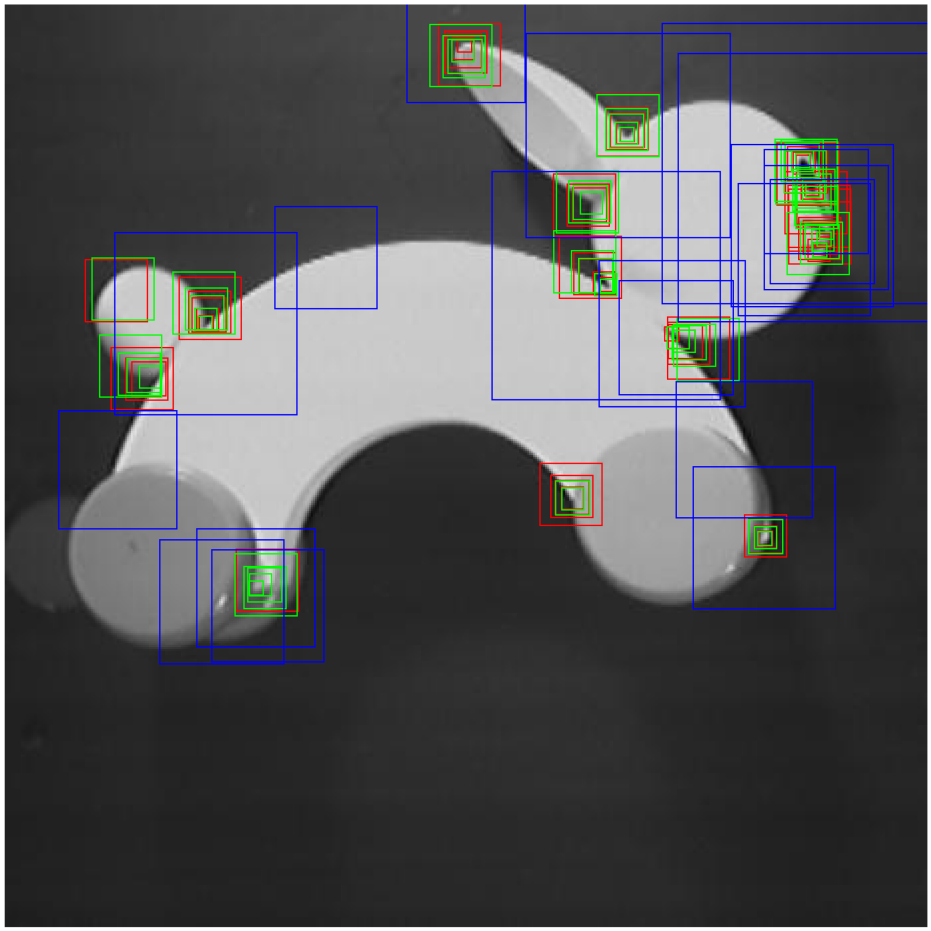
E11 bis

Característiques locals II

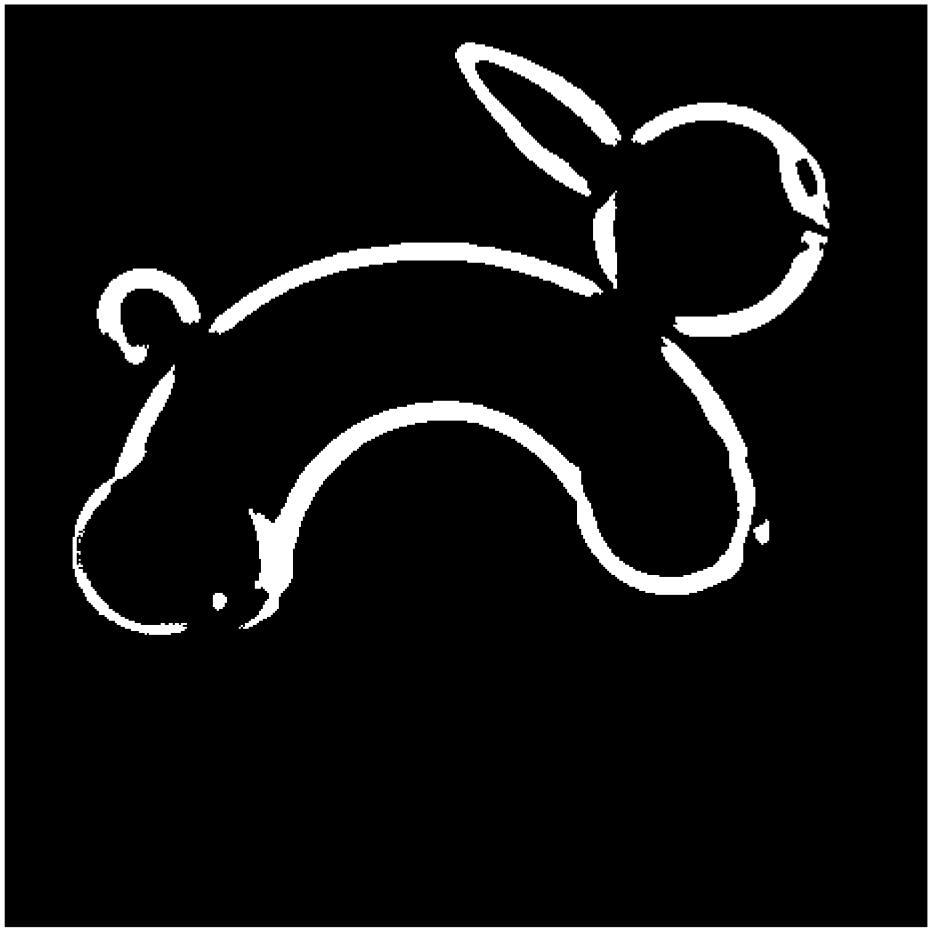
```
im = imread("rabbit.jpg");
imshow(im)
sizes = [7,11,17,21,31];
hold on

for j = 1:size(sizes,2)
    kp = detectHarrisFeatures(im,'FilterSize',sizes(j),'MinQuality',0.1);
    wsize = sizes(j);
    for i = 1:size(kp,1)
        rectangle('Position',[kp.Location(i,1)-wsize/2,kp.Location(i,2)-wsize/2,wsize,wsize],'E
    end
end

for j = 1:size(sizes,2)
    kp = detectMinEigenFeatures(im,'FilterSize',sizes(j),'MinQuality',0.2);
    wsize = sizes(j);
    for i = 1:size(kp,1)
        rectangle('Position',[kp.Location(i,1)-wsize/2,kp.Location(i,2)-wsize/2,wsize,wsize],'E
    end
end

kp = detectFASTFeatures(im,'MinQuality',0.1);
for i = 1:size(kp,1)
    wsize = kp.Metric(i);
    rectangle('Position',[kp.Location(i,1)-wsize/2,kp.Location(i,2)-wsize/2,wsize,wsize],'EdgeC
end
```



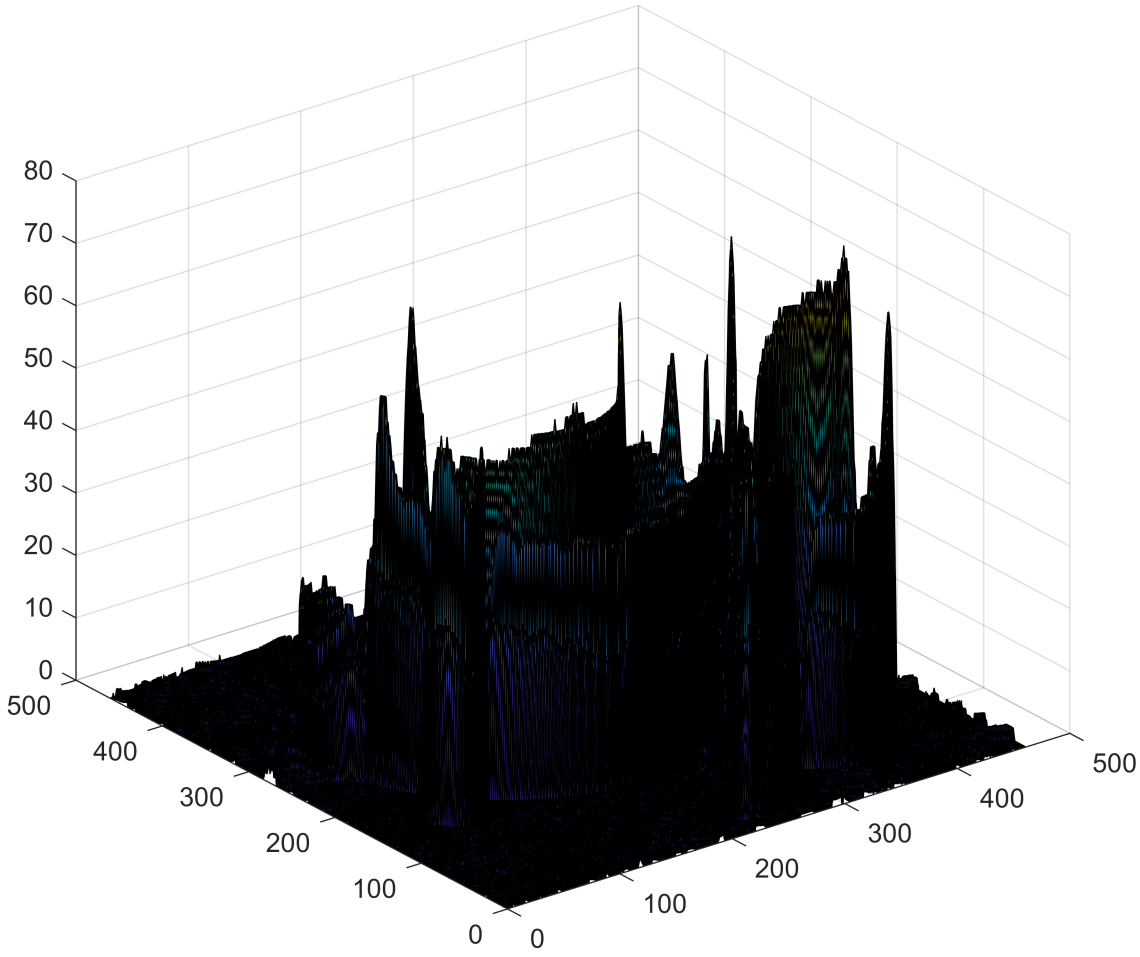
DoG

```
close all
im = imread("rabbit.jpg");
imshow(im)
```

```
h = fspecial("gaussian",7,7/4);
G(:,:,1) = imfilter(im,h,"replicate");
h = fspecial("gaussian",15,15/4);
G(:,:,2) = imfilter(im,h,"replicate");
h = fspecial("gaussian",30,30/4);
G(:,:,3) = imfilter(im,h,"replicate");

DoG(:,:,1) = abs(G(:,:,1)-G(:,:,2));
DoG(:,:,2) = abs(G(:,:,2)-G(:,:,3));

[V,S] = max(DoG,[],3);
I = V > 10;
imshow(I);
```



```
surf(double(V).*double(S));
```

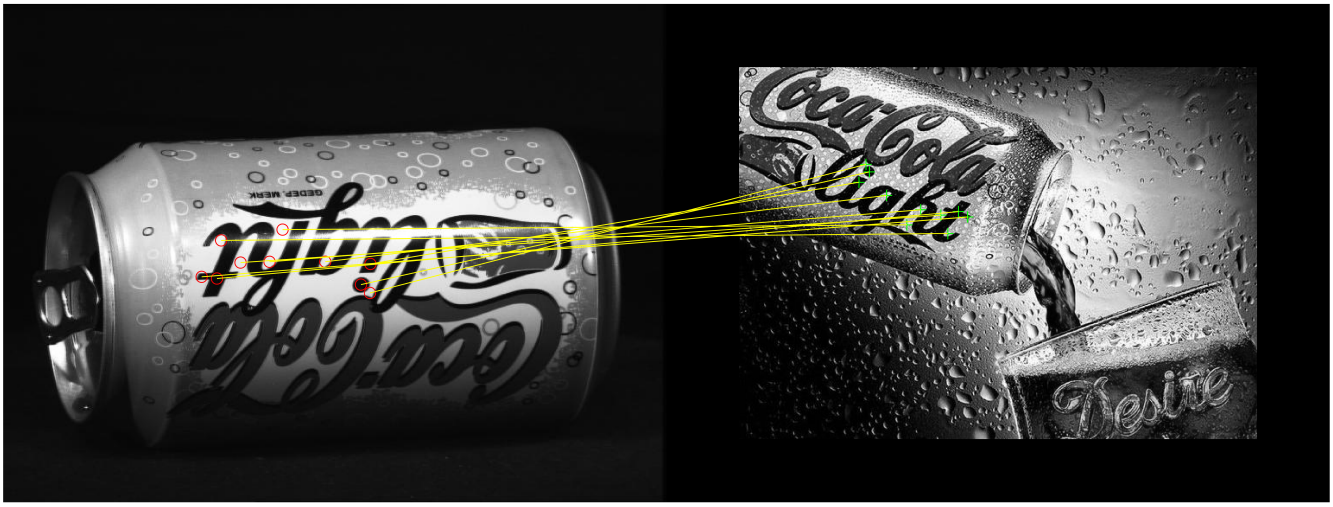



```
%imshow(G3-G1,[]);
```

SIFT & matching

```
im_obj = rgb2gray(imread('coke.jpg'));
im_esc = rgb2gray(imread('anunci.jpg'));

% im_obj = rgb2gray(imread('nba_logo.jpg'));
% im_esc = rgb2gray(imread('court2.jpg'));
% montage({im_obj,im_esc});

kp_obj = detectSIFTFeatures(im_obj);
kp_obj = selectStrongest(kp_obj,50);

% imshow(im_obj);
% hold on
% plot(kp_obj);

close all
```

```
kp_esc = detectSIFTFeatures(im_esc);
kp_esc = selectStrongest(kp_esc,200);

% imshow(im_esc);
% hold on
% plot(kp_esc);

[feat_obj,kp_obj] = extractFeatures(im_obj,kp_obj);
[feat_esc,kp_esc] = extractFeatures(im_esc,kp_esc);

pairs = matchFeatures(feat_obj,feat_esc,'MatchThreshold',10);

m_kp_obj = kp_obj(pairs(:,1),:);
m_kp_esc = kp_esc(pairs(:,2),:);

figure
showMatchedFeatures(im_obj,im_esc,m_kp_obj,m_kp_esc,"montage");
```




```
T = estimateGeometricTransform2D(m_kp_obj,m_kp_esc,"affine");

[f c] = size(im_obj);
figure
imshow(im_obj);
box = [1,100; c,100; c,f; 1,f; 1,100];
hold on
line(box(:,1),box(:,2));
```

```
nbox = transformPointsForward(T,box);

figure
imshow(im_esc);
hold on
line(nbox(:,1),nbox(:,2));
```


Coca-Cola
light
Desire