Introduction to Perceptron and CNN

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- **Can you get the accuracy better than in our hand single-neuron model? Try different configurations and explain the changes you have made.**

Yes, In the case of CNN we observer better accuracy when compared to that of a single neuron model due to increased representation of input parameters. Different configurations have been implemented in terms of varying hyperparameters such as number of filters in Conv2D layer, varying number of Conv2D & maxpool layers, varying the batch size and number of epochs, varying validation split and activation functions.

- **Compute the train and test loss and accuracy after the model has been trained. What model parameters does the fit function retain?**

The train accuracy has a variation around 0.9, loss around 0.3, test accuracy around 0.85 & loss around 0.42 for the given model.

The fit function considers training dataset, batch size, epochs, validation split in the model while the remaining parameters such as shuffle, validation batch size etc., are considered as default. The model is compiled with binary cross-entropy loss and an optimizer 'Adam' is used which usually contains the numerical values such as learning rate and other similar values required for the network.

- **How many parameters does the network have, explain where the number comes from?**

The network has 2 convolutional layers, 2 maxpool layers and a sigmoid layer. It is calculated by the following formula:

$$param\ number = output\ channel\ number * (input\ channel\ number * kernel\ height * kernel\ width + 1$$

- **What is the receptive field of the network?**

The receptive field gives the number of features in the input layer required for one feature in the output layer. This helps in getting a direct understanding of the influence of the input data in the output.