The list does not include all the experimentation done in the case study, as some are just minor tweaks. All the models included in the Jupyter Notebook have better performance than the initial models we have used.

|  |  |  |  |
| --- | --- | --- | --- |
| Model Number | Model | Result | Decision and Explanation |
| Note 1 | Conv3D (image size = **75 x 75**, # of images = **15**, epoch = **15**, batch size = **32**) | Models 1 to 4 are ran using these parameters but, the resulting val accuracies are very low | Make the image size larger to **100 x 100** to have more data |
| Note 2 | Conv3D (image size = **100 x 100**, # of images = **15**, epoch = **15**, batch size = **32**) | Models 1 to 4 are ran using these parameters and the accuracies has improved a bit. | Make the image size larger to **120 x 120**, change the epoch to **20** and batch size to **16**. This is to increase the intake of data |
| **1** | Conv3D – Basic Conv3D | This has only 1 convolution layer. As expected, the model is not performing well and is overfitting.  Categorical Accuracy: **1.0000**  Validation Accuracy: **0.6964** | Add more layers to improve the performance of the network possibly. Adding more layers help to extract more features. |
| **2** | Conv3D – With Multiple Layers (w/o Dropout) | The model has improved but the model is still overfitting.  Categorical Accuracy: **0.9571**  Validation Accuracy: **0.7646** | We will add a Dropout to address the overfitting at the expense of accuracy. |
| **3** | Conv3D – With Multiple Layers (w/ Dropout) | The model has improved and the model is no longer overfitting.  Categorical Accuracy: **0.7112**  Validation Accuracy: **0.6607** | We want to make the model less complicated. So we’ll remove some layers. |
| **4** | Conv3D – With Less Layers | The model has improved but the model is no longer overfitting.  Categorical Accuracy: **0.8670**  Validation Accuracy:  **0.7321** | The model score is not far off but became overfitting. The reason for that is we have removed one layer with a Dropout. |
| **5** | **Conv2D w/ RNN** | This model has not performed better than the Conv3D model. However, this model is clearly not overfitting.  Categorical Accuracy: **0.5919**  Validation Accuracy: **0.5714** | This model can still be further finetuned. |

We ran out of time trying more models, and we have used most of the time getting the right balance of parameters for our models. We also have encountered some issues in Nimblebox as the storage space gets full easily. We have to delete continuously the h5 files generated just to be able to complete running the notebook. The best model for us is **Model #3 - Conv3D – With Multiple Layers (w/ Dropout)**. That model has given us decent results without the issue of overfitting with less number of parameters.