Write Up

1)

Author's Name – Shriprasad Bhamare

E-mail Id – sbhamar1@binghamton.edu

2) Method-

1)RGB to Intensity transformation –

hue = 0.5 * ((red - green) + (red - blue)) / sqrt(((red - green)*(red - green)) + ((red - blue)*(green - blue)));

sat = 1 - 3 * (min_value / (blue + green + red));

Intensity(I) = (R+G+B)/3

2)DCT transformation-

$$F(u.v) = a(u)a(v)\sum_{x=0}^{N-1}\sum_{y=0}^{N-1} f(x,y)\cos\left[\frac{(2x+1)u\pi}{2N}\right]\cos\left[\frac{(2y+1)v\pi}{2N}\right]$$

$$a(u) = \begin{cases} \sqrt{\frac{1}{N}} & for \quad u=0 \\ \sqrt{\frac{2}{N}} & for \quad other \end{cases} \qquad a(v) = \begin{cases} \sqrt{\frac{1}{N}} & for \quad v=0 \\ \sqrt{\frac{2}{N}} & for \quad other \end{cases}$$

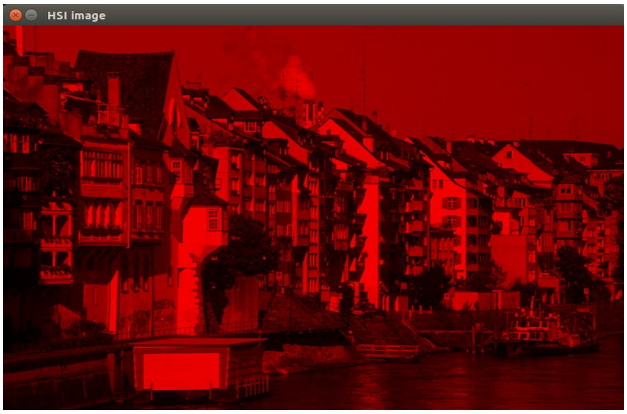
3) IDCT Transformation-

$$f(x,y) = \sum_{u=0}^{N-1}\sum_{v=0}^{N-1} a(u)a(v)F(u,v)\cos\left[\frac{(2x+1)u\pi}{2N}\right]\cos\left[\frac{(2y+1)v\pi}{2N}\right]$$

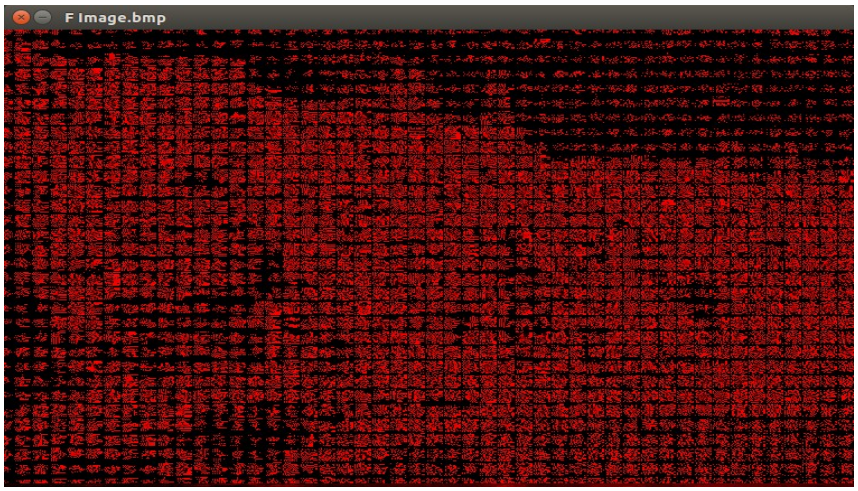
$$a(u) = \begin{cases} \sqrt{\frac{1}{N}} & for \quad u=0 \\ \sqrt{\frac{2}{N}} & for \quad other \end{cases} \qquad a(v) = \begin{cases} \sqrt{\frac{1}{N}} & for \quad v=0 \\ \sqrt{\frac{2}{N}} & for \quad other \end{cases}$$

3) Results –

HSI Image-

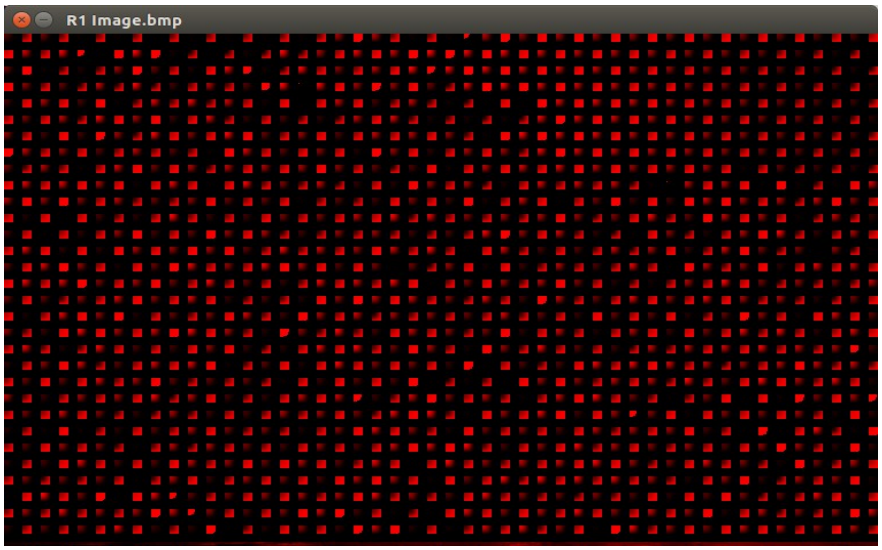


DCT Image-

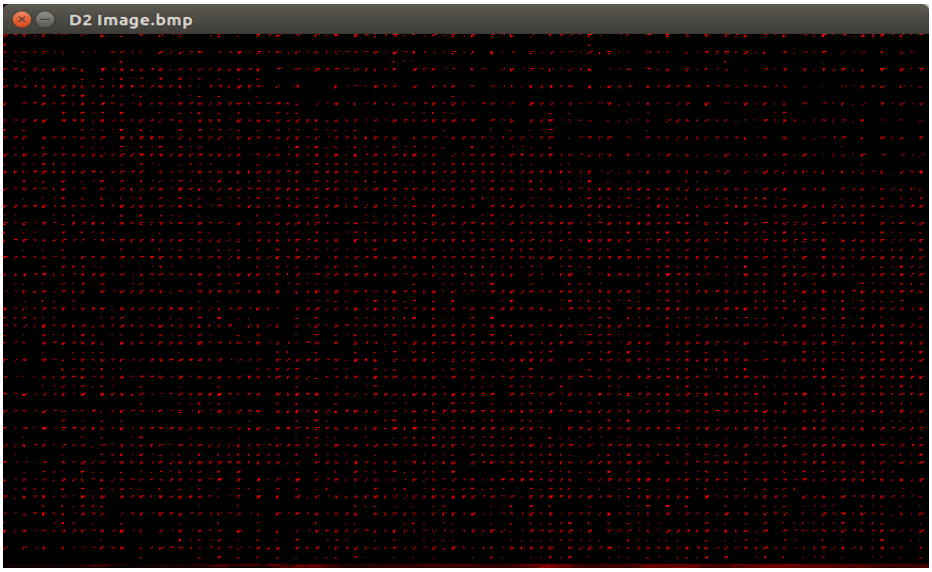


DCT removing DC component-

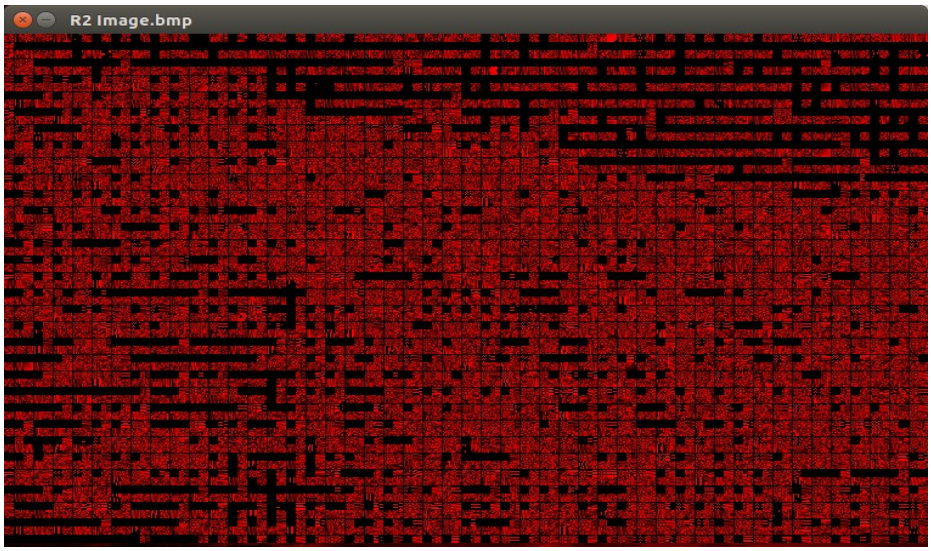
IDCT on D1 => R1-



D2 image by keeping low frequency components-



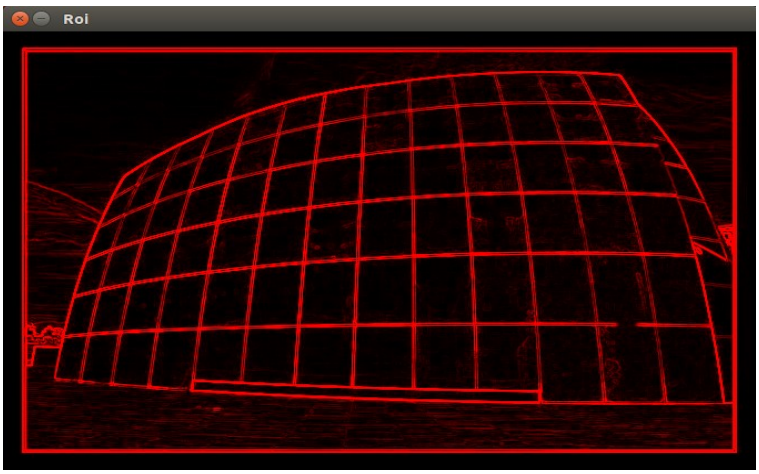
IDCT on D2 =>R2



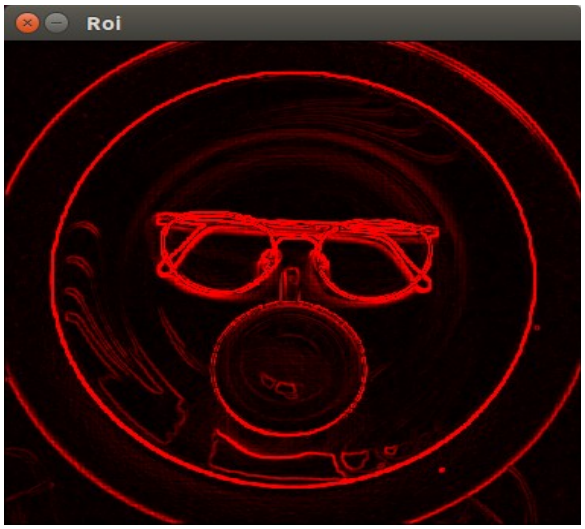
ROI

In ROI, I have used sobel operator on RGB image

Building1.bmp



Disk.bmp



6) References

Digital Image Processing (3rd Edition) By Gonzalez