**Assignment\_2**

1.Explain convolutional neural network, and how does it work?

**Ans: CNN a class of neural networks that specializes in processing data that has a grid-like topology, such as an image. A digital image is a binary representation of visual data.**

**CNN is a type of feed-forward artificial network where the connectivity pattern between its neurons is inspired by the organization of the animal visual cortex. The visual cortex has a small region of cells that are sensitive to specific regions of the visual field.**

2. How does refactoring parts of your neural network definition favor you?

**Ans: Refactoring is the process of changing the internal structure of software to improve its quality without modifying its external behavior.**

3. What does it mean to flatten? Is it necessary to include it in the MNIST CNN? What is the reason for this?

**Ans: The Flattening Step in Convolutional Neural Networks  
The flattening step is a refreshingly simple step involved in building a convolutional neural network. It involves taking the pooled feature map that is generated in the pooling step and transforming it into a one-dimensional vector.**

**It needs to be in the form of a 1-dimensional linear vector. Rectangular or cubic shapes can't be direct inputs. And this is why we need flattening and fully-connected layers. Flattening is converting the data into a 1-dimensional array for inputting it to the next layer**

4. What exactly does NCHW stand for?

**Ans: NCHW stands for: batch N, channels C, depth D, height H, width W. It is a way to store multidimensional arrays / data frames / matrix into memory, which can be considered as a 1-D array**

5. Why are there 7\*7\*(1168-16) multiplications in the MNIST CNN's third layer?

6.Explain definition of receptive field?

**Ans: The receptive field is defined by the filter size of a layer within a convolution neural network. The receptive field is also an indication of the extent of the scope of input data a neuron or unit within a layer can be exposed to (see image below).**

7. What is the scale of an activation's receptive field after two stride-2 convolutions? What is the reason for this?

8. What is the tensor representation of a color image?

**Ans: Colour images are three band monochrome images in which, each band contains a different color and the actual information is stored in the digital image. The color images contain gray level information in each spectral band. The images are represented as red, green and blue (RGB images).**

9. How does a color input interact with a convolution?

**Ans:  In the image, each channel is individually convoluted and then combined to form a pixel. This is how blurring operation works. In convolution, kernels weights for each channel are different and we add the 3 channels together to produce a single channels output.**