Object recognition using CNN

Developing a model which is able to identify objects from images.Here we are using CIFAR10 dataset. Keras has facility to load standard dataset such as CIFAR-10,CIFAR-100,IMDB,MNIST,REUTERS.

CIFAR-10 dataset consists of 60,000 (32 x 32) images, labelled over 10 classes.
Training set - 50,000
Testing set - 10,000

Format of CIFAR-10 dataset:-
  First byte is label of image(0-9)
  Next 1024 bytes of red, 1024 -green, 1024 - blue pixel value...which are stored in row major format.

CIFAR-100 dataset consists of 60,000(32 x 32) images, labelled over 100 classes (20 super classes)
Training set - 50,000
Testing set - 10,000

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# load_data() function is used to load data from dataset.
 (x_train,y_train),(x_test,y_test) = cifar10.load_data()

# Displaying first 9 images from training set.
  toimage() - it takes numpy array as input and returns PIL image
  imshow() - it displays image on axes

# convert the values of dataset in range from 0 to 1 by dividing it by 255
# one hot encoding of output vector
# convolutional layer :- 2 convolutional layer followed by max pooling and flatten layer to the fully connected layer

# Activation functions used:
  ReLU :- f(x) = max(x,0)
  Its a non linear activation function mostly used in hidden layers.
  If input value is less than  zero it outputs 0 , raw values otherwise.

  Softmax :- It squashes output of each unit between 0 and 1.
   It is same as sigmoid function, but sigmoid function can handle only two classes while softmax can handle more. It divides each output such that total sum of output is equal to 1. Its equivalent to categorical probability distribution.
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Therefore we use ReLU for hidden as it can train large network very fast and softmax for output layer.

#Dropout :-http://www.cs.toronto.edu/~rsalakhu/papers/srivastava14a.pdf

#By using single convolutional layer we can get accuracy upto 70% and by increasing convolutional layer accuracy rises up to 80%