Gesture Recognition

# problem Statement

### Imagine you are working as a data scientist at a home electronics company which manufactures state of the art smart televisions. 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.

# observations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model | Experiment | Result (Accuracy in %) | Decision and Explanation | Trainable Parameters |
| Conv3D | 1. Batch: 40 | OOM | Reduce the batch size |  |
| 2. Simple model with 3 hidden layers | Training: 99.86  Validation: 36.67  Best: 36.67 | Overfitting  We need to add some dropouts | 694,117 |
| 3: Add Dropouts | Training: 34.13  Validation: 26.25  Best: 27.08 | Model is not overfitting anymore, but accuracy is poor | 1,274,949 |
| 4. Change input dimensions (80\*80) | Training: 18.70  Validation: 19.17  Best: 25 | Accuracy is still poor | 1, 168, 453 |
| 5. increased number of layers | Training: 45.36  Validation: 46.67  Best: 46.67 | Accuracy has improved but not significantly | 5, 374, 053 |
| 6. Higher number of epochs | Training: 85.68  Validation: 79.17  Best: 85 | Best so far | 2, 095, 717 |
| 7. Higher image dimensions (160\*160) | Training: 20.14  Validation: 24.17  Best: 28.33 | Model accuracy has gone down so we can choose the 6th as final model in Conv3D section | 19, 991, 653 |
| Conv2d + GRU | 8. Simple Model | Training: 99.86  Validation: 50.00  Best: 50.00 | Model is overfitting | 5, 611, 909 |
| 9 Add Dropouts | Training: 59.13  Validation: 65.00  Best: 69.17 | Model accuracy has improved | 2, 564, 869 |
| 10. Update learning rate | Training: 32.32  Validation: 40.00  Best: 40.83 | Poor accuracy | 2, 564, 869 |
| 11. Reduce number of epochs | Training: 55.65  Validation: 65.00  Best: 65.00 | Same accuracy as above | 1, 336, 837 |
| Transfer Learning | 12. Simple Model with Dropouts | Training: 93.19  Validation: 86.67  Best: 86.67 | Mildly overfitting | 1, 591, 941 |
| 13. Add more epochs | Training: 94.35  Validation: 89.17  Best: 93.33 | Best overall. | 1, 591, 941 |

# FINAL Model

## Model with Training accuracy of 93.19% and validation accuracy of 93.33%.