy, model is overfitting
2	Conv3D	Trainable parameters: 4,820,830 categorical accuracy: 0.7054 Val categorical accuracy: 0.6719	Batch size of 32 and batch normalization after every conv layer with dropout added after the conv layers and after the dense layers, run for 30 epochs Optimizer-SGD Decreasing the batch size increased the val accuracy and the diff between the

			train and val accuracy is very less
3	Conv3D	Trainable parameters: 4,820,830 categorical accuracy: 0.7872 Val categorical accuracy: 0.7232	Batch size of 16 and batch normalization after every conv layer with dropout added after the dense layers, run for 20 epochs Optimizer-SGD Reducing the number of epochs and removing the dropout after conv layers has increased the val accuracy
4	Conv3D	Trainable parameters: 4,820,830 categorical accuracy: 0.8899 Val categorical accuracy: 0.7589	Batch size of 16 and batch normalization after every conv layer with dropout added after the conv layers and after the dense layers, run for 25 epochs Optimizer-SGD Increasing the epochs till 25 the accuracy is increasing but after 25 the accuracy is decreasing.
Final	Conv3D	Trainable parameters: 4,820,830 categorical accuracy: 0.8229 Val categorical accuracy: 0.7857	Batch size of 16 and batch normalization after every conv layer with dropout added after the conv layers and after the dense layers, run for 25 epochs Optimizer-SGD In this model we have cropped the images. We can see the accuracy has also improved and the diff between train and val accuracy is very less. The model is not overfitting.