**Day 52**

**What to do?**

Learn about Inception network.

**Inception network:**

An inception network answers the following questions.

1. What filter size to use in convnet layer?
2. Do you want a convnet layer or pool layer?

Inception network says, “USE THEM ALL”.

Consider an image of size 28 x 28 x 192. You are unable to decide whether to use 3 x 3 convnet with 128 filters or 5 x 5 convnet with 32 filters or 1 x 1 convnet with 64 filters or max pool with 32 filters. Inception network uses them all and produces an output of 28 x 28 x 256 (with same padding). The 3rd dimension 256, is the sum of all the filters.

However, when you are implementing all of them at once, computational cost increases, especially when you have large number of filters. To avoid this, an extra layer (bottle – neck layer) is added. This layer consists of 1 x 1 convnet with few numbers of layers, to reduce the dimension of the input layer. Say you add a 1 x 1 convnet of 16 filters before the 5 x 5 convnet. Then the output would be 28 x 28 x 16, which would be passed to the 5 x 5 x 32. Instead of a network going from 192 to 32, the network will reduce the computation from 192 -> 32 to 192 -> 16 -> 32.