

**THE UNIVERSITY OF TEXAS AT ARLINGTON, TEXAS  
DEPARTMENT OF ELECTRICAL ENGINEERING**

**EE 5356**

**DIGITAL IMAGE PROCESSING**

**PROJECT # 3**

**by**

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**Presented to**

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**Color Transformation**

*MATLAB Code:*

%%Open the RAW image

raw\_img = fopen('girl256color.raw','r');

%%Read the RAW image

img = fread(raw\_img);

%%vector for the Red component

R\_img = reshape(img(1:3:length(img)),256,256)';

%%vector for the Green component

G\_img = reshape(img(2:3:length(img)),256,256)';

%%vector for the Blue component

B\_img = reshape(img(3:3:length(img)),256,256)';

%%Reconstruct image from RGB components obtained above

recon\_img(:,:,1) = R\_img;

recon\_img(:,:,2) = G\_img;

recon\_img(:,:,3) = B\_img;

%%Display original image

figure(1)

imshow(uint8(recon\_img));

title('RAW Image');

%%Display RGB components

figure(2)

subplot(3,3,1)

image(uint8(R\_img));

title('Red Component')

subplot(3,3,2)

image(uint8(G\_img));

title('Green Component')

subplot(3,3,3)

image(uint8(B\_img));

title('Blue Component');

%%Color Transformation Phase

%%We seperate out the YUV components using the following formulas

%%Y component

Y = 0.299 \* R\_img + 0.587 \* G\_img + 0.114 \* B\_img;

%%U component

U = (B\_img - Y) / 2.03;

%%V component

V = (R\_img - Y) / 1.14;

%%Display YUV components

subplot(3,3,4)

image(uint8(Y))

title('Y Component');

subplot(3,3,5)

image(uint8(U))

title('U Component');

subplot(3,3,6)

image(uint8(V))

title('V Component');

%%Inverse transformation Phase

%%We seperate out the Yd Cb Cr components using the following formula

%%Yd component

Y\_d = 219 \* Y + 16;

%%Cb component

C\_b = (112 \* (B\_img - Y) / 0.889) + 128;

%%Cr component

C\_r = (112 \* (R\_img - Y)/0.701) + 128;

%%Display the Yd Cb Cr components

subplot(3,3,7)

image(Y\_d)

title('Yd Component');

subplot(3,3,8)

image(C\_b)

title('Cb Component');

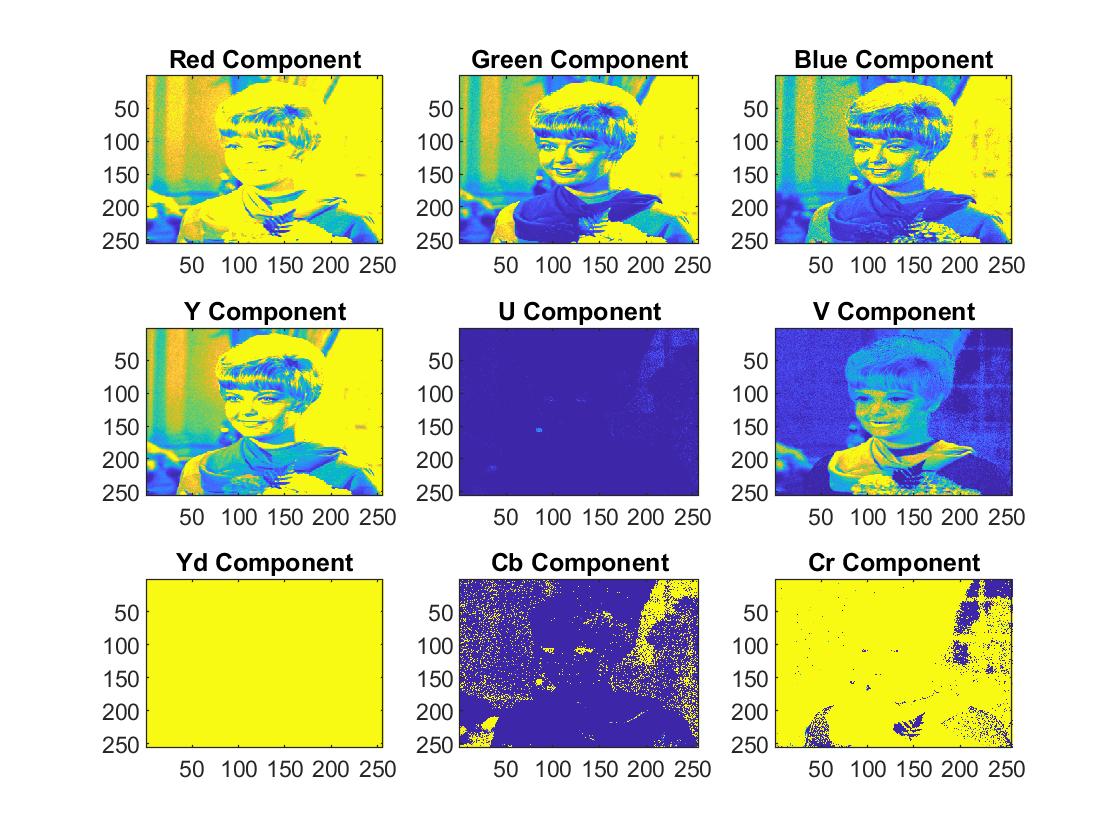
subplot(3,3,9)

image(C\_r)

title('Cr Component');

*RESULTS:*

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*MATLAB Code explanations (Conclusion):*

* Fopen is used to open the image and fread is used to store it in the form of vector.
* Reshape function is used to get the RBG components of the image.
* The corresponding transformations of YUV and YCbCr are obtained using the formulae.