## Task 1

Single parameter modifications taken from Group 1 out of 1-4 in table.

Multiple parameter modification taken from Group 1 out of 1-2 in table.

| **Architecture Parameters** | **Architecture modification** | **Accuracy** |
| --- | --- | --- |
| [(64,2),(32,2), (0.3,0.3)] | Base | 90.83% |
| [(***32***,2),(***16***,2), (0.3,0.3)] | Filter modification | 89.55% |
| [(***64***,2),(***64*,**2), (0.3,0.3)] | Filter modification | 91.9% |
| [(64,***5***),(32,***3***), (0.3,0.3)] | Kernel modification | 90.36% |
| [(64,***3***),(32,***3***), (0.3,0.3)] | Kernel modification | 89.68% |
| [(64,2),(32,2), (***0.3***,***0.25***)] | Dropout modification | 91.04% |
| [(64,2),(32,2), (***0.25***,***0.25***)] | Dropout modification | 91.49% |
| [(64,2),(32,2), (0.3,0.3)]  ***[(64,2),(32,2), (0.3,0.3)]*** | Extra layer | 86.91% |
| [(32,5),(16,2), (0.2,0.2)] | Multiple parameter modification | 91.18% |
| [(32,5),(16,5), (0.2,0.2)] | Multiple parameter modification | 91.22% |
| [(128,3),(64,3), (0.3,0.3)] | Multiple parameter modification | 90.79% |

From the results of these experiments, we can see that a higher filter number than the baseline model achieved higher prediction accuracy. Our model with architecture [(***64***,2),(***64*,**2), (0.3,0.3)] had prediction accuracy 91.9%, an improvement over baseline model 90.83%.

[(***32***,2),(***16***,2), (0.3,0.3)] had gotten a lower prediction accuracy.

A higher number of filters is preferable to the baseline (64, 32) as there are more complex features to capture that the number if baseline features wouldn’t capture. The baseline model filters is too basic.

A lower dropout rate is observed to lead to a higher prediction accuracy than the baseline (0.3, 0.3) dropout rates. We see this in the architecture [(64,2),(32,2), (***0.25***,***0.25***)] with accuracy 91.49%. The baseline model seems to be underfitting the model, as the dropout rate is too high. We should decrease dropout rates to avoid underfitting.

An extra layer in the model, leads to a drastic decrease in prediction accuracy (86.91%). Adding an extra layer causes an overfitting of the model, so we should not add an extra layer.

The results for Kernel size effect on prediction accuracy seems a lot more unclear than the rest of the modifications. It seems that the baseline architecture kernel size (2,2) fits the model the best. The larger kernel sizes tested here, led to smaller prediction accuracies. A larger kernel size may overfit the data.