

**Name: VEN THON**

**ID: e20191250**

**Group: I5-GIC-C**

### Assignment Discussion11

1) What is edge detection?

- Edge detection is an image processing technique for finding the boundaries of objects within images.

2) Why do we need edge detection?

Because we want to:

- Detect an object in an image
  - Example: a robot that wants to play soccer
- Do measures of an image
  - Example: objects verification in a factory
- Extract information from an image
  - Example: intensity, types of images
- Compress image data
  - Example: decreasing size of image

3) What are primitives of edge detection?

Primitives of edge detection are:

- **Edges:** typically occur on the boundary between two different regions in a n image.
  - They are important features for analyzing images.
- **Region of interest (ROI):** is a selected subset of samples within a dataset identified for a particular purpose.
  - The ROI defines the borders of an object under consideration.
- **Point of interest (POI) or corners:** is a specific point in an image that may find useful or interesting.
  - POI is selected from the general background in a field of view.
- **Patterns:** are a repetition of specific visual elements.
  - Natural patterns include spirals, waves, and so on.

#### 4) Explain the edge detection algorithm?

Algorithms for edge detection contain 4 steps:

- **Filtering:** is used to improve the performance of an edge detector with respect to noise. However, there is a balance between edge strength and noise reduction. More filtering to reduce noise results in a loss of edge strength.
- **Enhancement:** emphasizes pixels where there is a significant change in local intensity values and is usually performed by computing the gradient magnitude.
- **Detection:** determine which points are edge points. Frequently, thresholding provides the criterion used for detection.
- **Localization:** estimate the location of the edge with subpixel resolution if required for the application. The edge orientation can also be estimated.

#### 5) How to enhance first filter result?

Enhancing first filter result:

❖ In order to enhance the result, we will compose:

- A vertical edge detector
  - difference between  $(x, y)$  and  $(x-1, y)$
  - $I_{cv}(x, y) = I(x, y) - I(x-1, y)$
- An horizontal edge detector
  - difference between  $(x, y)$  and  $(x, y-1)$
  - $I_{ch}(x, y) = I(x, y) - I(x, y-1)$
- A magnitude
  - $I_c(x, y) = \sqrt{I_{cv}(x, y)^2 + I_{ch}(x, y)^2}$

❖ In brief, we separate result of edge detection into two:

- Vertical result
- Horizontal result