**DEEP LEARNING**
**ASSIGNMENT 1**

Aditya Vikram Dash
(120224162)

| S.NO | MODEL | PARAMETERS | TEST ACCURACY |
|---|---|---|---|
| 1. | Baseline Model | [(64,2),(32,2),(0.3,0.3)] | 0.9059000015258789 |
| 2. | Modified Filter 1 | [(32,2),(16,2),(0.3,0.3)] | 0.8960999846458435 |
| 3. | Modified Filter 2 | [(64,2),(64,2),(0.3,0.3)] | 0.9150999784469604 |
| 4. | Modified Kernel 1 | [(64,5),(32,3),(0.3,0.3)] | 0.9110999703407288 |
| 5. | Modified Kernel 2 | [(64,3),(32,2),(0.3,0.3)] | 0.9104999899864197 |
| 6. | Modified Dropout 1 | [(64,2),(32,2),(0.3,0.25)] | 0.9110999703407288 |
| 7. | Modified Dropout 2 | [(64,2),(32,2),(0.25,0.25)] | 0.9089999794960022 |
| 8. | Extra Layer | [(64,2),(32,2)(64,2),(32,2),(0.3,0.3,0.3,0.3)] | 0.8720999956130981 |
| 9. | Architecture 1 | [(32,2),(16,2),(0.3,0.3)] | 0.8988000154495239 |
| 10. | Architecture 2 | [(32,5),(16,5),(0.2,0.2)] | 0.9103000164031982 |
| 11. | Architecture 3 | [(128,2),(64,2),(0.3,0.3)] | 0.9169999957084656 |
| 12. | Architecture 4 | [(128,3),(64,3),(0.3,0.3) | 0.9047999978065491 |

## REPORT

**BASELINE MODEL:**

BASELINE FILTER: [(64,2),(32,2),(0.3,0.3)]

ACCURACY IN BASELINE: **90.59%**

**MODEL1: Modified Filter 1**

MODIFIED FILTER: [(32,2),(16,2),(0.3,0.3)]

ACCURACY IN MODIFIED FILTER: **89.61%**

OBSERVATION: The accuracy obtained after modifying the filter is lower than the baseline model. It is because of the decrease in the number of units in both layers.

**MODEL2: Modified Filter 2**

MODIFIED FILTER: [(64,2),(64,2),(0.3,0.3)]

ACCURACY IN MODIFIED FILTER: **91.50%**

OBSERVATION: The accuracy obtained in this case is higher than the baseline model. It is because of the increase in the number of units in second layer.

**MODEL3: Modified Kernel 1**

MODIFIED KERNEL: [(64,5),(32,3),(0.3,0.3)]

ACCURACY IN MODIFIED KERNEL: **91.10%**

OBSERVATION: The accuracy obtained after modifying the Kernel values is higher than the accuracy obtained from the baseline model because in this case the kernel size is increased.

**MODEL4: Modified Kernel 2**

MODIFIED KERNEL: [(64,3),(32,2),(0.3,0.3)]

ACCURACY IN MODIFIED KERNEL: **91.04%**

OBSERVATION: The accuracy obtained in this case is higher than the accuracy obtained from the baseline model.

**MODEL5: Modified Dropout 1**

MODIFIED DROPOUT: [(64,2),(32,2),(0.3,0.25)]

ACCURACY IN MODIFIED DROPOUT VALUE: 91.10%

OBSERVATION: The accuracy obtained after modifying the dropout values is same as the accuracy obtained from the baseline model.

**MODEL6: Modified Dropout 2**

MODIFIED DROPOUT:

[(64,2),(32,2),(0.25,0.25)]ACCURACY IN

MODIFIED DROPOUT VALUE: **90.89%**

OBSERVATION: The accuracy obtained after modifying the dropout values is lower than the accuracy obtained from the baseline model because in this case the modified dropout value is lower for both the layers.

**MODEL7: Extra Layer**

EXTRA LAYER: [(64,2),(32,2),(64,2),(32,2),(0.3,0.3,0.3,0.3)]

ACCURACY AFTER ADDING EXTRA LAYER: **87.20%**

OBSERVATION: The accuracy obtained in this case is incredibly lower than the accuracy obtained from the baseline model. This is due to the addition of pooling and dropout values hence there is more information loss.

**MODEL8: Architecture 1**

ARCHITECTURE 1: [(32,2),(16,2),(0.3,0.3)]

ACCURACY: **89.88%**

OBSERVATION: The accuracy obtained in this case is lower than the base line model as the number of filters for both the layers is reduced.

**MODEL9: Architecture 2**

ARCHITECTURE 2: [(32,5),(16,5),(0.2,0.2)]

ACCURACY: **91.03%**

OBSERVATION: The accuracy obtained in this case increases when compared with the baseline model.

**MODEL10: Architecture 3**

ARCHITECTURE 3: [(128,2),(64,2),(0.3,0.3)]

ACCURACY: **91.69%**

OBSERVATION: The accuracy obtained in this case increases when compared with the baseline model due to the filter size being increased for both the layers while having other parameters constant.

**MODEL11: Architecture 4**

ARCHITECTURE 4: [(128,3),(64,3),(0.3,0.3

ACCURACY: **90.47%**

OBSERVATION: The accuracy obtained in this case decreases when compared with the baseline model. This maybe because of the increase in kernel size.

## CONCLUSIONS

From the above, we find that **Model 10(Architecture 3)** is the best model to go with an accuracy 91.69%. This is because of increase in filter values for both layers.

The worst model is **Model 7(Extra Layer).** This is because there is an addition of pooling and dropout in each layer which leads in information loss.