Contents

- Stratified metric promotion after affine rectification
- solve the system
- compute the rectifying homography

Stratified metric promotion after affine rectification

perform metric rectification of an image, after affine rectification. Given two pairs of image of orthogonal lines, the script finds the image of the dual conic to circular points and computes the homography that brings it back to its canonical form

Luca Magri
Politecnico di Milano
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```
close all;
clear all;
clc;
imgAffRect = imread('E4_data/affRect.JPG');


figure;
imshow(imgAffRect);
numConstraints = 10;
```

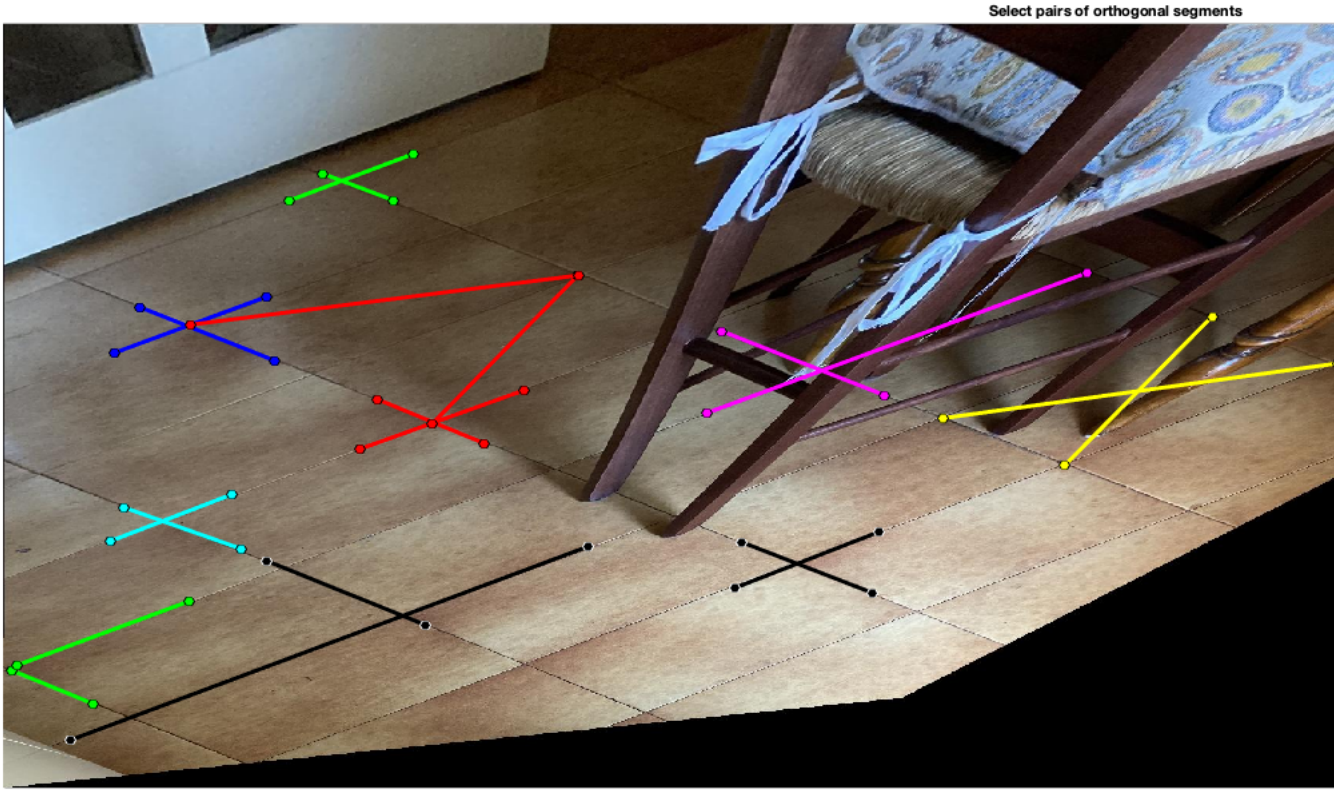
```
hold all;
fprintf('Draw pairs of orthogonal segments\n');
doAgain = 1;
count = 1;
A = zeros(numConstraints,3);
% select pairs of orthogonal segments
while (count <=numConstraints)
    figure(gcf);
    title('Select pairs of orthogonal segments')
    col = 'rgbcmykwrgbcmykw';
    segment1 = drawline('Color',col(count));
    segment2 = drawline('Color',col(count));

    l = segToLine(segment1.Position);
    m = segToLine(segment2.Position);

    % each pair of orthogonal lines gives rise to a constraint on s
    % [l(1)*m(1),l(1)*m(2)+l(2)*m(1), l(2)*m(2)]*s = 0
    % store the constraints in a matrix A
     A(count,:) = [l(1)*m(1),l(1)*m(2)+l(2)*m(1), l(2)*m(2)];

    count = count+1;
end
```

```
Draw pairs of orthogonal segments
```



solve the system

```
%S = [x(1) x(2); x(2) 1];
[~,~,v] = svd(A);
s = v(:,end); %[s11,s12,s22];
S = [s(1),s(2); s(2),s(3)];
```

compute the rectifying homography

```
imDCCP = [S,zeros(2,1); zeros(1,3)]; % the image of the circular points
[U,D,V] = svd(S);
A = U*sqrt(D)*V';
H = eye(3);
H(1,1) = A(1,1);
H(1,2) = A(1,2);
H(2,1) = A(2,1);
H(2,2) = A(2,2);

Hrect = inv(H);
Cinfty = [eye(2),zeros(2,1);zeros(1,3)];

tform = projective2d(Hrect');
J = imwarp(imgAffRect,tform);

figure;
imshow(J);
```

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