

though DCF is derived via DFT, it was used to overcome the drawbacks of the DFT.

Here we use cosine function and DCF is much similar to DFT but we use only the real numbers.

So according to me the transform equation should be:-

$$X(k) = \sum_{n=0}^{N-1} x(n) \cos\left(\frac{2\pi kn}{N}\right)$$

the advantage

the advantage of DCF is that it is a real transform which results in a single real number whereas DFT results in a complex number which requires double the memory for storage. So we get an advantage in storage.