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HW1

1. PART 2.1

Harris corner detector is in essence - a partial-derivative operator of a defined neighborhood of a point, and its output is based on the eigenvalues corresponding to the eigenvectors - describing the Second moment ellipse shape (eigenvalues) and direction (eigenvectors) .
We make use of this knowledge in the following questions.

A. Is Harris corner detector invariant to translation? Yes/No? Explain.
   i. A pixel's neighborhood is invariant to translations; thus the partial-derivatives are invariant – hence Harris Corner detector is invariant to translation. eigenvalues are not changing.

B. Is Harris corner detector invariant to rotation? Yes/No? Explain.
   i. A pixel's neighborhood is invariant to rotations; thus, the partial-derivatives are invariant – hence Harris Corner detector is invariant to rotations.
   regarding the eigenvalues – they are not changing due to the rotation, only the direction is changing (i.e. the eigenvectors).

C. Is Harris corner detector invariant to constant illumination? Yes/No? Explain.
   i. Scaling indeed change eigenvalues by the same scale, thus, Harris corner detector is not invariant to constant illumination.

2. PART 3.3

Sobel Operator – is an approximation of the gradient of the image intensity function.
The gradient is approximated in the horizontal and vertical directions, hence combining the two gives one the ability to measure horizontal and vertical edges.

To display the edge we can use the Sobel operator and show a grayscale colormap image showing the intensity of the gradient at each point.