```matlab
%date - 19/01/2026
%created by - Nikhil Sahu

clc;
clear all;
close all;

%load the image
image_matrix = imread('input.jpg');
%display(image_matrix);
imshow(image_matrix);
title('Original Image also Grayscale Image');

figure;

%matlab command to get histogram Equalized image
Ieq=histeq(image_matrix);
imshow(Ieq);
title('Equalized image using matlab histeq command');

figure;


%{
%testing the equalisation code with pre loaded image data
image_matrix = [52     55     61     59     79     61     76     61
62     59     55     104     94     85     59     71
63     65     66     113     144     104     63     72
64     70     70     126     154     109     71     69
67     73     68     106     122     88     68     68
68     79     60     70     77     66     58     75
69     85     64     58     55     61     65     83
70     87     69     68     65     73     78     90];

count_matrix = [
52 1;
55 3;
58 2;
59 3;
60 1;
61 4;
62 1;
63 2;
64 2;
65 3;
66 2;
67 1;
68 5;
69 3;
70 4;
71 2;
72 1;
```

```matlab
73 2;
75 1;
76 1;
77 1;
78 1;
79 2;
83 1;
85 2;
87 1;
88 1;
90 1;
94 1;
104 2;
106 1;
109 1;
113 1;
122 1;
126 1;
144 1;
154 1
];

%}

%calculating the Equalized Image

%forming unique elements matrix
[m,n] = size(image_matrix);

count_matrix_initial = [];

for ii = 1:m
    for jj = 1:n

        val = image_matrix(ii,jj);
        found = 0;   % reset for each value

        [x,~] = size(count_matrix_initial);

        for kk = 1:x
            if val == count_matrix_initial(kk,1)
                found = 1;
                break;
            end
        end

        if found == 0
            count_matrix_initial(x+1,1) = val;
        end

    end
end

%arrange the count_matrix in ascending order
```

```matlab
[x,~]=size(count_matrix_initial);
count_matrix = count_matrix_initial;
for ii=1:x-1
    for jj=1:x-ii
        if(count_matrix(jj+1,1)<=count_matrix(jj,1))
            temp = count_matrix(jj,1);
            count_matrix(jj,1) = count_matrix(jj+1,1);
            count_matrix(jj+1,1) = temp;
        end
    end
end


%disp(count_matrix);

%add the count of unique variables
[m,n]=size(image_matrix);
[x,~]=size(count_matrix);
count_matrix(:,2) = 0;
for kk=1:x
    val=count_matrix(kk,1);
for ii=1:m
    for jj=1:n
        if(val == image_matrix(ii,jj))
            count_matrix(kk,2) = count_matrix(kk,2)+1;
        end
    end
end
end

%making the cdf matrix
matrix_cdf = zeros(x,1);
value=0;
for ii=1:x
    value=value+count_matrix(ii,2);
    matrix_cdf(ii,1)=value;
end

%making the histogram equivalent value matrix
hist_val = zeros(x,1);
cdf_min = min(matrix_cdf);
n=size(image_matrix);
for ii = 1:x
    hist_val(ii) = round(((matrix_cdf(ii,1) - cdf_min) / ((n(1)*n(2)) -
cdf_min)) * (256 - 1));
end
[m,n] = size(image_matrix);
histeq_mat = zeros(m,n);

for ii = 1:m
    for jj = 1:n

        old_val = image_matrix(ii,jj);
```

```matlab
        % find matching value in count_matrix and replace with hist_val
        for kk = 1:x
            if old_val == count_matrix(kk,1)
                histeq_mat(ii,jj) = hist_val(kk);
                break;
            end
        end

    end
end

%disp(histeq_mat);

histeq_mat = uint8(histeq_mat);
imshow(histeq_mat);
title('Equalized image using made functions');
```


Original Image also Grayscale Image

Equalized image using matlab histeq command

Equalized image using made functions

Published with MATLAB® R2025b