TP4
Feature detection

The objective of this practical work is to implement the Harris corner detector.

1   Exercise 1: Gradient Images

- Write a c program that computes the images I_x and I_y of the gradients of an image (smoothed), in the x and y directions respectively, using the Sobel operator. Images will be stored in the PGM format.

- Compute and display as well the image of the gradient norm.

2   Exercise 2: Corner Detection

- Using I_x and I_y, compute the images I_x^2, I_y^2 and $I_{xy} = I_x \times I_y$. Smooth these images using the filter implemented in the previous practical work.

- Compute the Harris function $H = \det C - \alpha \mathrm{trace}^2 C$ in each pixel. Values of this function depend on the autocorrelation matrix C defined by $C = \begin{pmatrix} I_x^2 & I_{xy} \\ I_{xy} & I_y^2 \end{pmatrix}$, where α is a parameter of the detector to be tuned and where the elements of C, in any pixel, correspond to values of that pixel in the smoothed images of the previous question.

- Display the image of H.

- How does α influence H ?

- Display the n local maxima of H where n is a parameter that can be modified.

Edmond.Boyer@inrialpes.fr