

```

clc;
clear;
% close all;
tic
%% Input Image
[file,path] = uigetfile('*.');
f1 = fullfile(path,file);
if prod(double(file) == 0) && prod(double(path) == 0)
    return
end
a = imread(f1);

%% Input Formating
in = input('Press 1 for Rotate and 2 for Transform : ');
if in==1
    angle = input('Enter angle in Degrees : ');
    in1 = input('Press 1 for further transform else 2 : ');
    if in1 == 1
        homo = input('3D rotation as row vector (1x3) : ');
        anglerad = pi*angle/180;
        A1 = [cos(anglerad), sin(anglerad); -sin(anglerad), cos(anglerad)];
        A = [A1, [0;0]; homo];
    else
        anglerad = pi*angle/180;
        A = [cos(anglerad), sin(anglerad), 0; -sin(anglerad), cos(anglerad), 0; 0,0,1];
    end
else
    A = input('Enter transform Matrix : ');
end
a1=0;

% Is it color or grayscale
b = size(a);
if size(b,2)==3
    a1 = 1;
end

%Convert to double
a= double(a);

%% Transform

% Bring the origin to the center by this Matrix
trans = [1,0, -b(2)/2; 0,1, -b(1)/2; 0,0,1];

%Transform Happens Here

outx = zeros(b(1),b(2));
outy = zeros(b(1),b(2));

for i = 1:b(1)
    for j = 1:b(2)

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        new = A*trans*[j;i;1];
        outx(i,j) = round(new(1)/new(3));
        outy(i,j) = round(new(2)/new(3));
    end
end
%% Forming the transformed image
minoutx = min(outx,[],'all');
minouty = min(outy,[],'all');

maxoutx = max(outx,[],'all');
maxouty = max(outy,[],'all');

f = zeros(maxouty+abs(minouty)+1,maxoutx+abs(minoutx)+1);

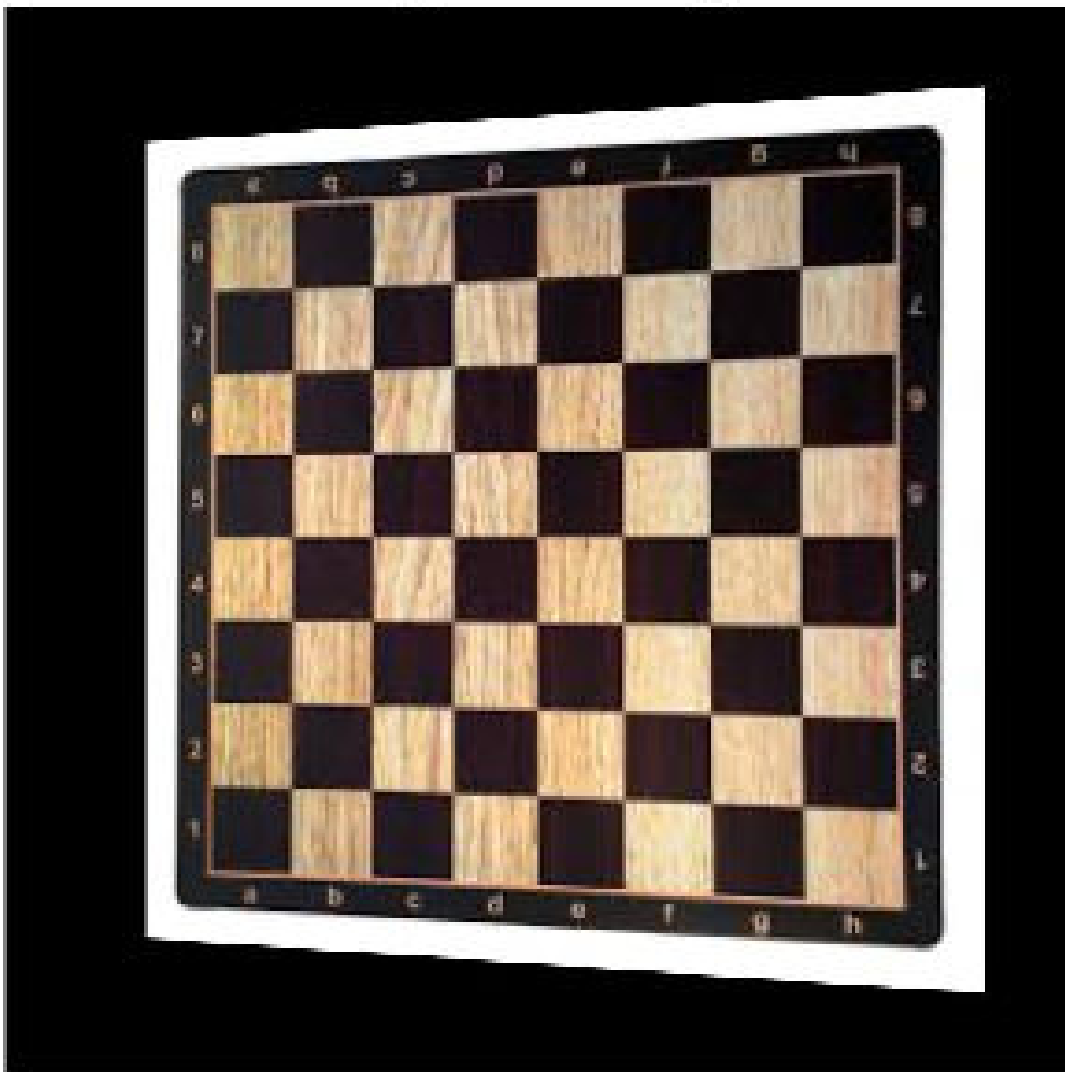
for i = 1:b(1)
    for j = 1:b(2)
        f(outy(i,j)+abs(minouty)+1,outx(i,j)+abs(minoutx)+1,1) = a(i,j,1);
        if a1 == 1
            f(outy(i,j)+abs(minouty)+1,outx(i,j)+abs(minoutx)+1,2) = a(i,j,2);
            f(outy(i,j)+abs(minouty)+1,outx(i,j)+abs(minoutx)+1,3) = a(i,j,3);
        end
    end
end

%% Fill the gaps
%Fill in the gaps By using Median Filter
b1 = size(f);
for i = 2:b1(1)-2
    for j = 2:b1(2)-2
        if f(i,j)==0
            f(i,j) = median([f(i-1,j-1),f(i-1,j),f(i-1,j+1),f(i,j-1),f(i,j),f(i,j+1),f(i+1,j-1),f(i+1,j),f(i+1,j+1)]);
            if a1 == 1
                f(i,j,2) = median([f(i-1,j-1,2),f(i-1,j,2),f(i-1,j+1,2),f(i,j-1,2),f(i,j,2),f(i,j+1,2),f(i+1,j-1,2),f(i+1,j,2),f(i+1,j+1,2)]);
                f(i,j,3) = median([f(i-1,j-1,3),f(i-1,j,3),f(i-1,j+1,3),f(i,j-1,3),f(i,j,3),f(i,j+1,3),f(i+1,j-1,3),f(i+1,j,3),f(i+1,j+1,3)]);
            end
        end
    end
end

%% Display the Images
figure;
imshow(uint8(a));
title('Original Image')

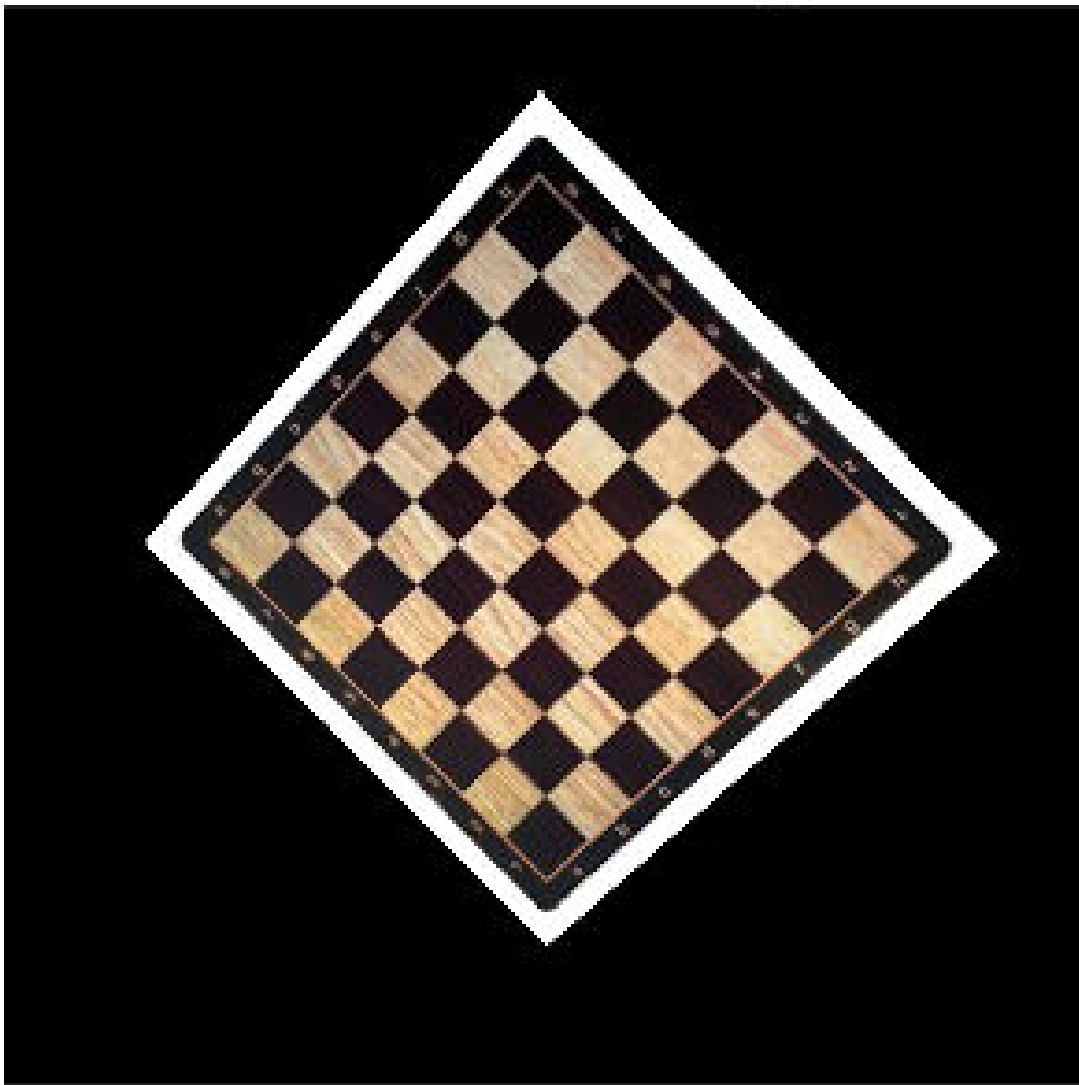
```

Original image



```
figure;  
imshow(uint8(f));  
title('Transformed Image')
```

Transformed image



toc

Elapsed time is 62.178184 seconds.

```
% Save the image ?  
in2 = input('Do you want to save the image ? (Press 1 for yes 2 for No) : ');  
if in2 == 1  
    [file,path] = uinputfile('*.');  
    f2 = fullfile(path,file);  
    imwrite(uint8(f),f2);  
end
```