Reconhecimento de caracteres e palavras em imagens

Universidade Federal Rural do Rio de Janeiro

Disciplina: Processamento de Imagens

Prof.: Bruno Dembogurski

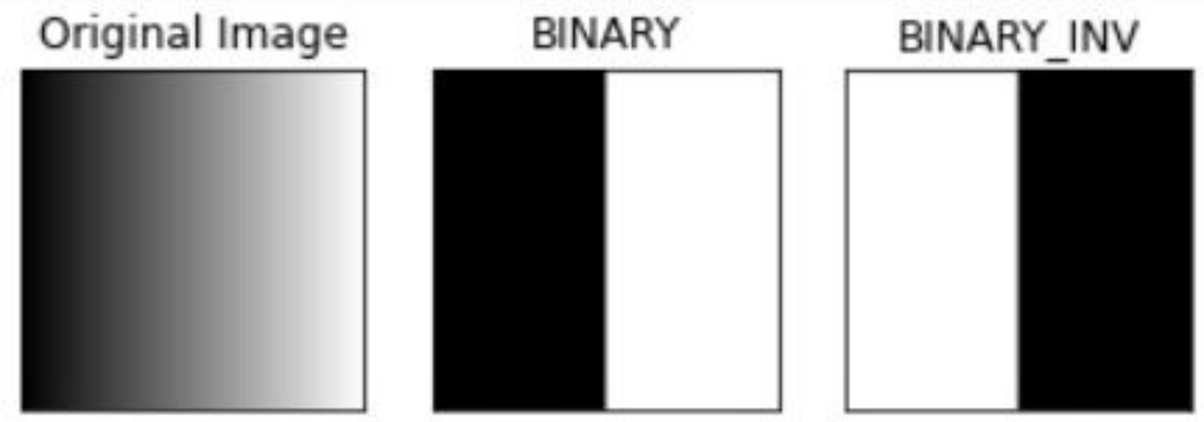
Integrantes: Aline Araujo, Jéssica Ruel

01

FILTROS

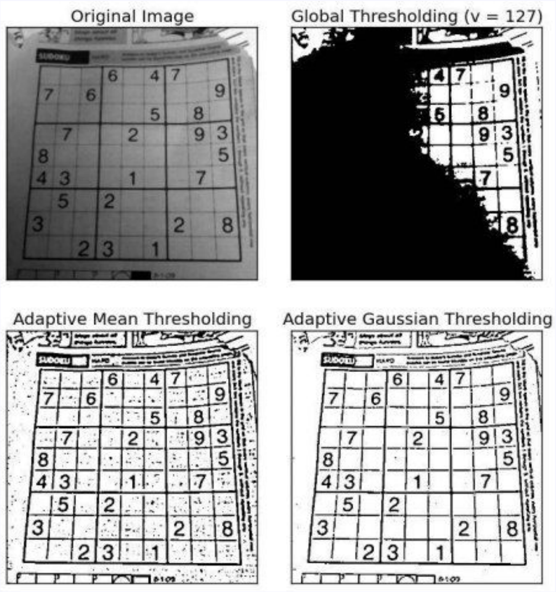
1.1. Thresholding

- Thresholding Simples
  - **Binário**
  - **Binário Inverso**



1.2. Thresholding

- **Thresholding Adaptativo**
  - **Adaptativo Médio**
  - **Adaptativo Gaussiano**



Original Image

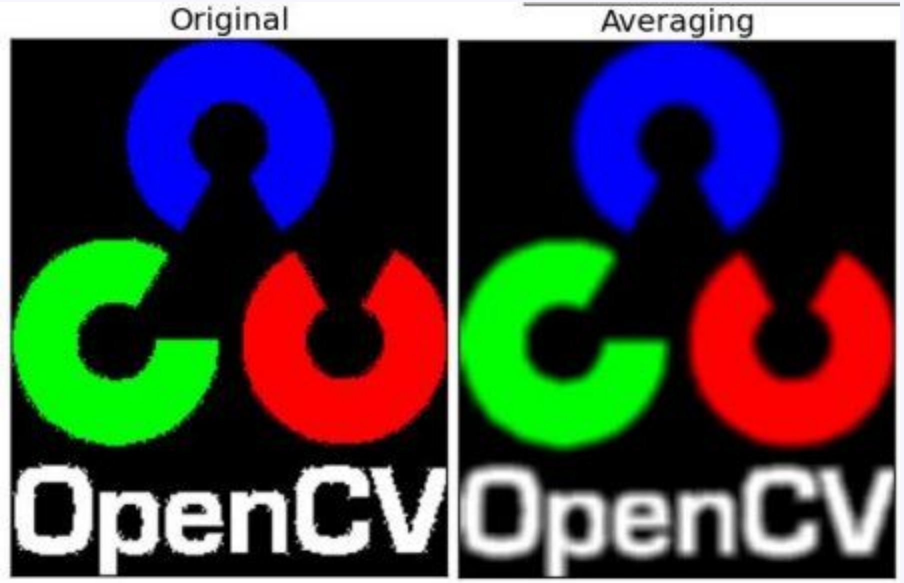
Global Thresholding (v = 127)

Adaptive Mean Thresholding

Adaptive Gaussian Thresholding

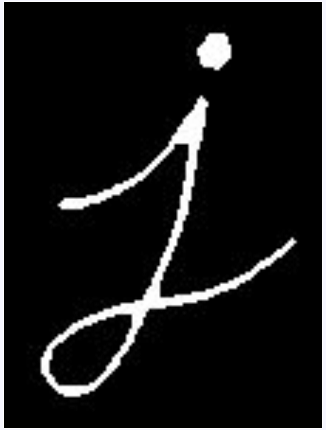
2. Suavização

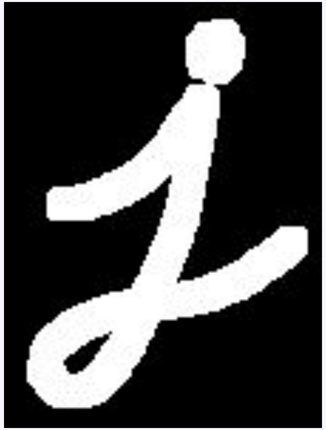
- Suavização Média
- Suavização Gaussiana
- Suavização Mediana.



3. Transformações Morfológicas

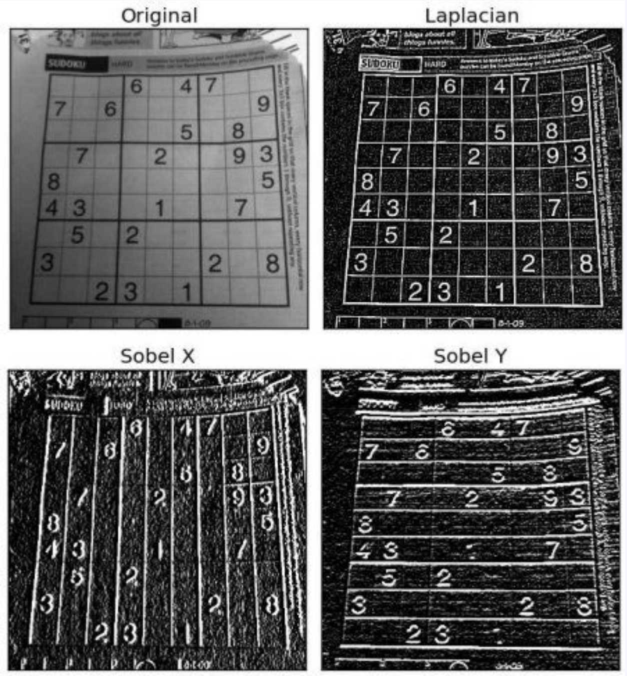
- Erosão
- Dilatação
- Abertura
- Fechamento





4. Detecção de bordas

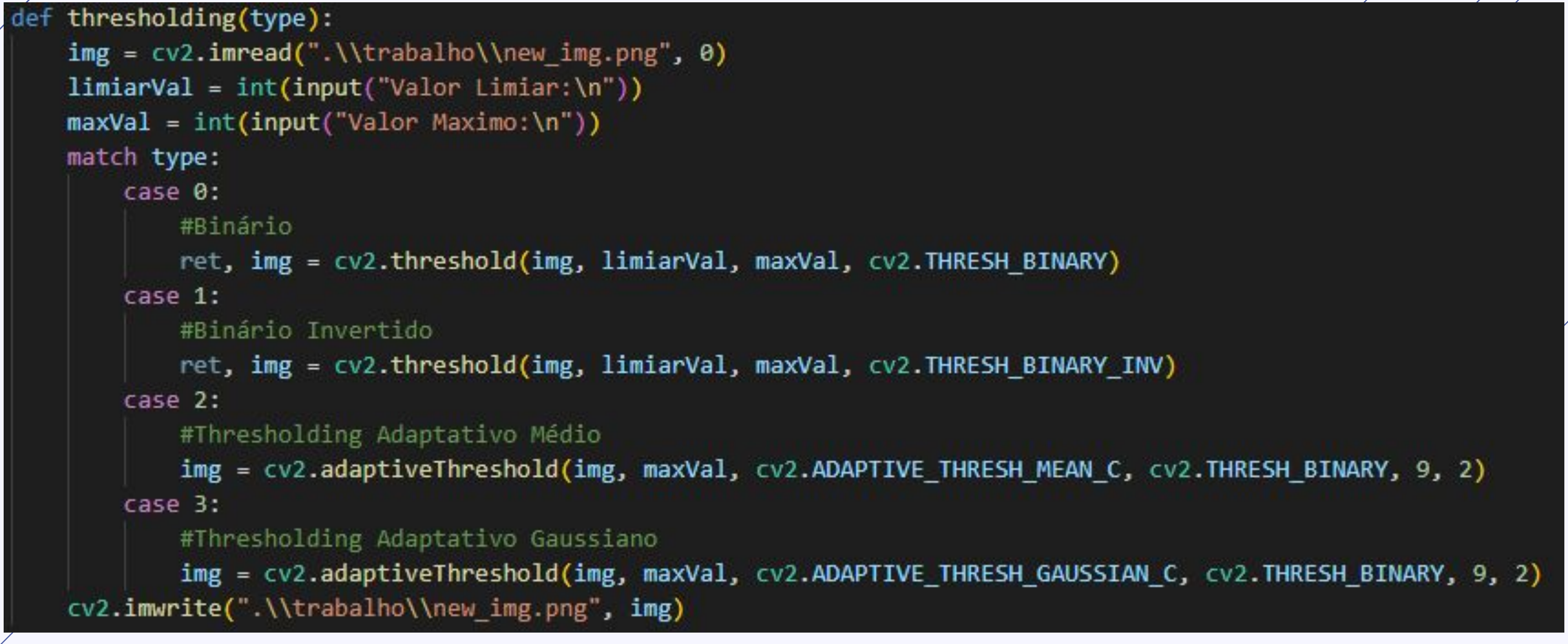
- Filtro Sobel
- Filtro Laplaciano
- Canny



02

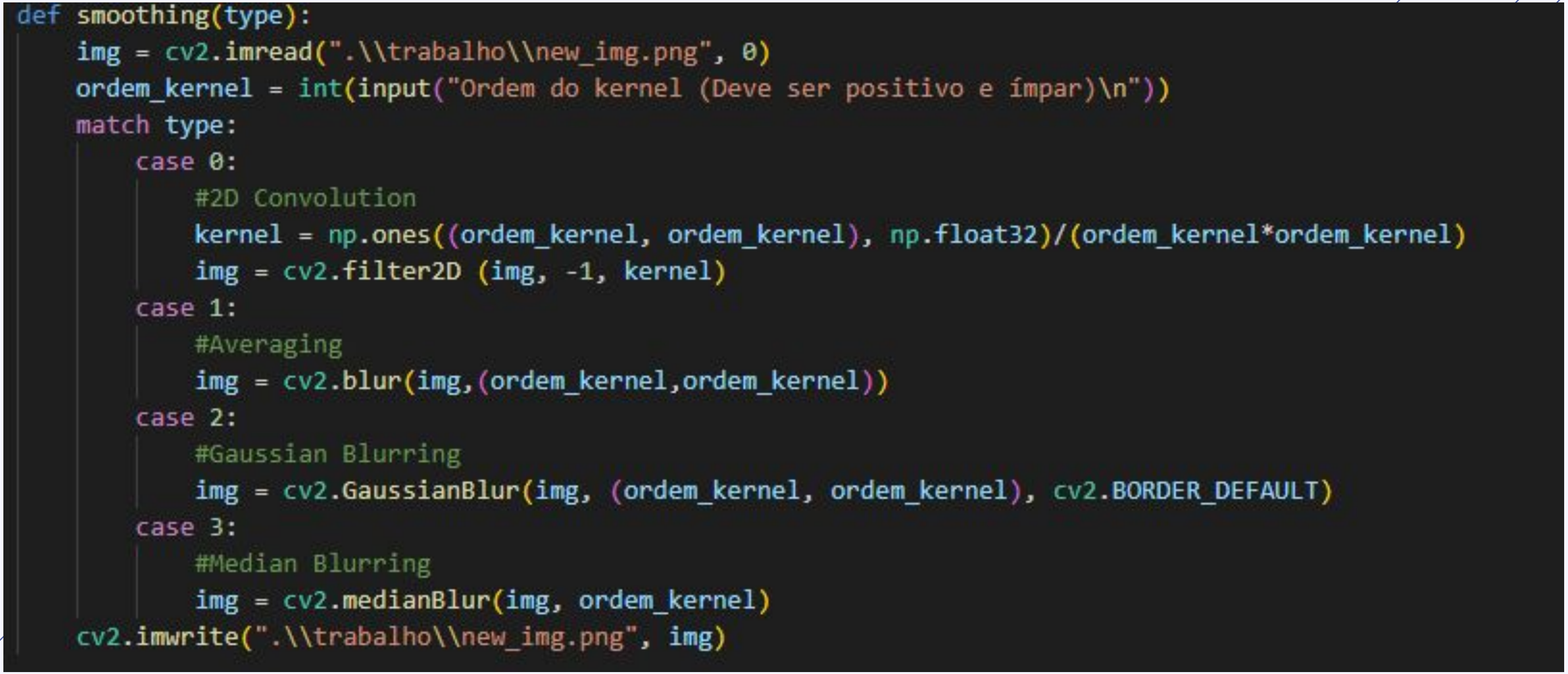
IMPLEMENTAÇÃO

1. Thresholding



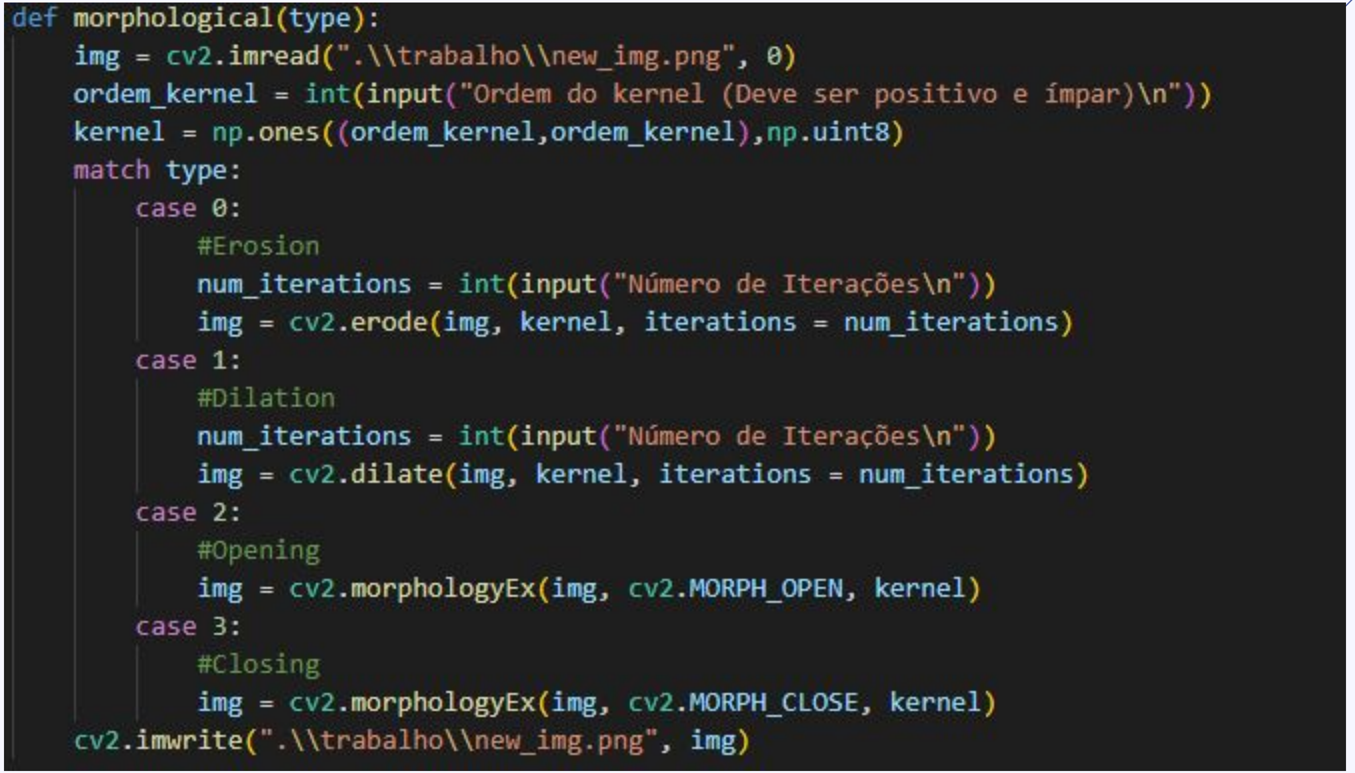
```python
def thresholding(type):
    img = cv2.imread(".\\trabalho\\new_img.png", 0)
    limiarVal = int(input("Valor Limiar:\n"))
    maxVal = int(input("Valor Maximo:\n"))
    match type:
        case 0:
            #Binário
            ret, img = cv2.threshold(img, limiarVal, maxVal, cv2.THRESH_BINARY)
        case 1:
            #Binário Invertido
            ret, img = cv2.threshold(img, limiarVal, maxVal, cv2.THRESH_BINARY_INV)
        case 2:
            #Thresholding Adaptativo Médio
            img = cv2.adaptiveThreshold(img, maxVal, cv2.ADAPTIVE_THRESH_MEAN_C, cv2.THRESH_BINARY, 9, 2)
        case 3:
            #Thresholding Adaptativo Gaussiano
            img = cv2.adaptiveThreshold(img, maxVal, cv2.ADAPTIVE_THRESH_GAUSSIAN_C, cv2.THRESH_BINARY, 9, 2)
    cv2.imwrite(".\\trabalho\\new_img.png", img)
```

2. Suavização



```
def smoothing(type):
    img = cv2.imread(".\\trabalho\\new_img.png", 0)
    ordem_kernel = int(input("Ordem do kernel (Deve ser positivo e ímpar)\n"))
    match type:
        case 0:
            #2D Convolution
            kernel = np.ones((ordem_kernel, ordem_kernel), np.float32)/(ordem_kernel*ordem_kernel)
            img = cv2.filter2D (img, -1, kernel)
        case 1:
            #Averaging
            img = cv2.blur(img,(ordem_kernel,ordem_kernel))
        case 2:
            #Gaussian Blurring
            img = cv2.GaussianBlur(img, (ordem_kernel, ordem_kernel), cv2.BORDER_DEFAULT)
        case 3:
            #Median Blurring
            img = cv2.medianBlur(img, ordem_kernel)
    cv2.imwrite(".\\trabalho\\new_img.png", img)
```

3. Transformações Morfológicas

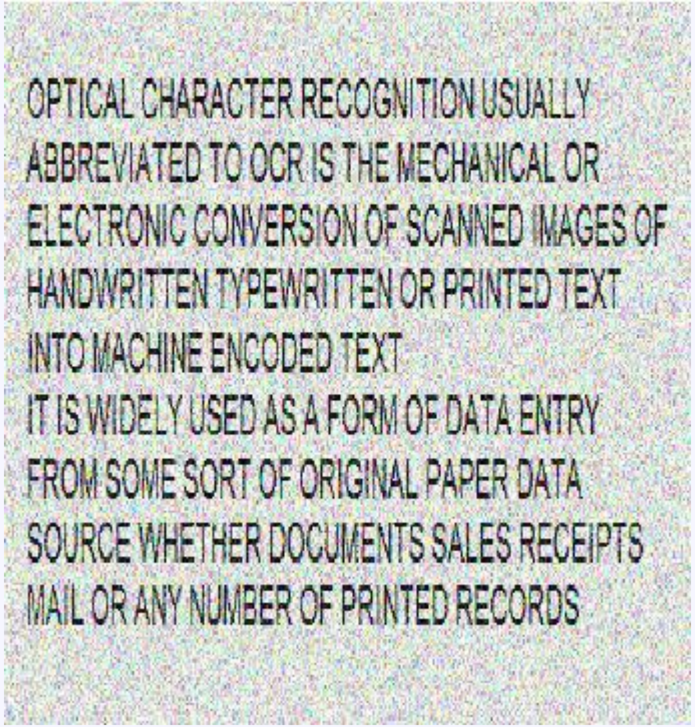


```python
def morphological(type):
    img = cv2.imread(".\\trabalho\\new_img.png", 0)
    ordem_kernel = int(input("Ordem do kernel (Deve ser positivo e ímpar)\n"))
    kernel = np.ones((ordem_kernel,ordem_kernel),np.uint8)
    match type:
        case 0:
            #Erosion
            num_iterations = int(input("Número de Iterações\n"))
            img = cv2.erode(img, kernel, iterations = num_iterations)
        case 1:
            #Dilation
            num_iterations = int(input("Número de Iterações\n"))
            img = cv2.dilate(img, kernel, iterations = num_iterations)
        case 2:
            #Opening
            img = cv2.morphologyEx(img, cv2.MORPH_OPEN, kernel)
        case 3:
            #Closing
            img = cv2.morphologyEx(img, cv2.MORPH_CLOSE, kernel)
    cv2.imwrite(".\\trabalho\\new_img.png", img)
```

03

RESULTADOS

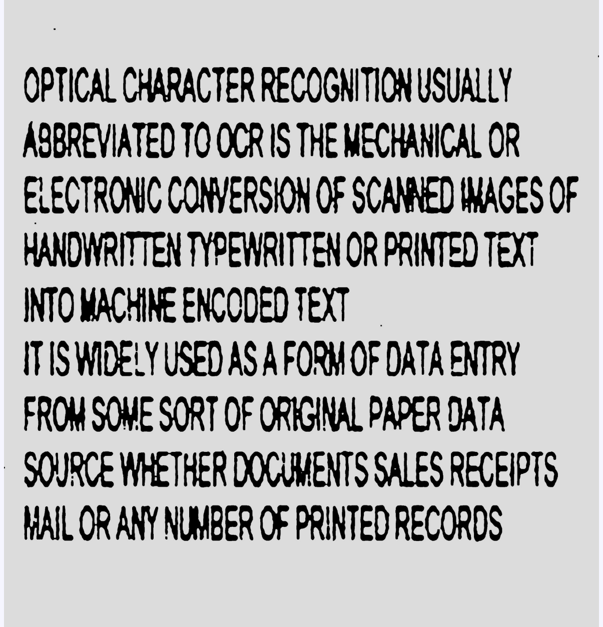
1. Primeiro experimento



OPTICAL CHARACTER RECOGNITION USUALLY ABBREVIATED TO OCR IS THE MECHANICAL OR ELECTRONIC CONVERSION OF SCANNED IMAGES OF HANDWRITTEN TYPEWRITTEN OR PRINTED TEXT INTO MACHINE ENCODED TEXT

IT IS WIDELY USED AS A FORM OF DATA ENTRY FROM SOME SORT OF ORIGINAL PAPER DATA SOURCE WHETHER DOCUMENTS SALES RECEIPTS MAIL OR ANY NUMBER OF PRINTED RECORDS

1. Resultado



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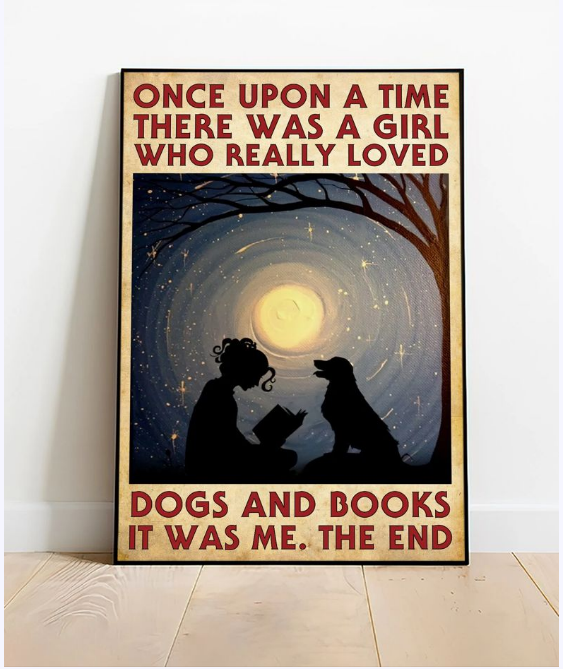
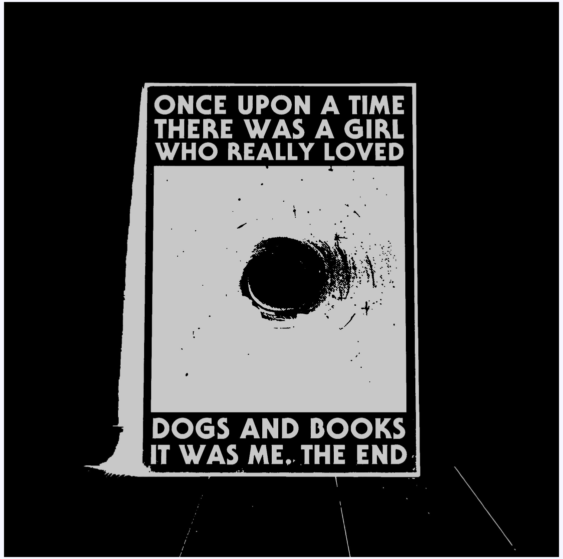
SOURCE WHETHER DOCUMENTS SALES RECEIPTS MAIL OR ANY NUMBER OF PRINTED RECORDS"

2. Segundo experimento



2. Resultado

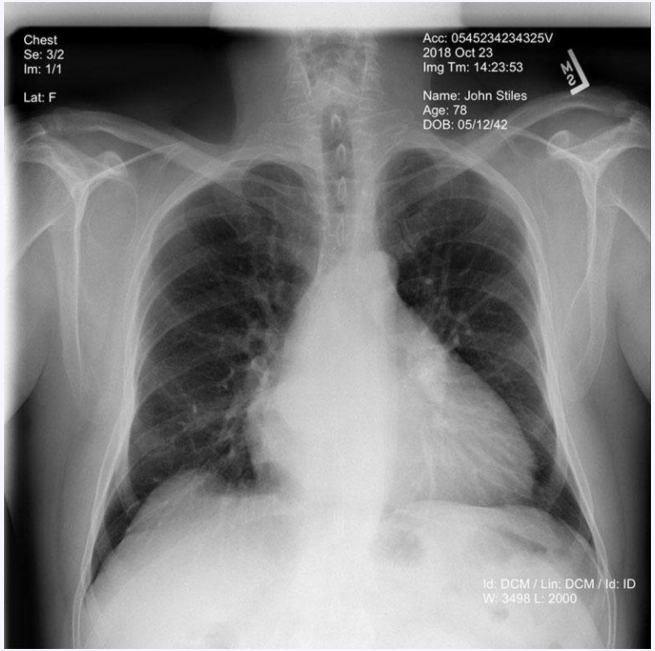


"ONCE UPON A TIME

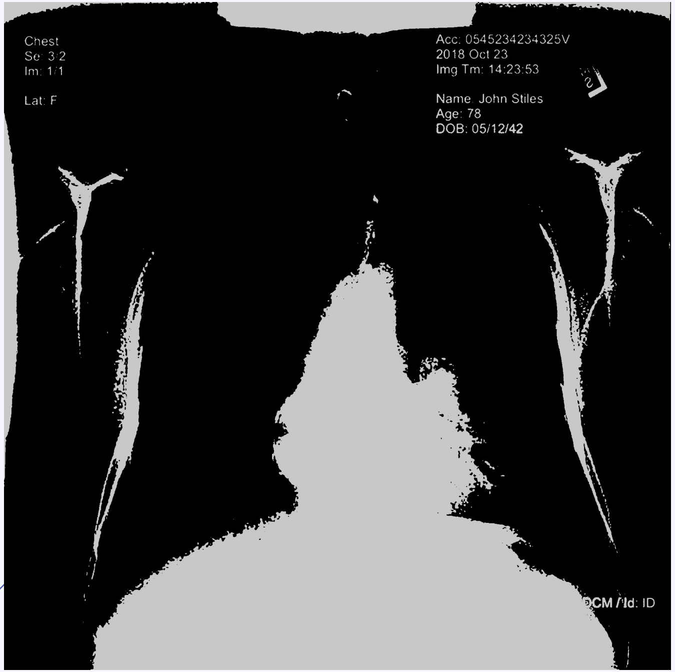
THERE WAS A GIRL
WHO REALLY LOVED

DOGS AND BOOKS
IT WAS ME. THE END."

3. Terceiro experimento



3. Resultado



“Chest
Se: 3:2
Im: 1/1

Lat: F

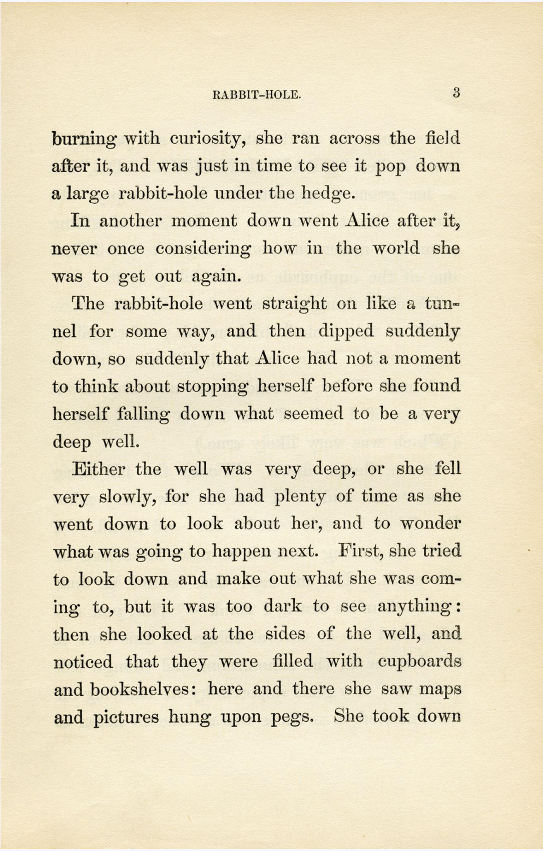
Acc: 0545234234325V
2018 Oct 23
Img Tm: 14:23:53 ra

»

Name. John Stiles
Age: 78
DOB: 05/12/42

BCM ld: 1D”

4. Quarto experimento



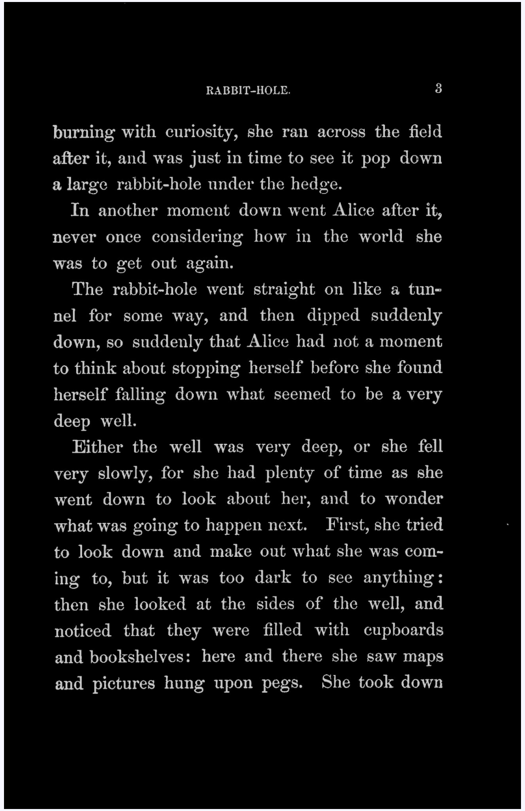
burning with curiosity, she ran across the field after it, and was just in time to see it pop down a large rabbit-hole under the hedge.

In another moment down went Alice after it, never once considering how in the world she was to get out again.

The rabbit-hole went straight on like a tunnel for some way, and then dipped suddenly down, so suddenly that Alice had not a moment to think about stopping herself before she found herself falling down what seemed to be a very deep well.

Either the well was very deep, or she fell very slowly, for she had plenty of time as she went down to look about her, and to wonder what was going to happen next. First, she tried to look down and make out what she was coming to, but it was too dark to see anything: then she looked at the sides of the well, and noticed that they were filled with cupboards and bookshelves: here and there she saw maps and pictures hung upon pegs. She took down

4. Resultado



RABBIT-HOLE. 3

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