

BLG 453E Homework 1 Report

Ece Naz Sefercioğlu
150130140 |

1-

a)

Underexposed, R channel mean: 36.6057490637

Underexposed, G channel mean: 50.8570318352

Underexposed, B channel mean: 67.2611329588

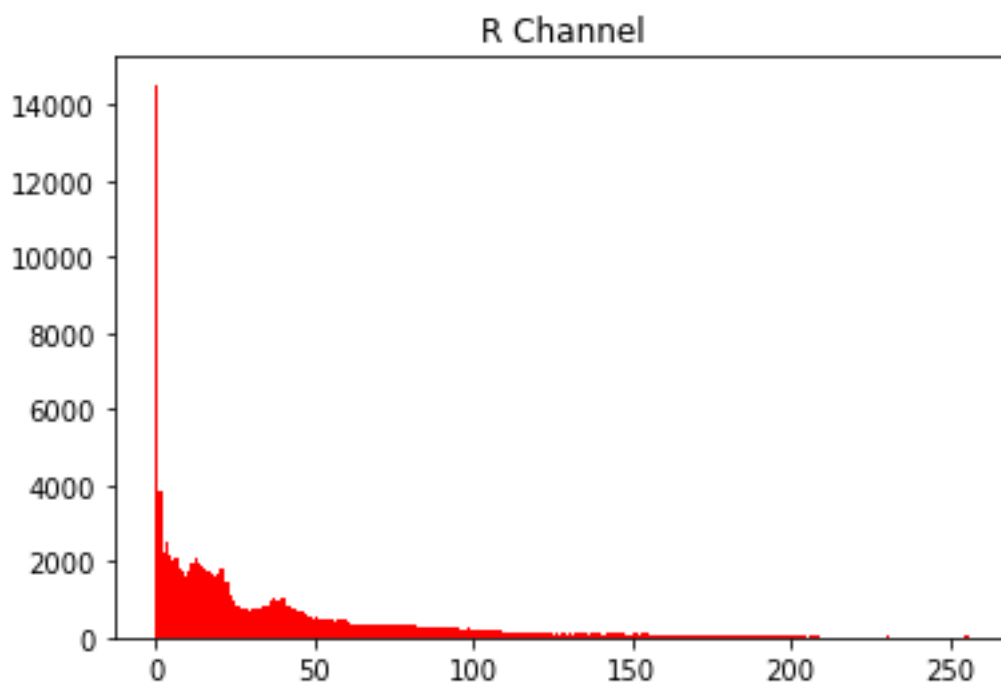
Underexposed, R channel standart derivation: 44.241283200571814

Underexposed, G channel standart derivation: 55.14339578105659

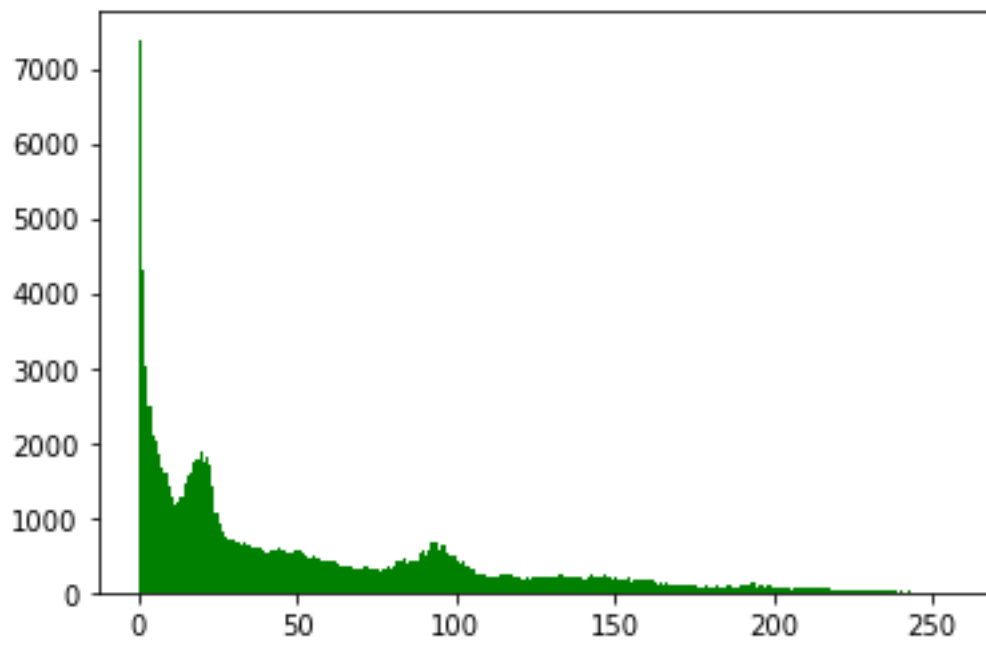
Underexposed, B channel standart derivation: 81.15060095976092

b)

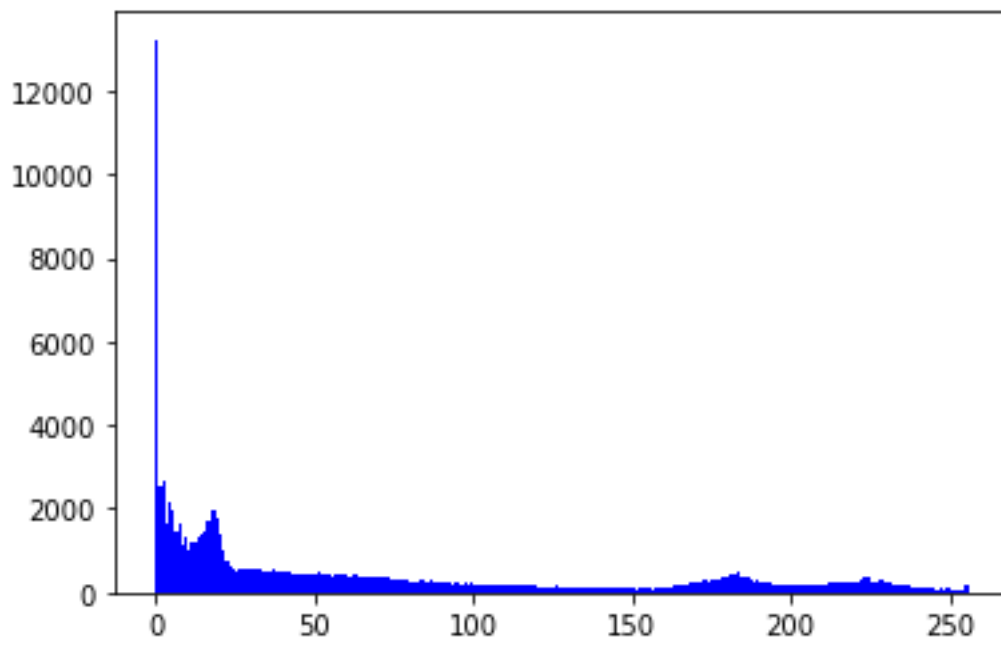
Histograms Of The Underexposed Image



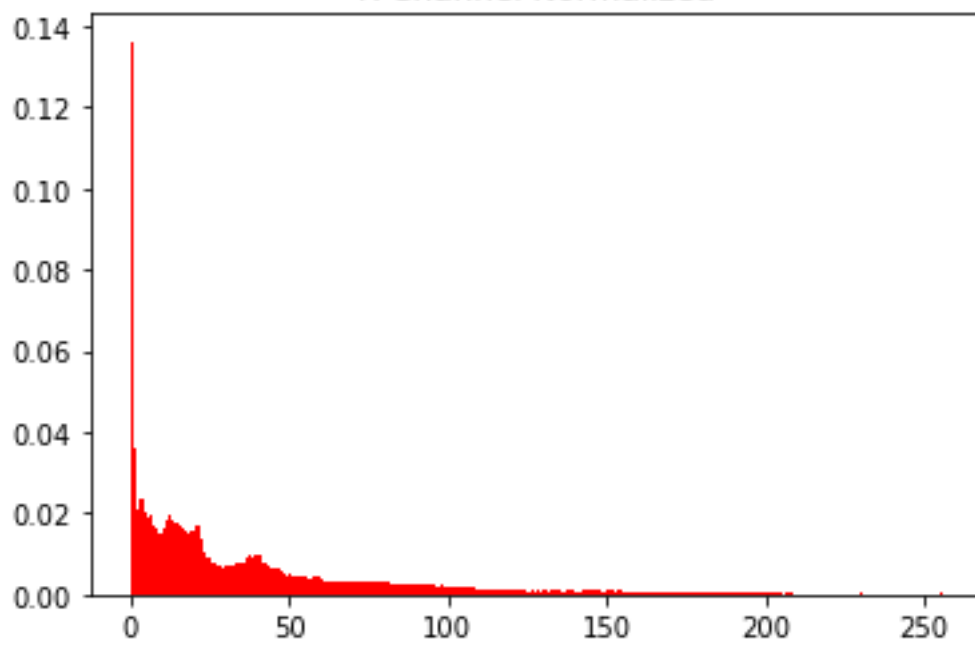
G Channel



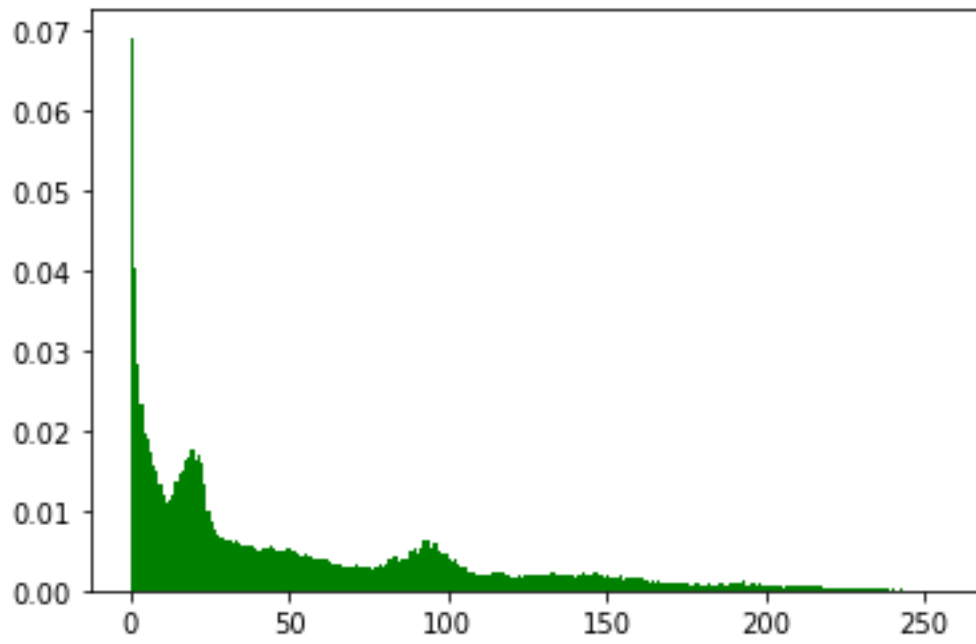
B Channel



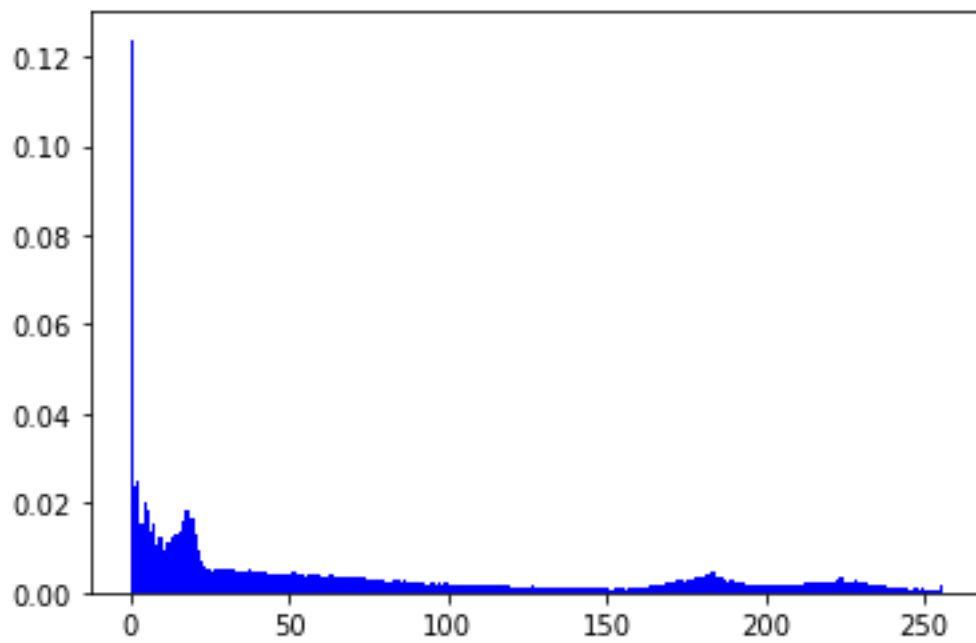
R Channel Normalized



G Channel Normalized

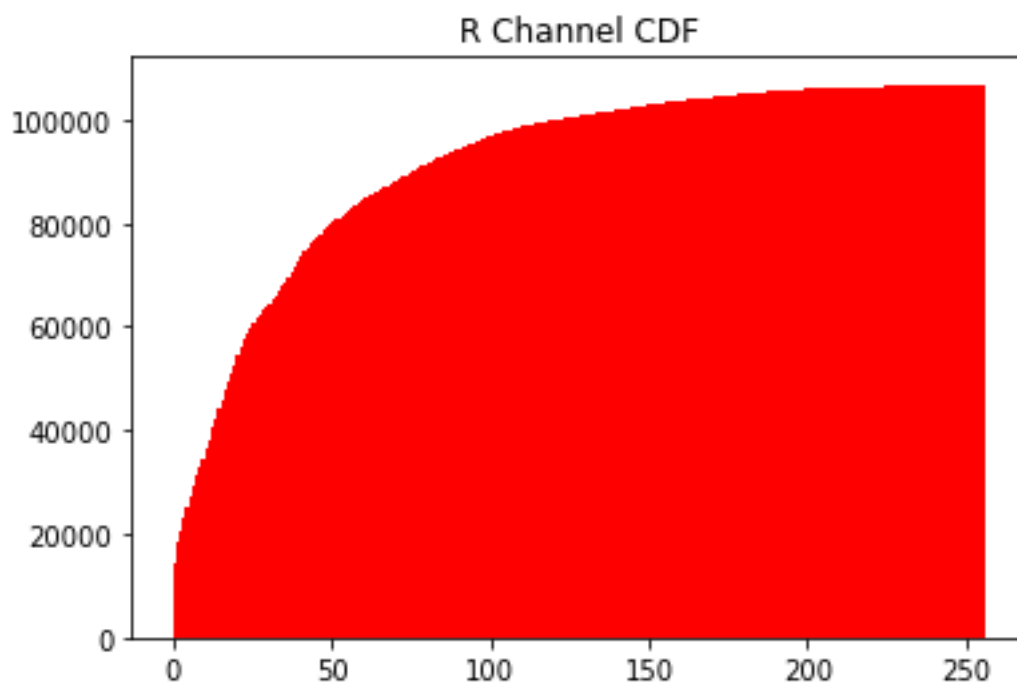


B Channel Normalized

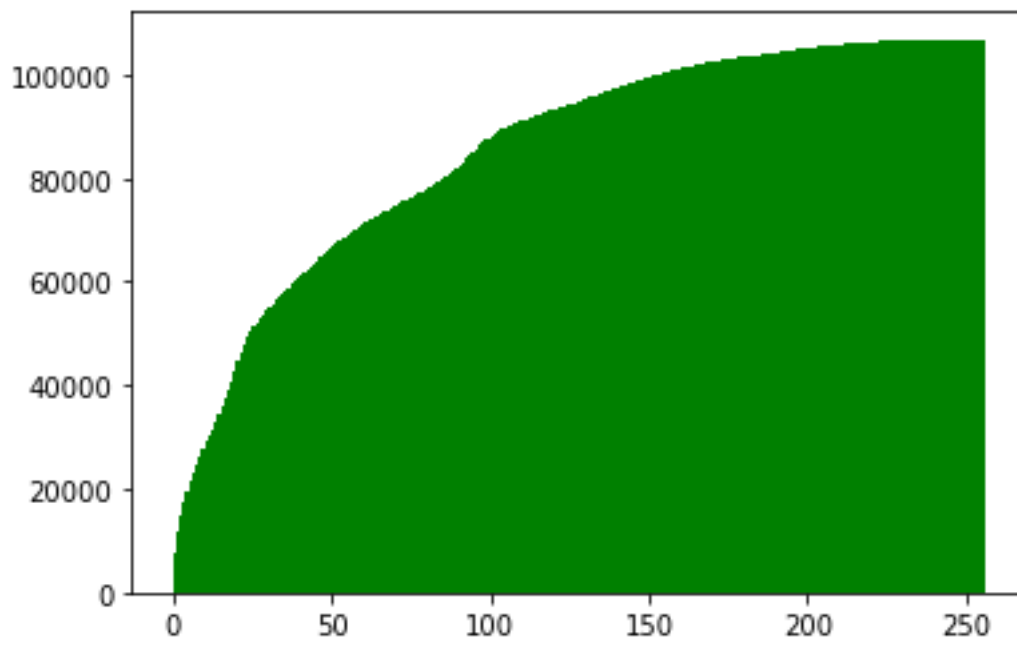


c)

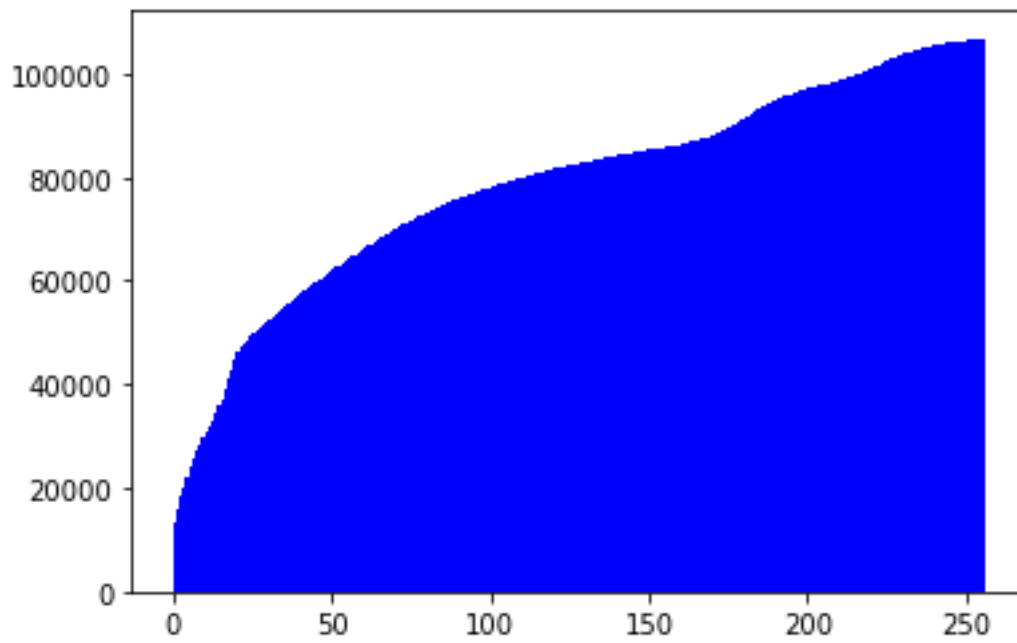
CDFs Of The Underexposed Image



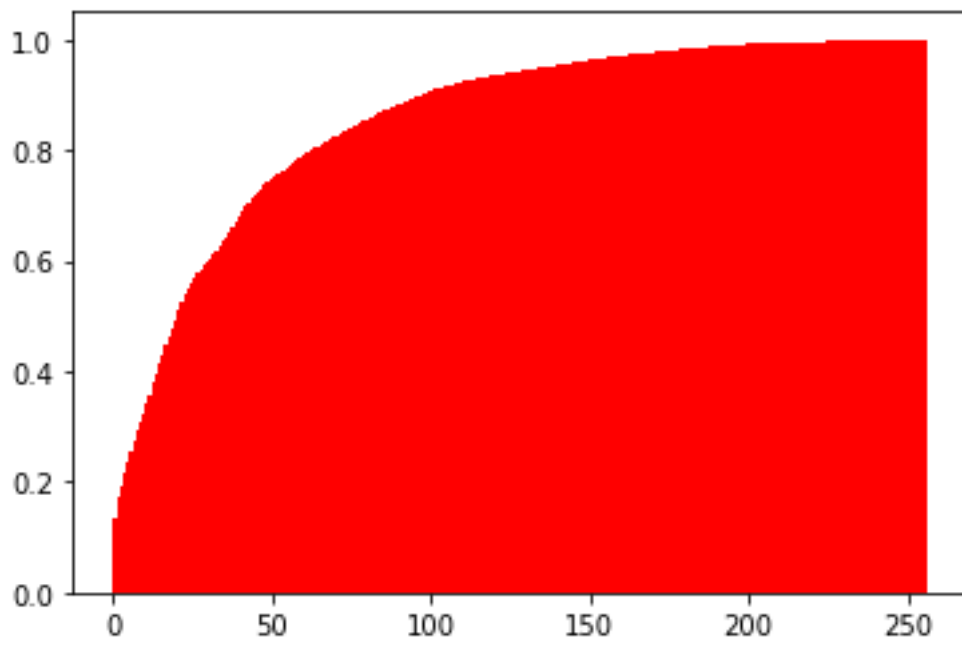
G Channel CDF



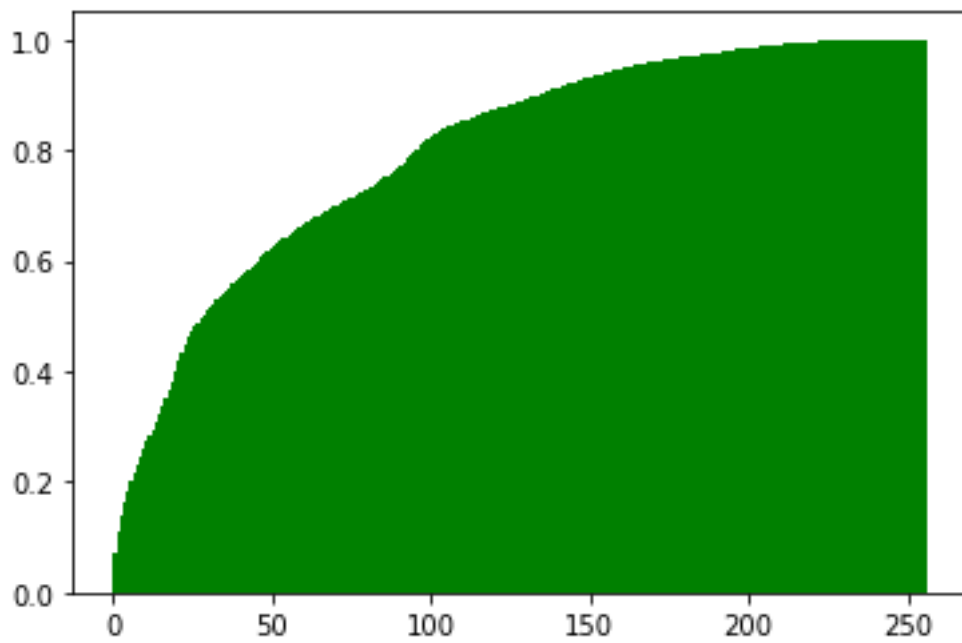
B Channel CDF

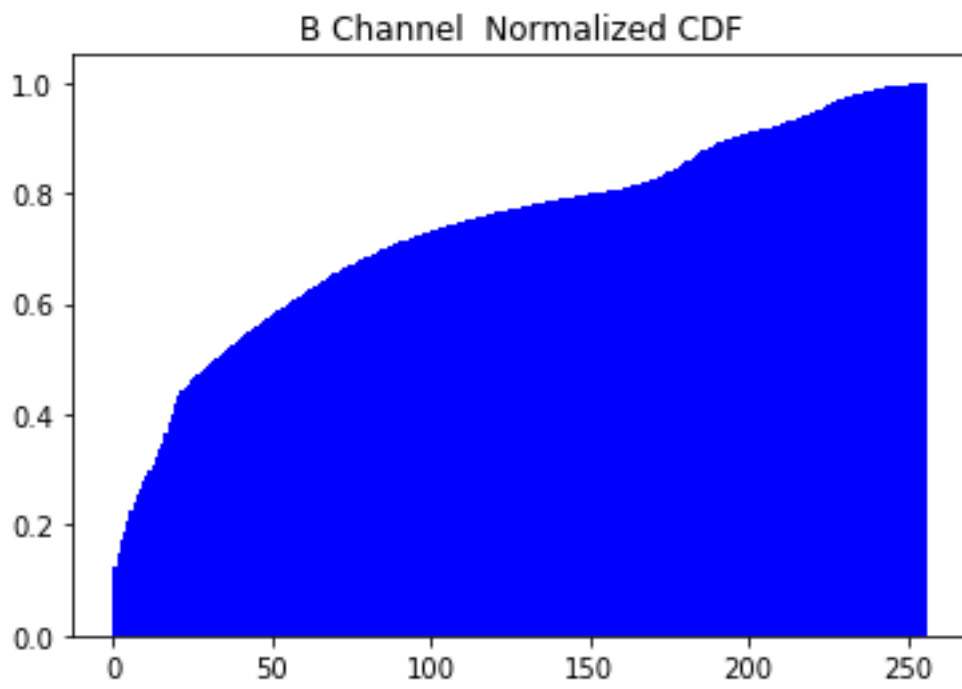


R Channel Normalized CDF



G Channel Normalized CDF

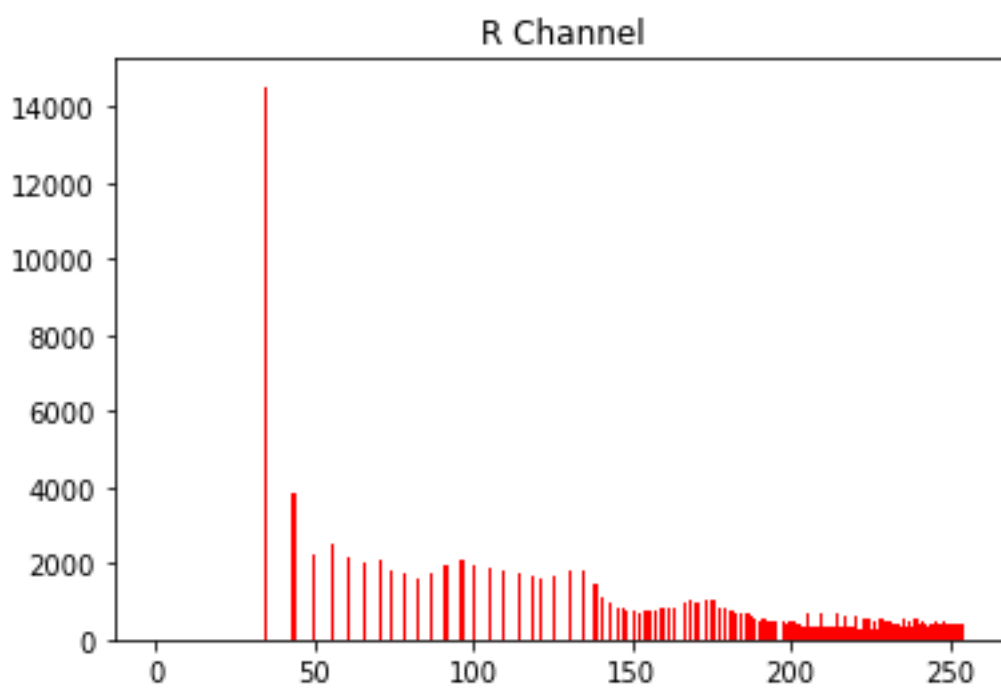




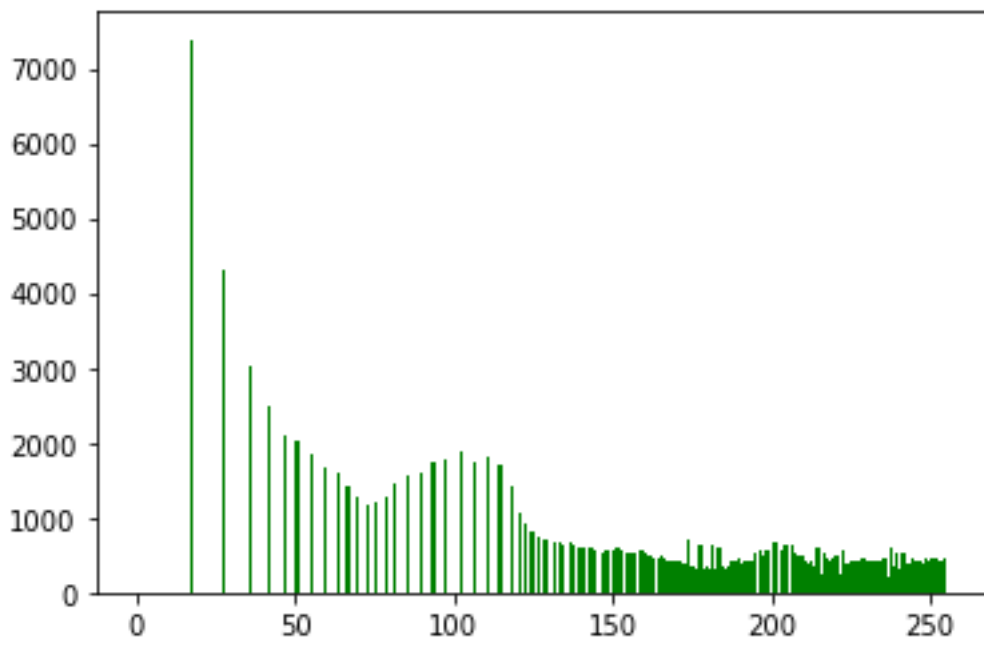
d)



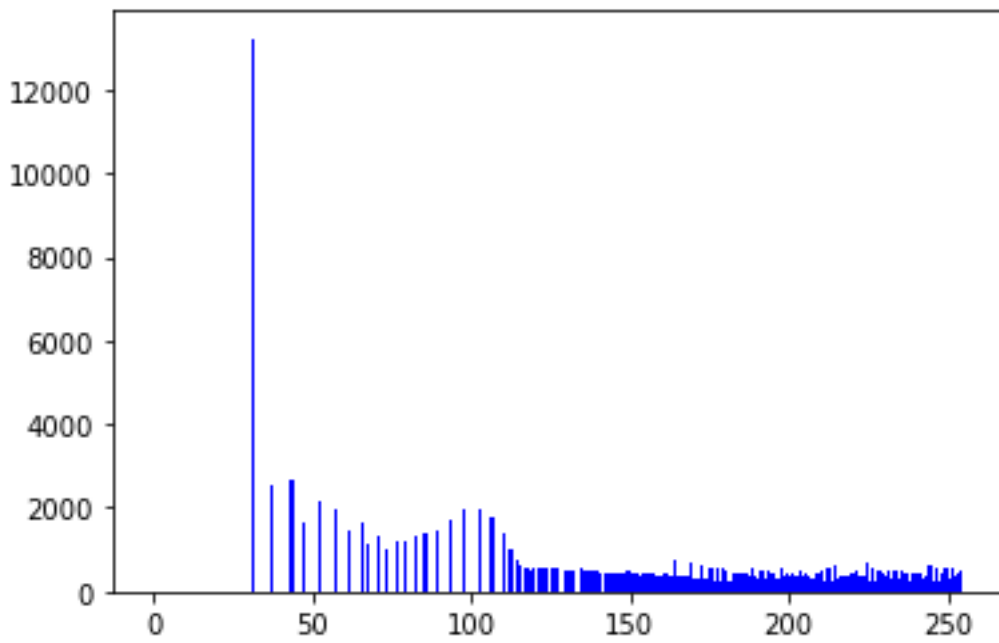
Histograms Of The Equalized Image



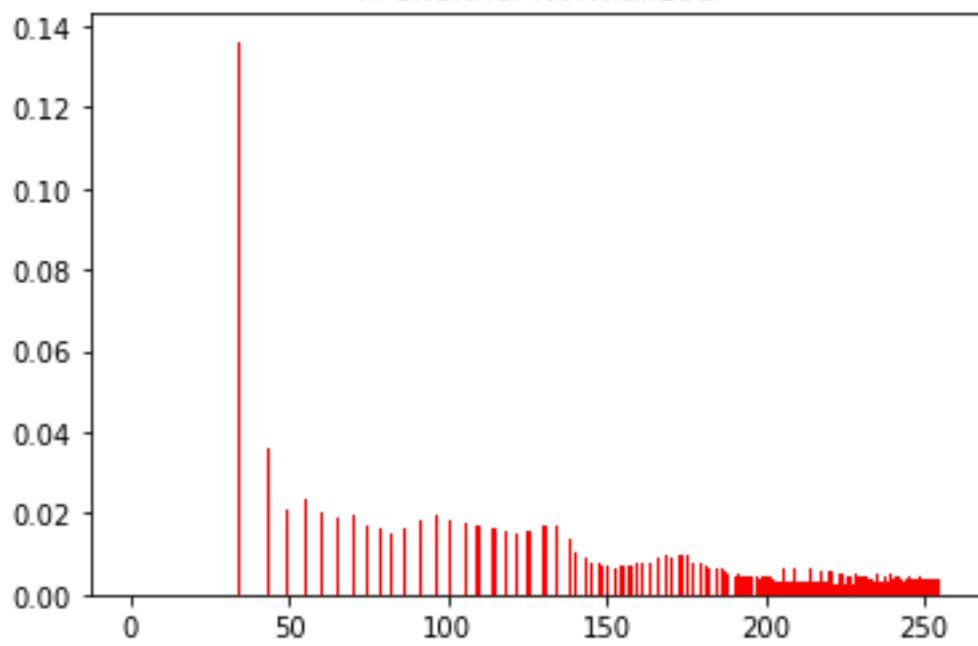
G Channel



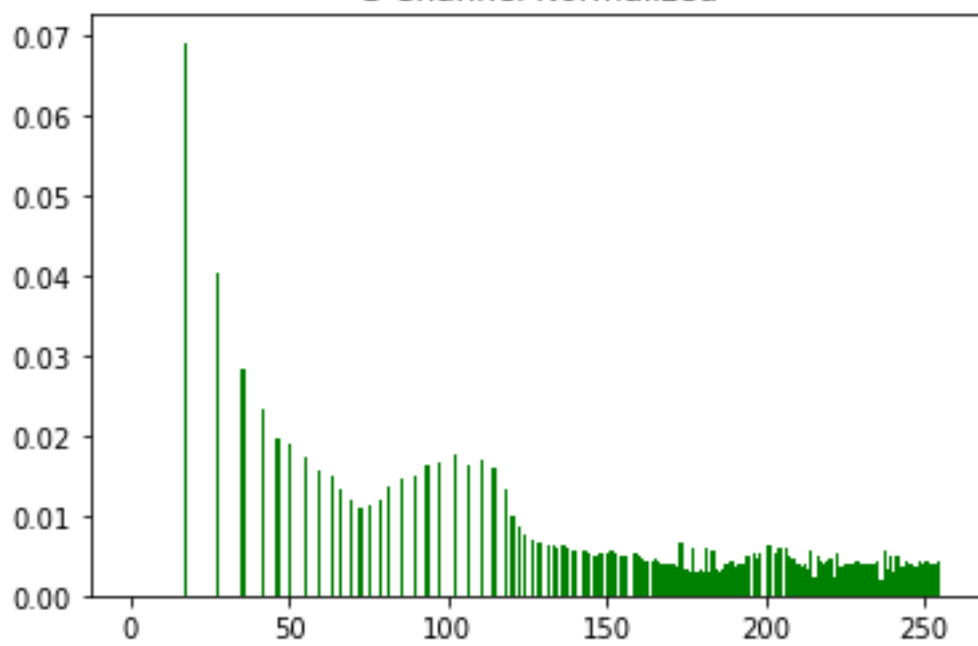
B Channel



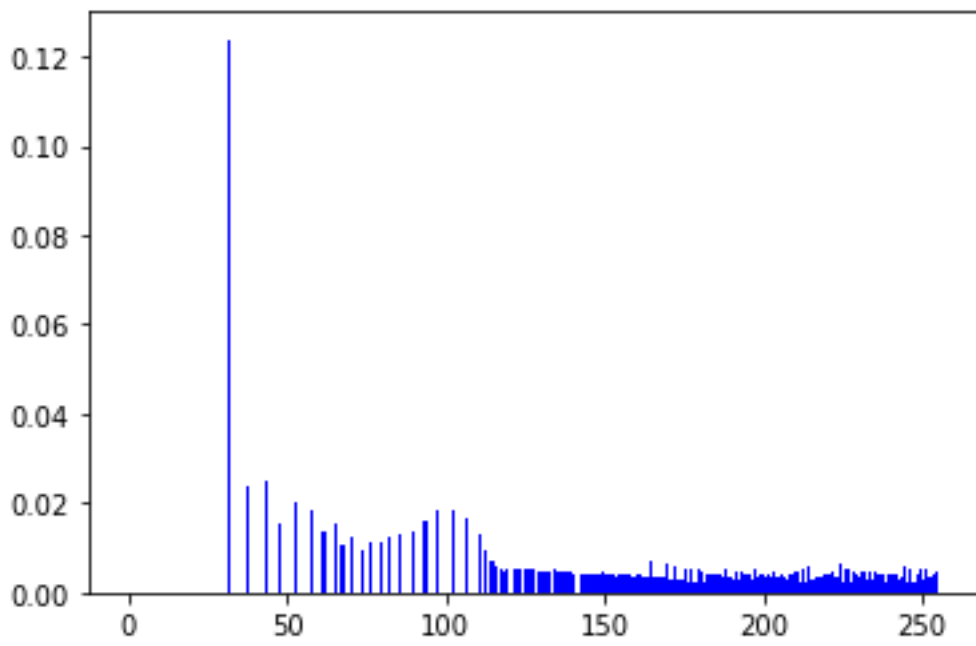
R Channel Normalized



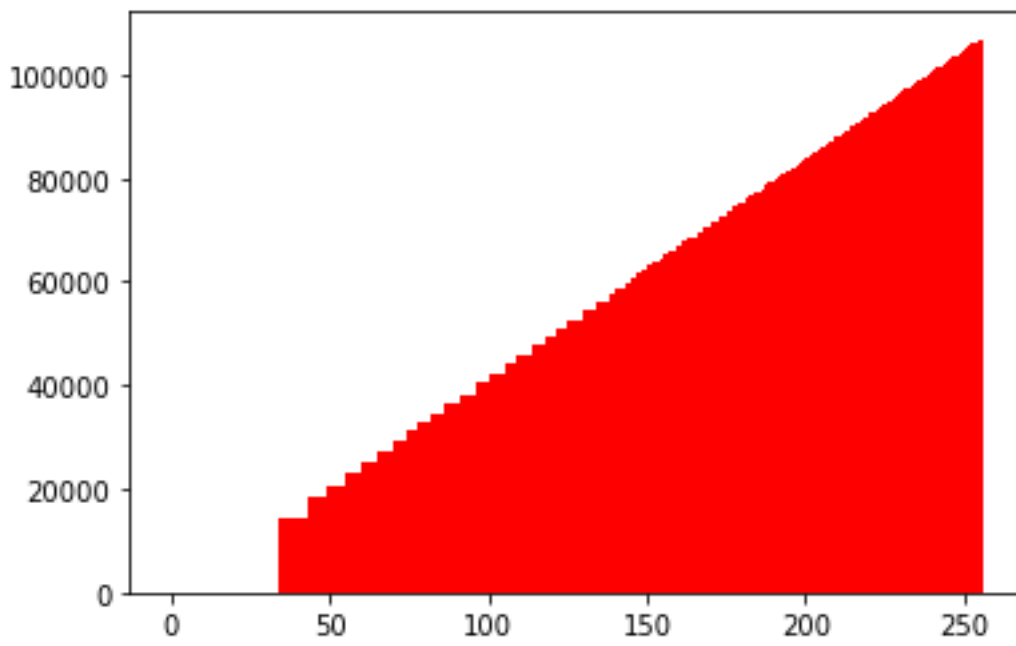
G Channel Normalized



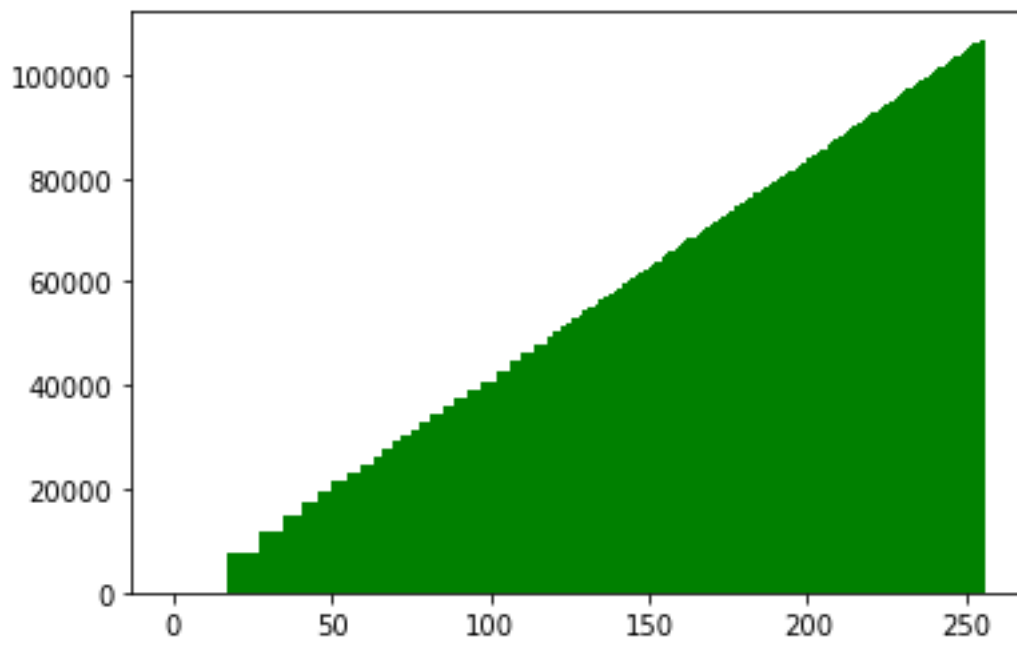
B Channel Normalized



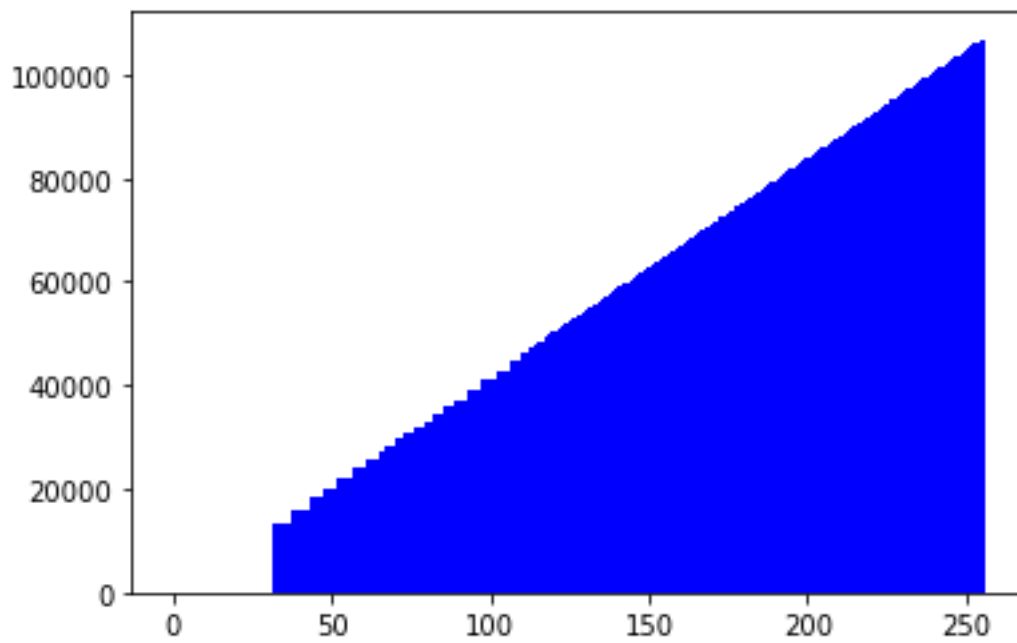
R Channel CDF



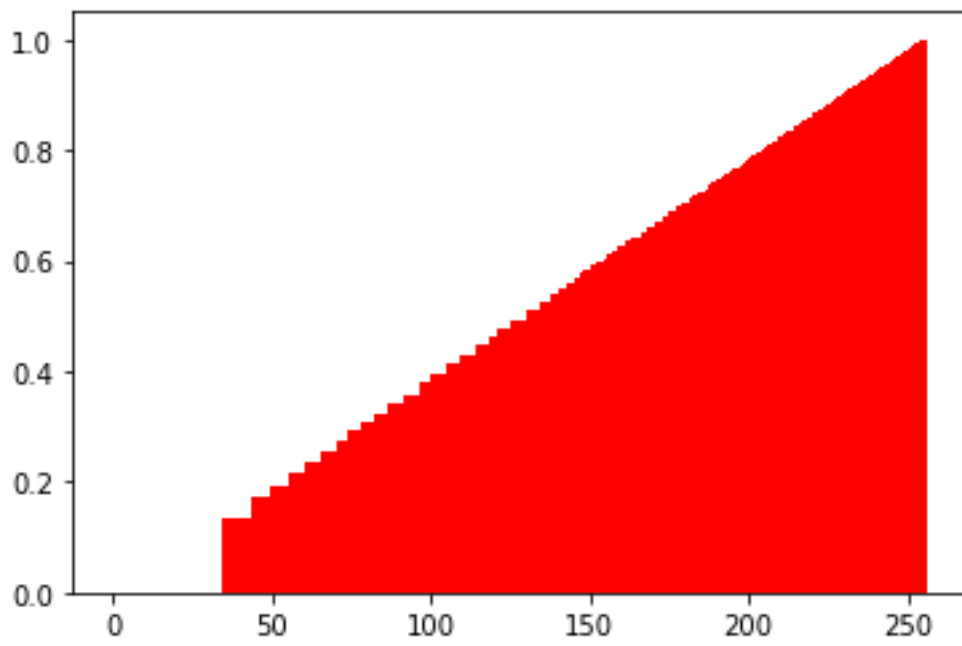
G Channel CDF



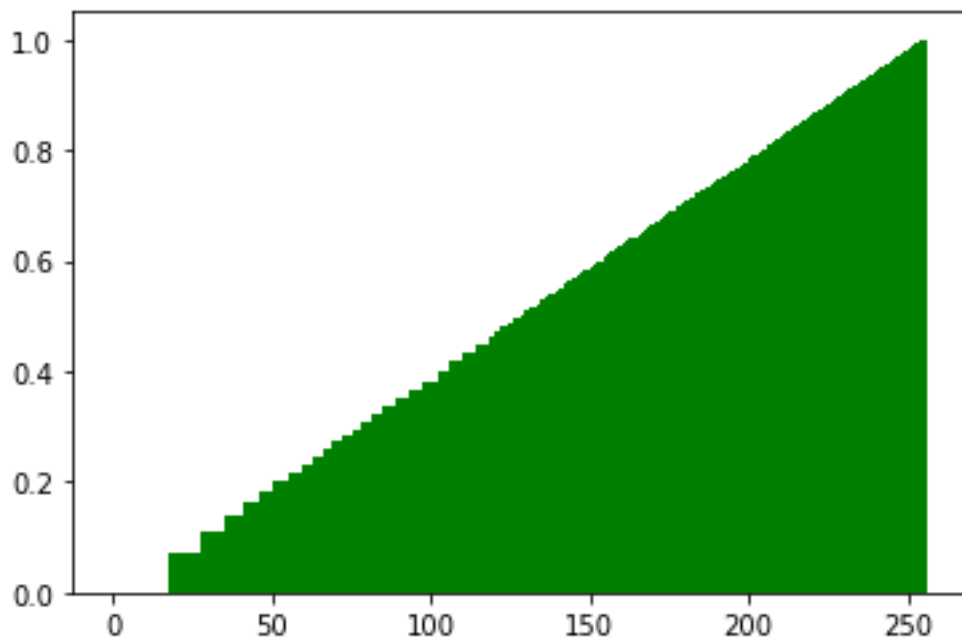
B Channel CDF

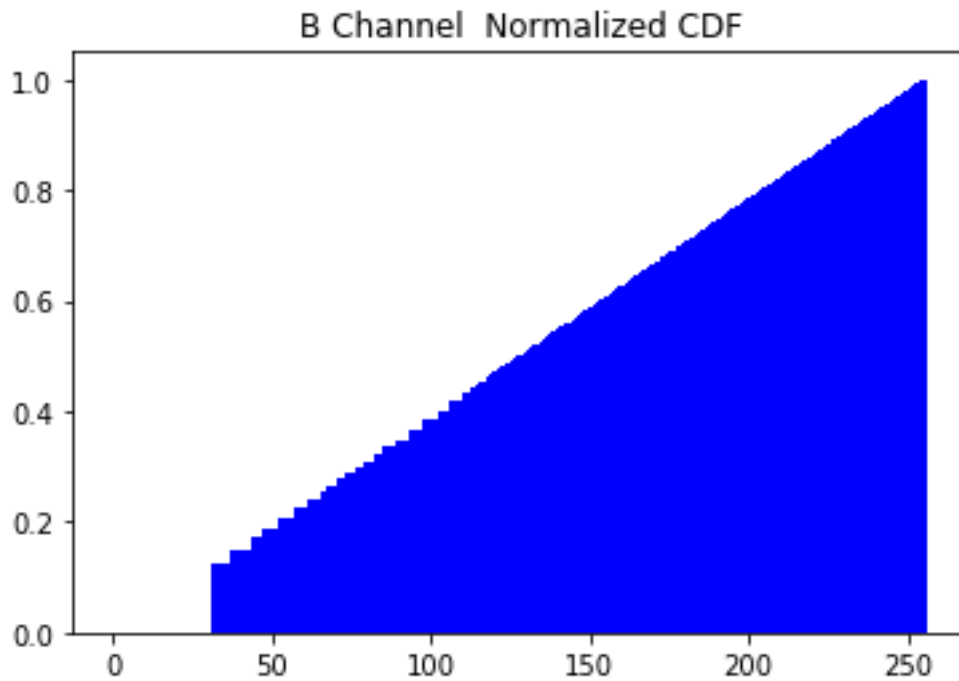


R Channel Normalized CDF



G Channel Normalized CDF





e) As it can be inspected by comparison of before and after equalization, mean values are increased as number of pixels with higher, brighter values. CDF histograms show linear increase which show we have a linear distribution among pixel values after equalization. Before equalization, CDF was faster on dark pixel values. Image got brighter and many detail can be spotted now. Pixel numbers on darker values decreased and left discrete areas in some distributions with high number of pixels with dark values, on the brighter side of distribution pixels show more continuous behaviour.

f) As equalization implemented, color values get closer to mean values of pixels, which represents gray colors. Occurance rate of gray levels would be increased.

Equalized, R channel mean: 130.593717228

Equalized, G channel mean: 128.879840824

Equalized, B channel mean: 129.821797753

Equalized, R channel standart derivation: 69.6745152190843

Equalized, G channel standart derivation: 71.89052332689212

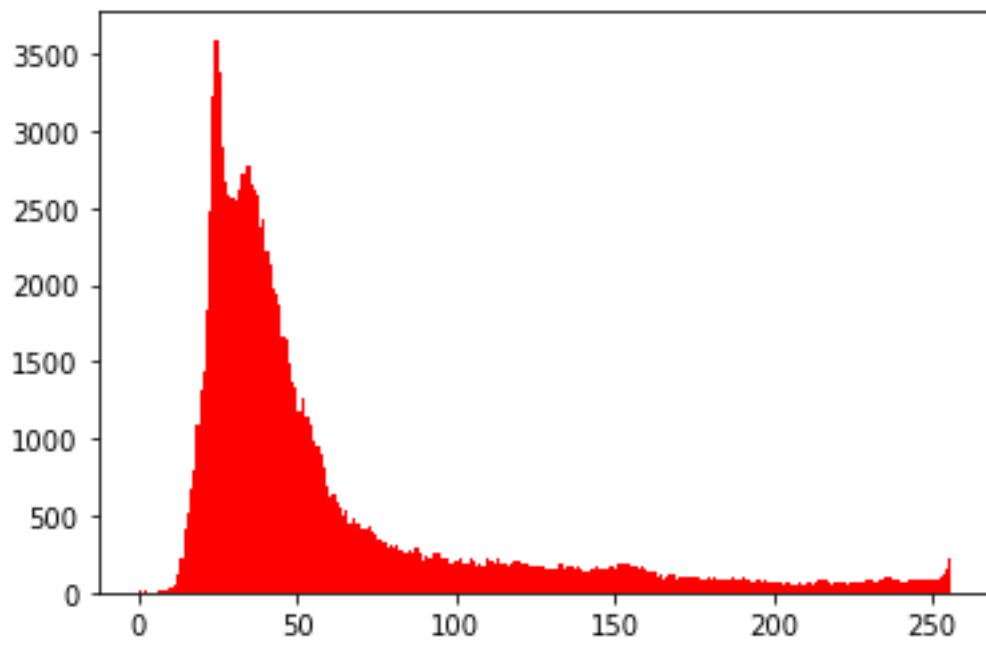
Equalized, B channel standart derivation: 70.30922152695184

2)

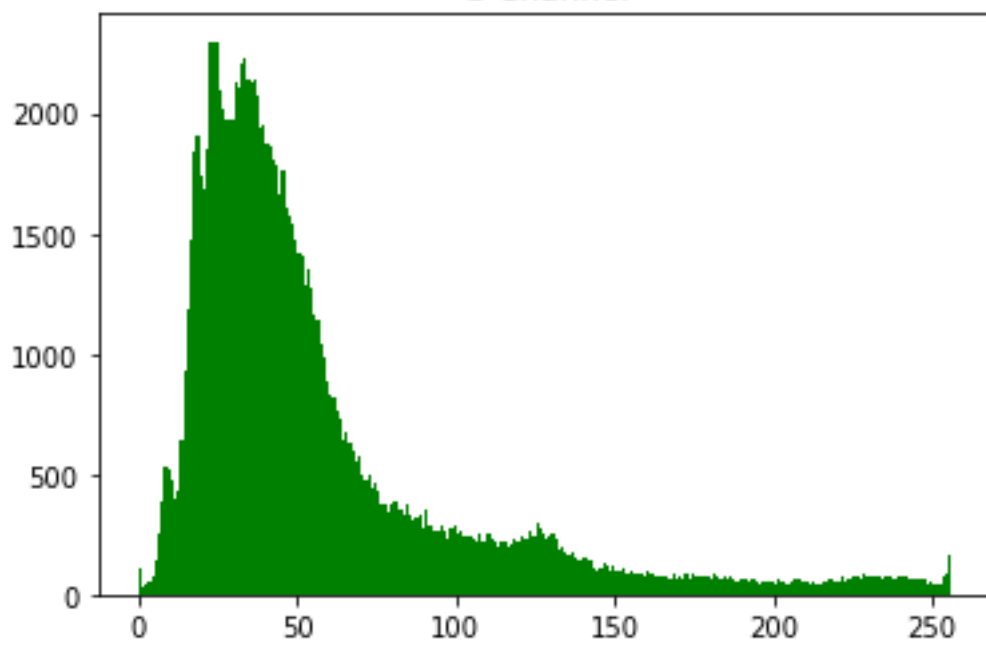
a)

Color 1 Graphics

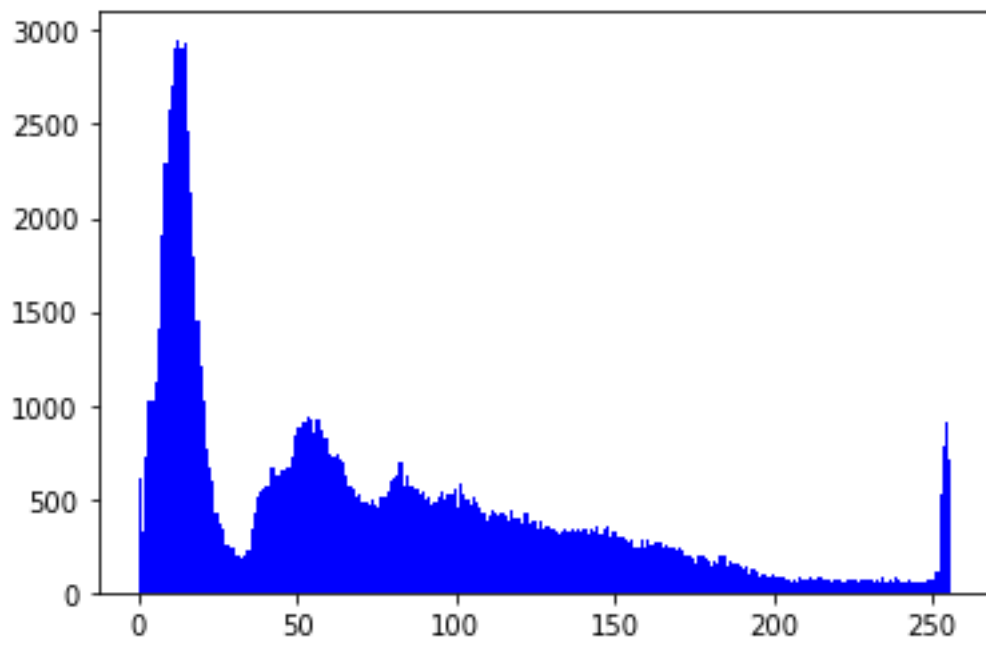
R Channel



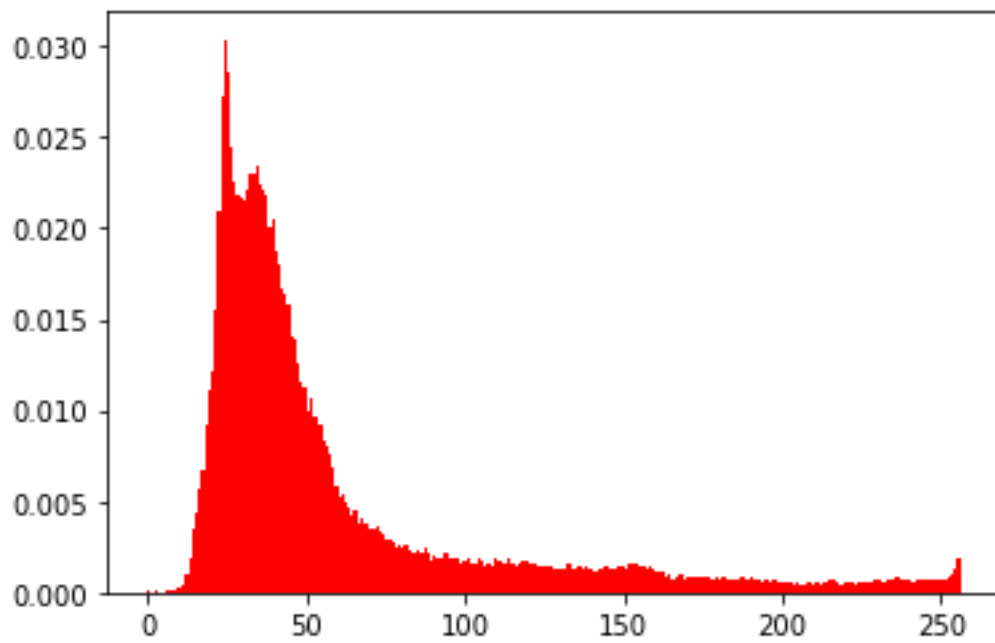
G Channel

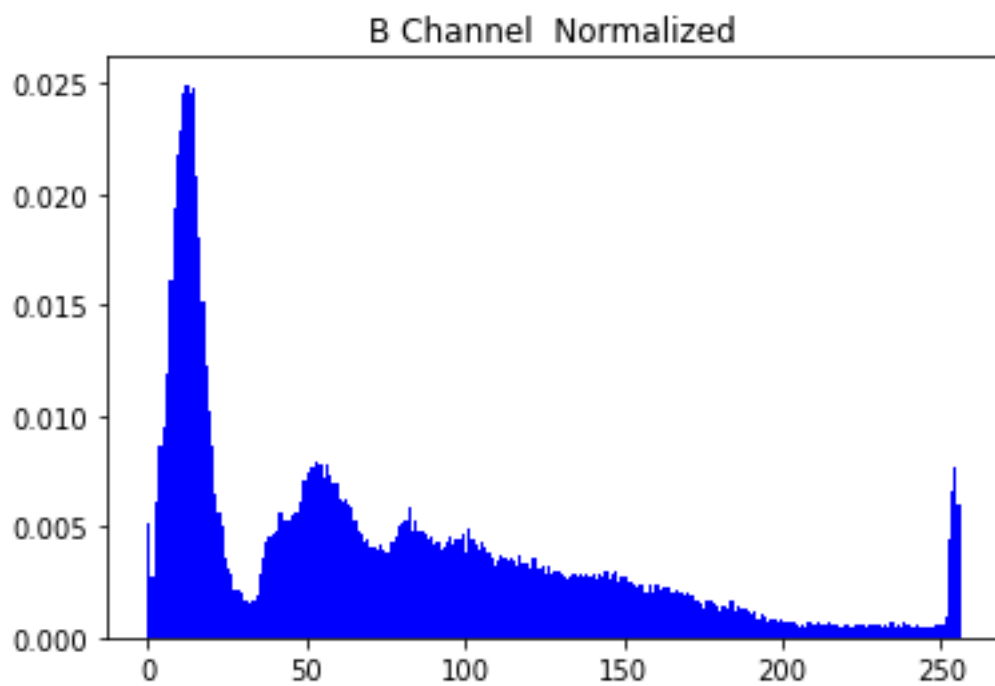
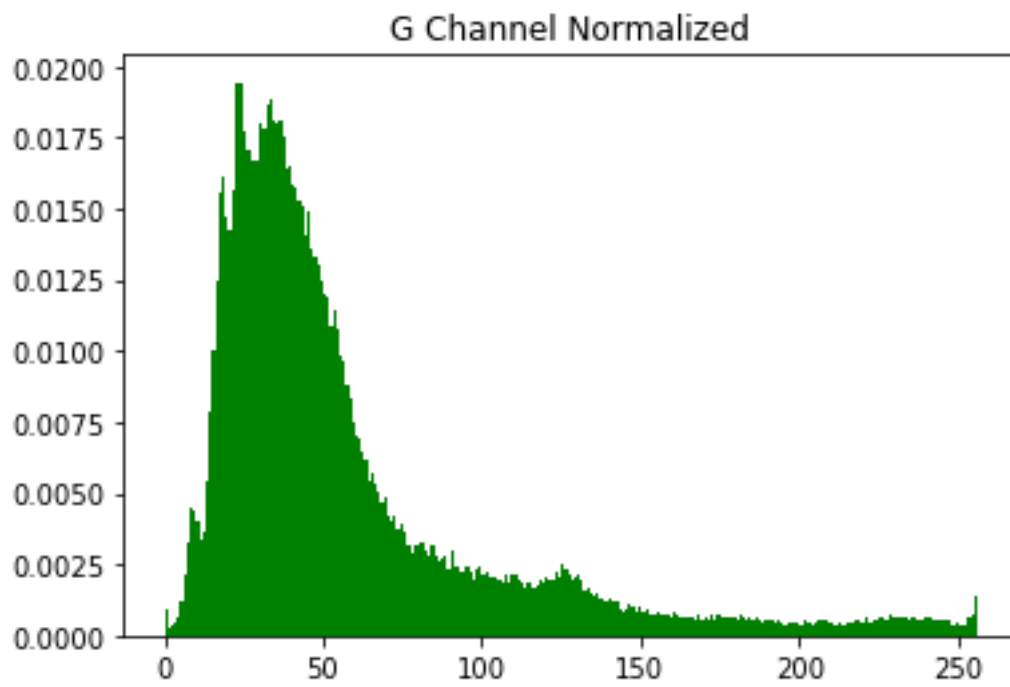


B Channel



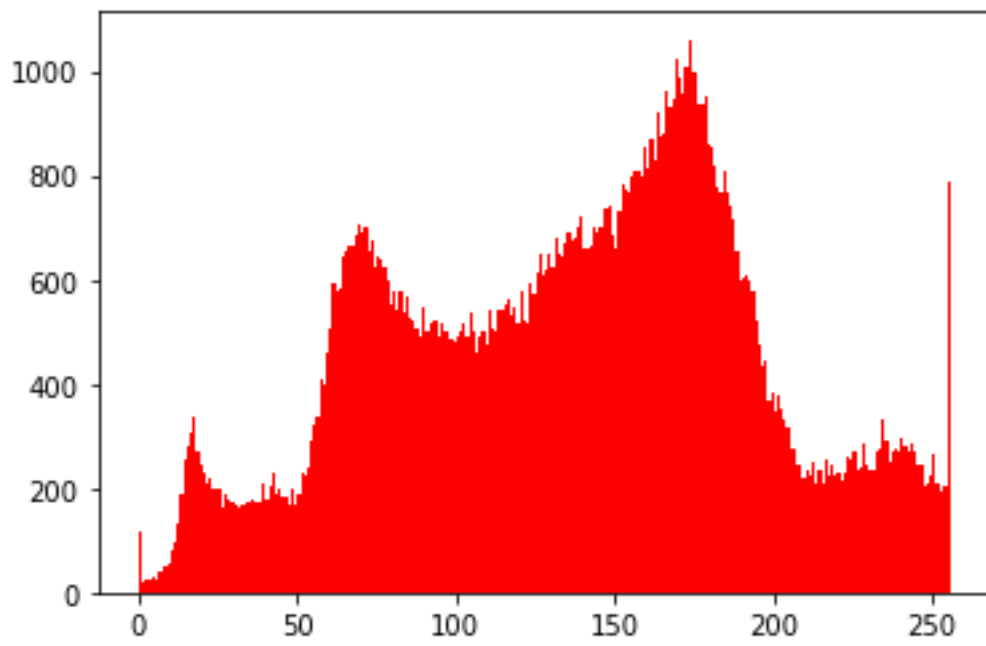
R Channel Normalized



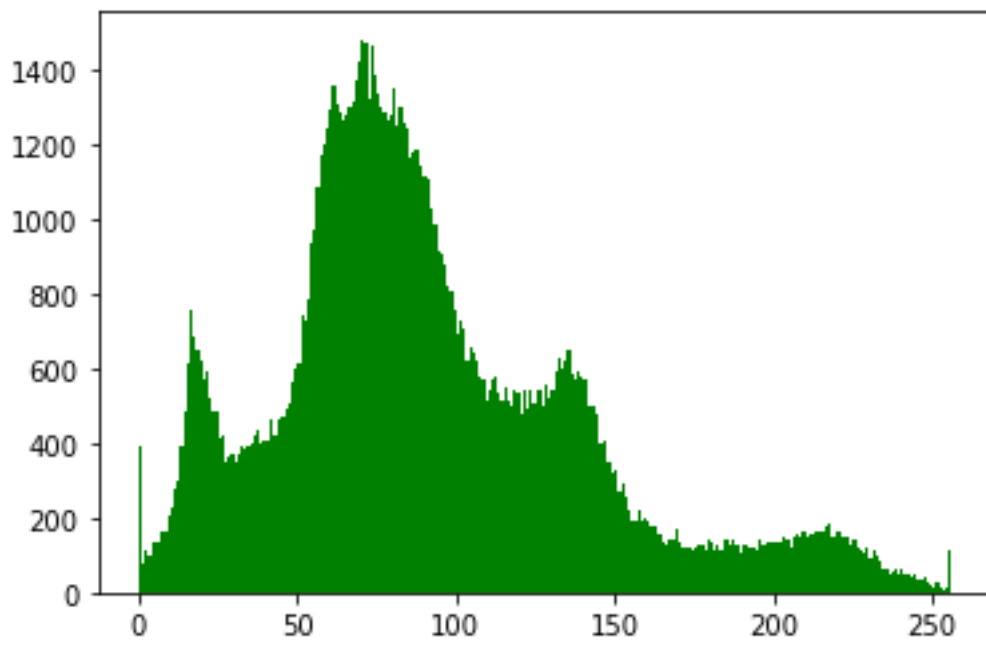


Color 2 Graphics

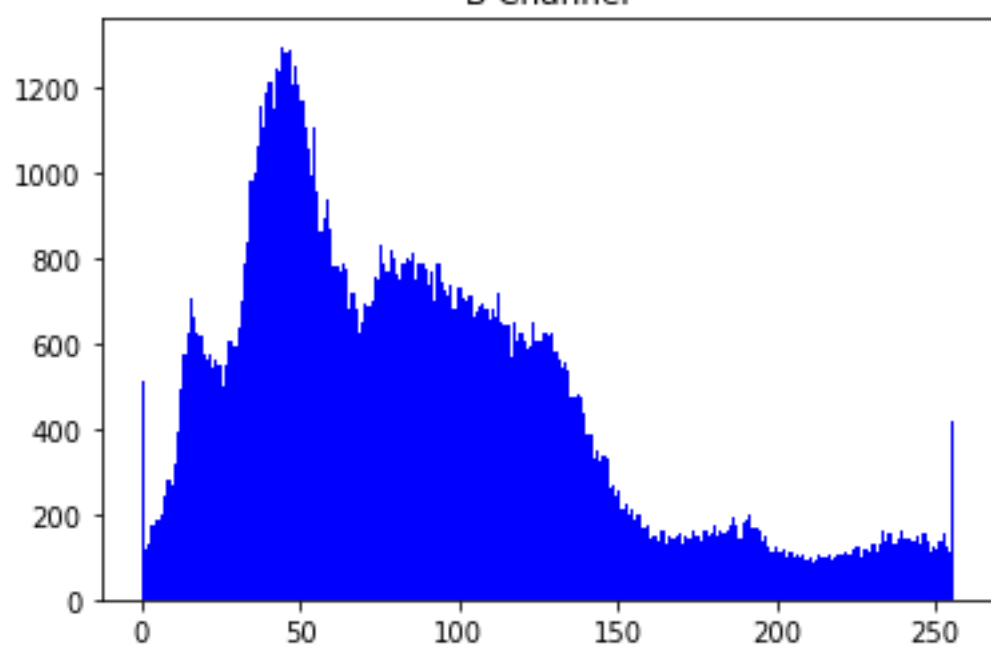
R Channel



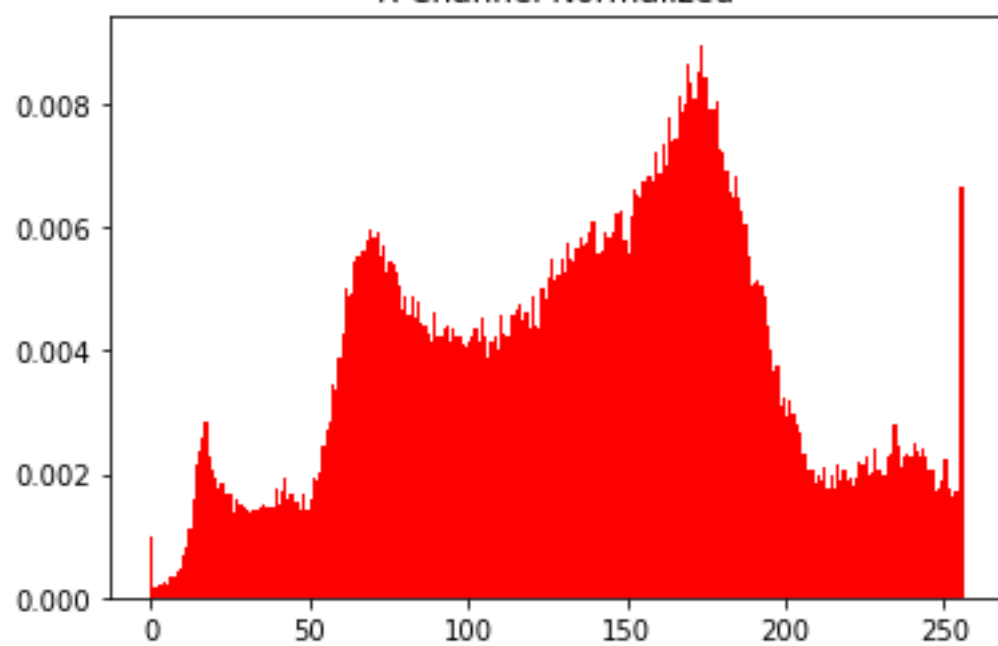
G Channel



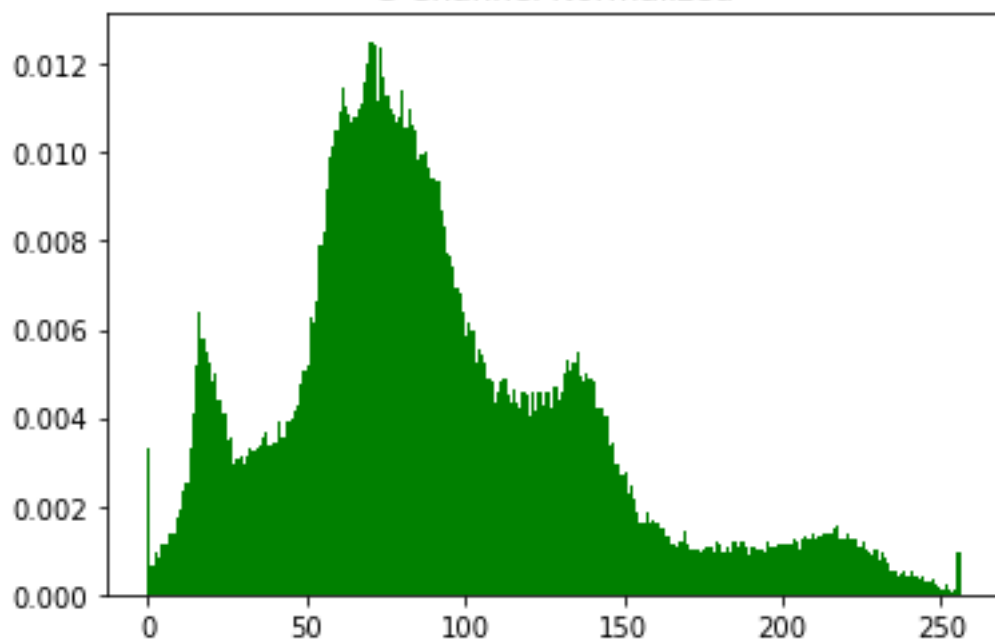
B Channel



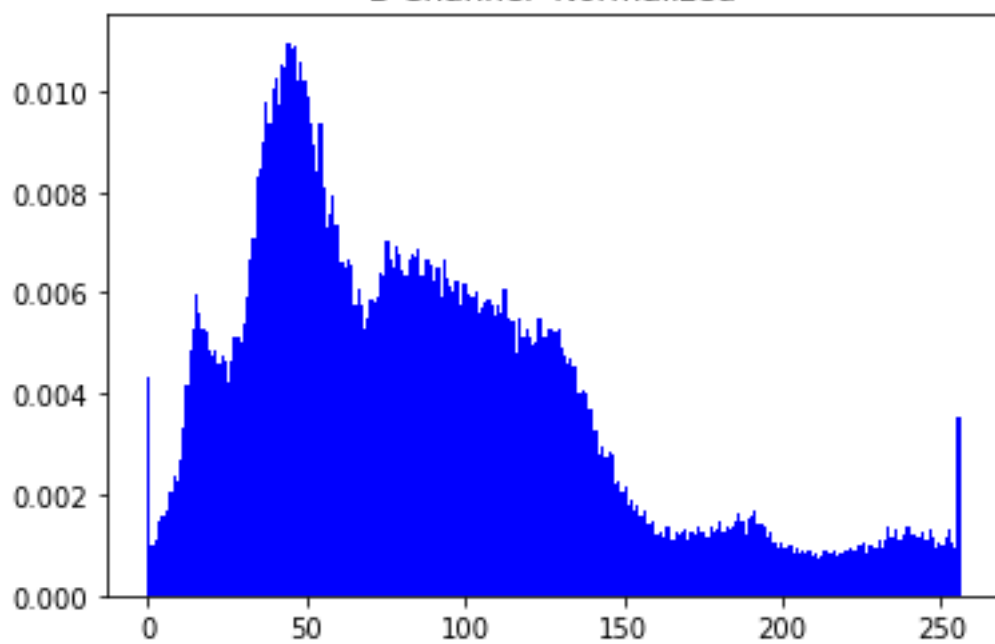
R Channel Normalized



G Channel Normalized



B Channel Normalized

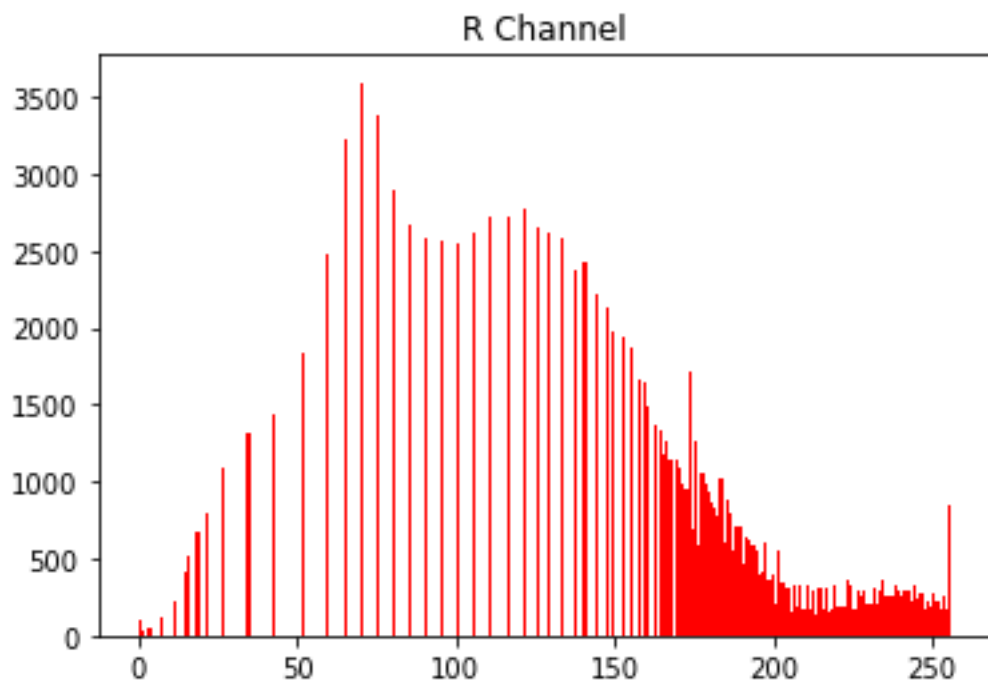


b)

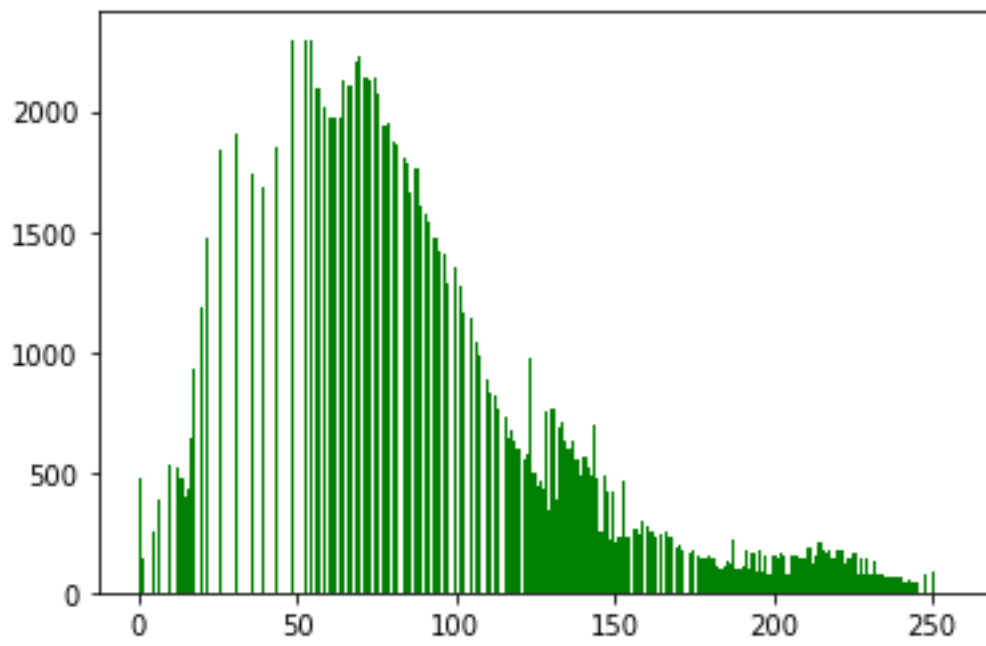


c)

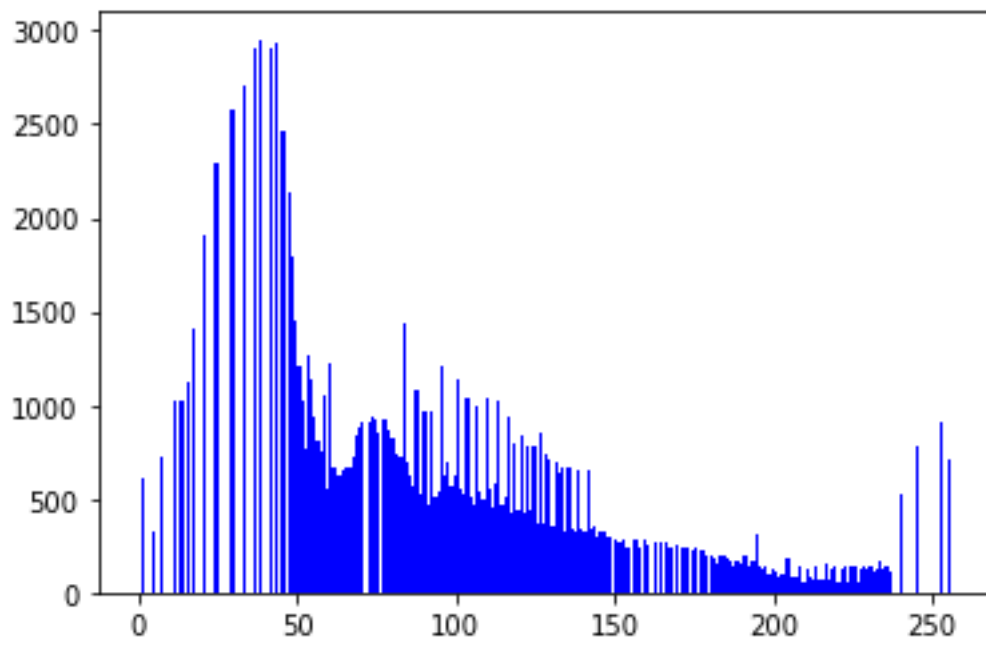
Histograms of The Matched Image



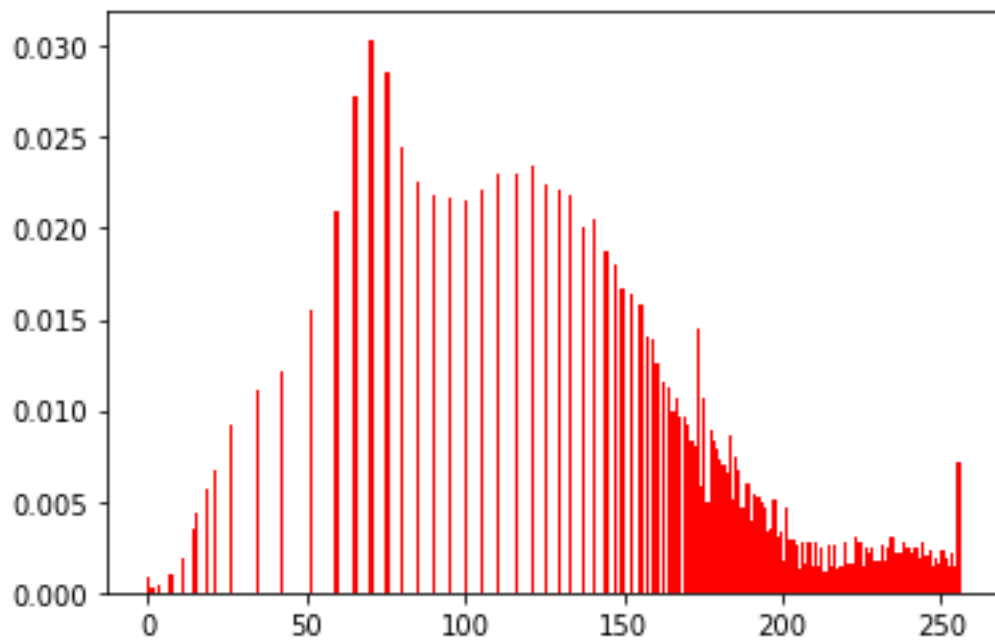
G Channel



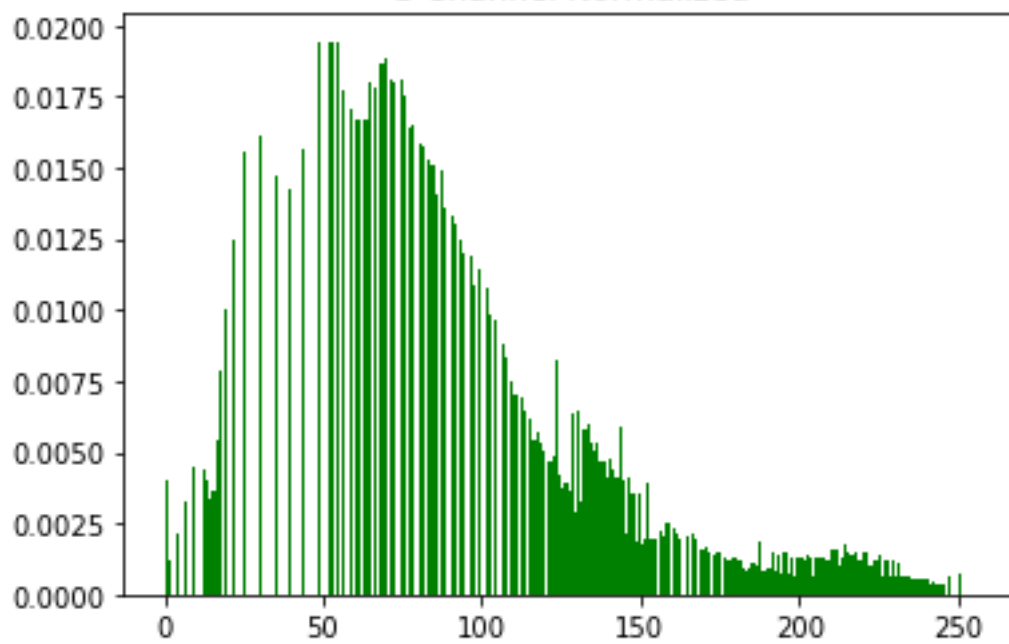
B Channel

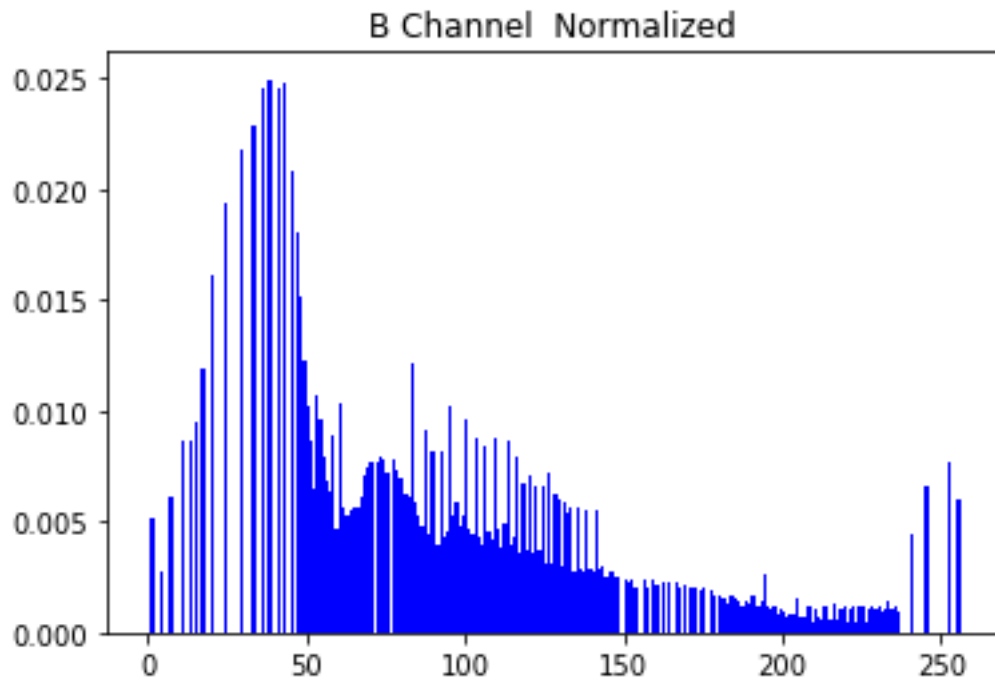


R Channel Normalized



G Channel Normalized





3)

a) For Affine Matrix: $a_{11}=1.46161787$ $a_{12}=-0.50852893$ $a_{21}=-0.17059107$ $a_{22}=1.16236843$

For Deaffine Matrix: $a_{11}= 0.71965025$ $a_{12}= 0.3157246$ $a_{21}= 0.10689339$ $a_{22}= 0.9063374$

b)

$$\begin{bmatrix} x_1 & y_1 & 0 & 0 \\ 0 & 0 & x_1 & y_1 \\ x_2 & y_2 & 0 & 0 \\ 0 & 0 & x_2 & y_2 \\ x_3 & y_3 & 0 & 0 \\ 0 & 0 & x_3 & y_3 \\ x_4 & y_4 & 0 & 0 \\ 0 & 0 & x_4 & y_4 \\ x_5 & y_5 & 0 & 0 \\ 0 & 0 & x_5 & y_5 \end{bmatrix} \cdot \begin{bmatrix} a_{11} \\ a_{12} \\ a_{21} \\ a_{22} \end{bmatrix} = \begin{bmatrix} x_1' \\ y_1' \\ x_2' \\ y_2' \\ x_3' \\ y_3' \\ x_4' \\ y_4' \\ x_5' \\ y_5' \end{bmatrix}$$

$$A \cdot x = b$$

$$x = (A^T A)^{-1} \cdot A^T \cdot b$$

c)

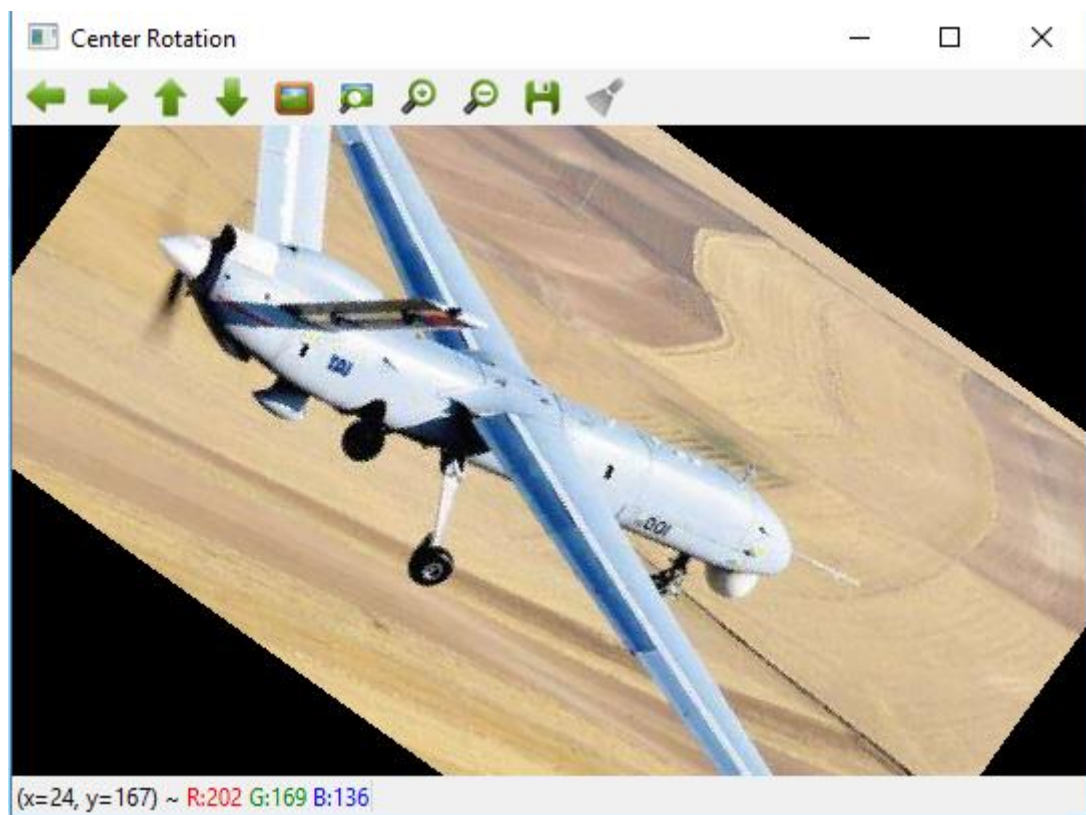


d) When the accuracy is high between the points and where they match, picture carries out a more clean and sharp transform. In low accuracy, picture contains distortions and flows through edges.

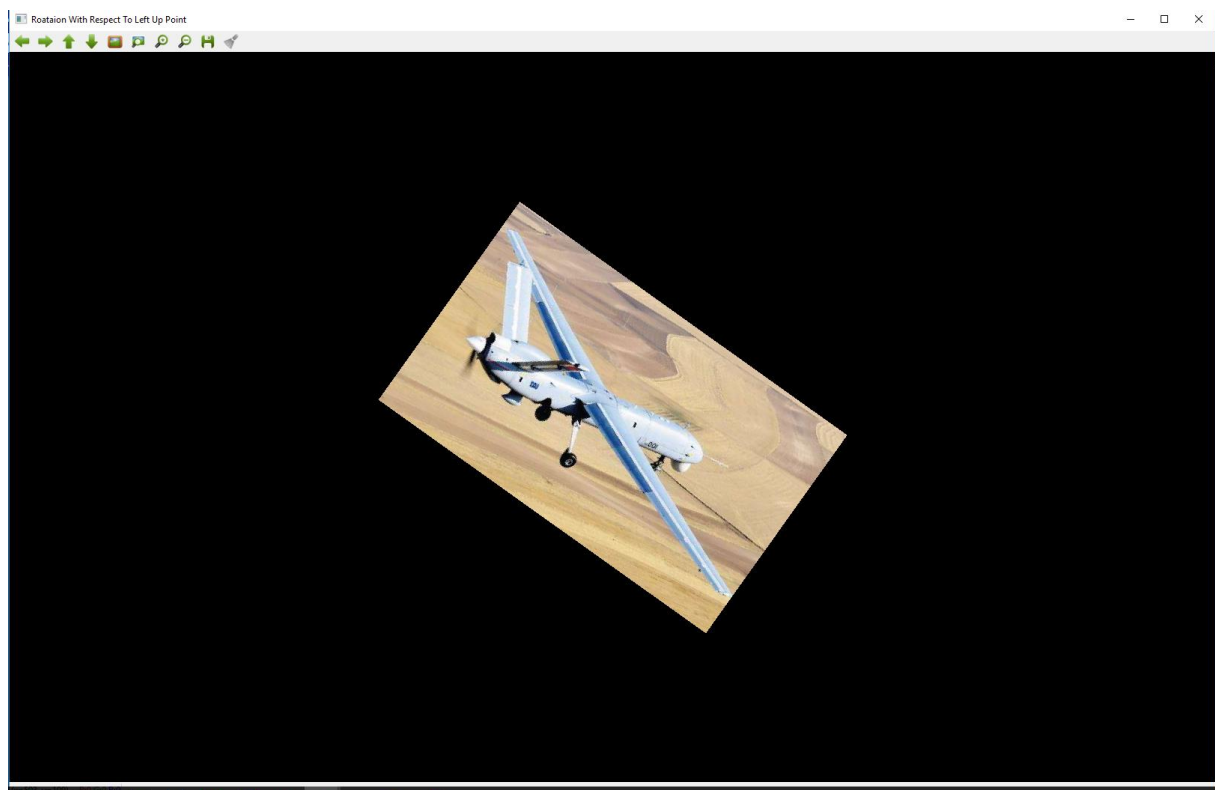


4)

(i)



(ii)



5) Forward mapping explained in <http://www.ece.ucsb.edu/~manj/ece178-Fall2008/ImageWarping> 11/36, tried to be implemented

