Exercise on Harris Feature Detector

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In this exercise, you will work on Harris corner detector.

1 Harris corner

1. compute horizontal and vertical first order derivative: you can use any template like Prewitt, Sobel, or DoG.
2. Compute three intermediate images I_x^2, I_{xy}, I_y^2, show them.
3. Smooth them (I_x^2, I_{xy}, I_y^2) with the Gaussian template.
4. for every pixel, find $\mathbf{C} = \begin{bmatrix} Ix^2 & I_{xy} \\ I_{xy} & I_y^2 \end{bmatrix}$.
5. compute $det(\mathbf{C}) - ktrace(\mathbf{C})^2$.
6. threshold to find corners.
7. apply Non-maxima suppression.

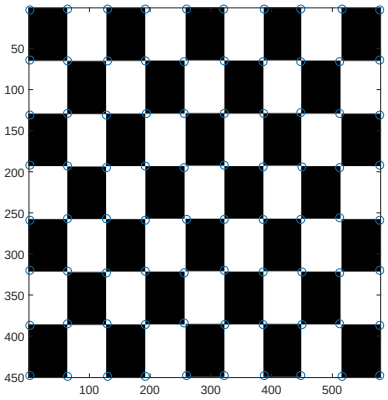

Figure 1: Example of result.

2 Useful functions

```
imread;
rgb2gray;
im2double;
filter2;
imfilter;
conv2;
imshow;
```