

Teste – Visão Computacional

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Docente: Miguel Tavares Coimbra

Duração: 1h30

1. Digital Image

- Describe the two types of sensors that we have in our retinas. (2 values)
- Explain the concept of pinhole photography. (2 values)
- What are the advantages and disadvantages of using *quantization* on a signal? (2 values)
- What is a *color space*? (2 values)

2. Digital Filters

- Apply a Laplacian filter (Figure 1.b) to the *intensity* image represented in Figure 1.a. Obtain the result for only the pixels marked in grey. Show all performed calculations. (2 values)

10	10	4	0
10	10	4	0
10	10	2	0
10	10	2	0

Figure 1.a)

0	-1	0
-1	4	-1
0	-1	0

Figure 1.b)

- This filter is a necessary step for an *edge detector*. Describe the rest of an algorithm that can obtain a binary image where an edge is represented by the value 1 (one) and the rest of the pixels by the value 0 (zero). (2 values)
- What happens when you try to apply the filter in Figure 1.b. to the pixels not marked in grey of Figure 1.a? Describe two ways to deal with this problem, commenting their strengths and weaknesses. (2 values)

3. Segmentation

- One of the most popular segmentation algorithms is called *thresholding*. Describe it and explain its strengths and weaknesses. (2 values)
- This algorithm is not adequate for images with the characteristics of the one represented in Figure 2. Describe an algorithm that can robustly segment images such as this.
- Hough Transform
 - Describe the algorithm. (1 value)
 - Explain the practical limitations of this transform when implemented in a digital computer. (1 value)

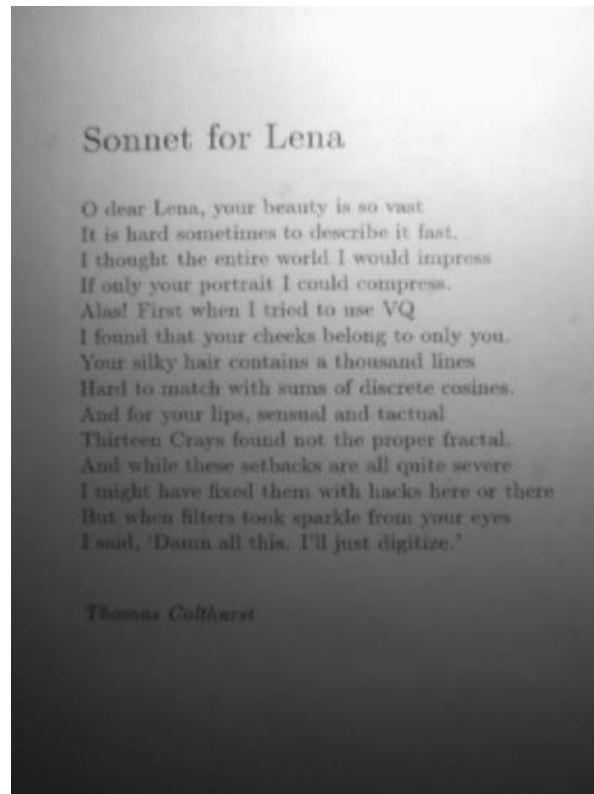


Figure 2