

## CIFAR 10 IMAGE CLASSIFICATION TASK

Architecture used along with batch normalisation and dropout

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```

Convolutional Layers (Feature Extraction)

Conv1: Takes 3 input channels (RGB) and increases them to 64 feature maps.

Conv2: Expands from 64 to 128 feature maps, learning more complex patterns.

Conv3: Further increases from 128 to 256 feature maps, capturing high-level details.

Pooling: After each convolution, max pooling reduces the height and width of the feature maps but keeps the number of feature maps the same.

Flattening (Transition to Fully Connected Layers)

After the third convolutional block, the 256 feature maps are flattened into a 1D vector of 4096 values, making it ready for classification.

Fully Connected Layers (Classification)

First fully connected layer: Reduces the 4096 features to 512 neurons, allowing the model to learn deep relationships.

Output layer: Reduces from 512 to 10 neurons, where each neuron represents one of the 10 CIFAR-10 classes.

### EXP 3.1

```
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```

```
1  CIFAR 10 EXP3.1
2
3  INITIALISATION: DEFAULT
4
5  ACTIVATION FUNCTION : RELU
6
7  OPTIMISER : ADAM
8
9  LEARNING RATE = 0.001
10
11 EPOCHS = 10
12
13 TRAINING LOSS = 0.7927
14
15 VALIDATION LOSS = 0.6614
16
17 VALIDATION ACCURACY = 78.12%
```

## EXP3.2

```
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```

```
CIFAR 10 EXP3.2  
  
INITIALISATION : DEFAULT IN PYTORCH  
  
ACTIVATION FUNCTION : LEAKY RELU  
  
OPTIMISER : ADAM  
  
LEARNING RATE : 0.001  
  
TRAINING LOSS = 0.7886  
  
VALIDATION LOSS = 0.6795  
  
VALIDATION ACCURACY = 77.44%
```

## EXP 3.3

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```

```
CIFAR 10 EXP3.3  
  
HERE I USED A VERY SIMPLE CNN ARCHITECTURE WITHOUT BATCH NORMALISATION AND DROPOUT  
  
ACTIVATION FUNCTION : RELU BUT IT IS ONLY USED IN THE FC LAYER  
  
INITIALISATION : DEFAULT IN PYTORCH  
  
OPTIMISER : ADAM  
  
LEARNING RATE : 0.001  
  
EPOCHS = 10  
  
TRAINING LOSS = 0.7247  
  
VALIDATION LOSS = 0.6696  
  
VALIDATION ACCURACY = 77.28%
```

### EXP 3.4 (BEST MODEL)

```
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CIFAR 10 EXP3.4

INITIALISATION : DEFAULT IN PYTORCH

ACTIVATION FUNCTION : LEAKY RELU

OPTIMISER = ADAM

LEARNING RATE = 0.001

EPOCHS = 20

TRAINING LOSS = 0.3938

VALIDATION LOSS = 0.4503

VALIDATION ACCURACY = 85.61%

BEST MODEL YET
```

### EXP 3.5

```
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CIFAR 10 EXP3.5

PRETRAINED ON RESNET 18

USED PRETRAINED WEIGHTS

OPTIMISER : ADAM

LEARNING RATE = 0.001

EPOCHS = 30

TRAINING LOSS = 0.2426

ACCURACY = 91.56%
```