

Task:

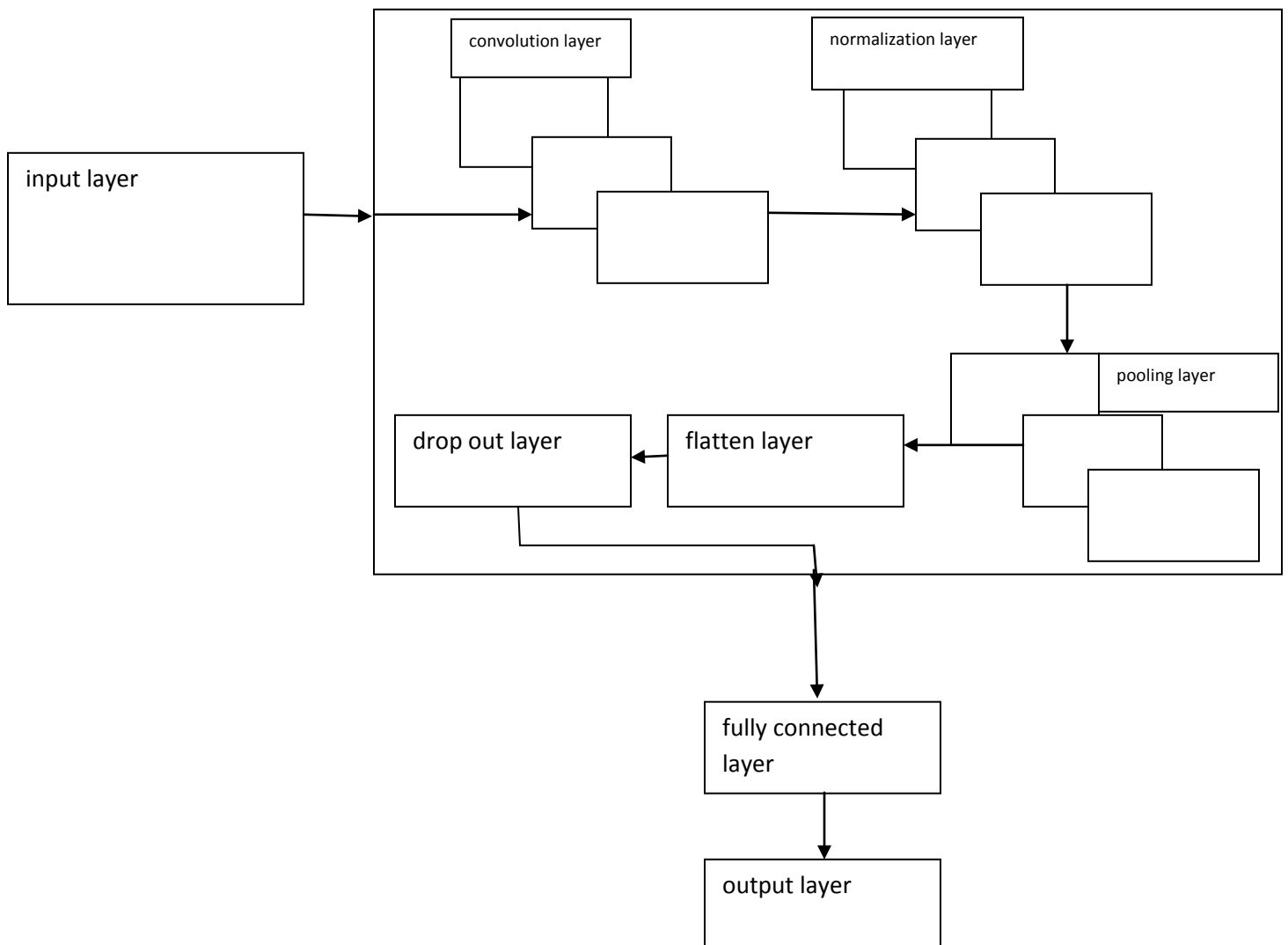
To classify the images of CIFAR 10 dataset using AI models.

Challenges:

Though the images are of smaller size, the dataset is quite large. The images are with low resolution which makes extraction of feature tedious.

Solution:

To deal with the above problems CNN (Convolution Neural Network) is used and the steps are narrated below with the architecture

**1) Input layer**

The images are fed into the neural network through this layer.

2)Pre Processing and feature extraction

These procedures are carried out by following layers

2.1 convolution layer

The image pixels are convolved using a filter. This convolved image is fed into the activation function to generate a rectified feature map. The image undergoes multiple convolution and feature map generation to locate filters. This strategy is used here as the images of CIFAR dataset are of low resolution and hence manual feature extraction is merely possible. Most feature extraction require edge detection which is not possible in this dataset. The filter in the convolution layer filters out the feature throughout image.

2.2 batch normalisation

Normalisation of vectors between hidden layers are carried over here. This is done for stabilisation and speed of the network

2.3 Pooling layer

This helps is dimensionality reduction and there by helps in reducing the number of parameters to learn.

3. flatten layer

This results in converting 2d array to single long vector which is acceptable in fully connected layer where classification happens

4.dropout layer

Some random neurons are dropped during the process to avoid overfitting.

5. fully connected layer

This is the place where all neurons are connected and classification process takes place.

The normalisation, pooling and dropout helps in reduction of feature and hence CNN can handle large amount of data

Implementation

CIFAR-10 is readily available tensorflow library and i have used it for the work. I have used 3 sets of covolution, batch normalisation and pooling layer with filter size of 3 for convolution layer and filter size of 2 for pooling layer. I have used two fully connected layer one to connect all the previous layers and other is the output layer where prediction is done. I have tested on variety of random images and included two outputs with false prediction and true prediction respectively.

image number 4

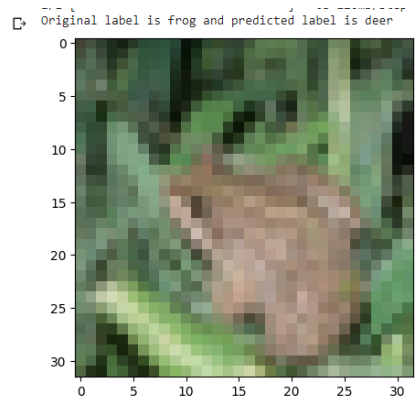


image number 10

