Practical No. 6

Fourier Related Transforms

The Fourier real function transformation is highly complex. Three transforms associated to Fourier: the discrete Hartley transform, discrete cosine transform, and discrete sine transform.All three transforms handle unnecessary numbers' computational complexity and can be carried out via fast FFT-like algorithms.

Discrete Cosine Transform

The most frequently found form discrete cosine transform (DCT) is achieved by replacing theinverse transformations kernel. There are 8 standard DCT variations and various symmetry conditions are assumed. For example, even about a sample or about a point between two samples could be assumed to be the entry

$$s(x,u) = \alpha(u)\cos\left(\frac{(2x+1)u\pi}{2N}\right)$$

Where

$$\alpha(u) = \begin{cases} \sqrt{\frac{1}{N}} & \text{for } u = 0 \\ \sqrt{\frac{2}{N}} & \text{for } u = 1, 2, ..., N-1 \end{cases}$$

Aim: Program to compute Discrete Cosine

Transforms.Code:

```
clear all;
a=imread("D:\MSc IT Image
Processing\image\measure_gray.jpg");dctImg=imdct(a);
subplot(1,2,1);
imshow(a);
title('Original
Image');
subplot(1,2,2);
imshow(dctImg,
jetcolormap(256));
title(Discrete Cosine
Transform);
```

Output: