Segmentação por Cor

ES235 - Aula 07
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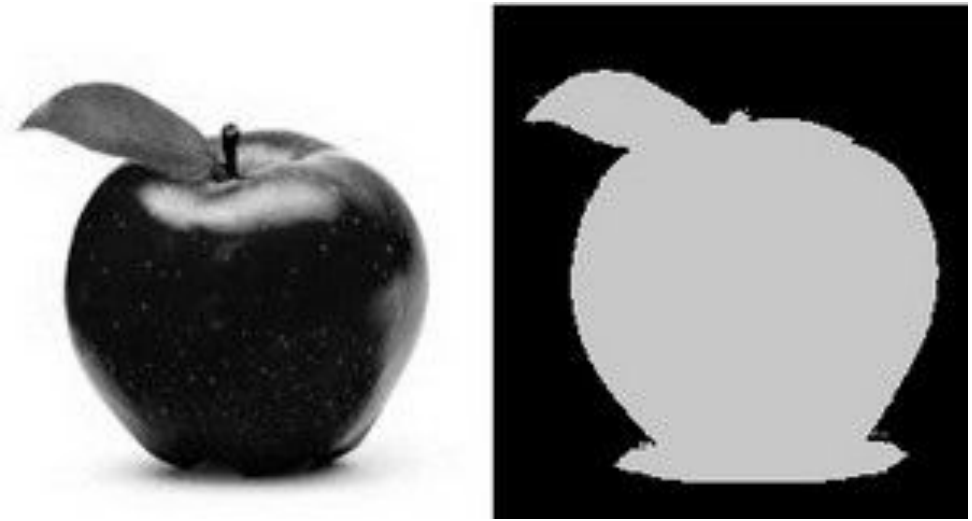
Binarização (ou limiarização)

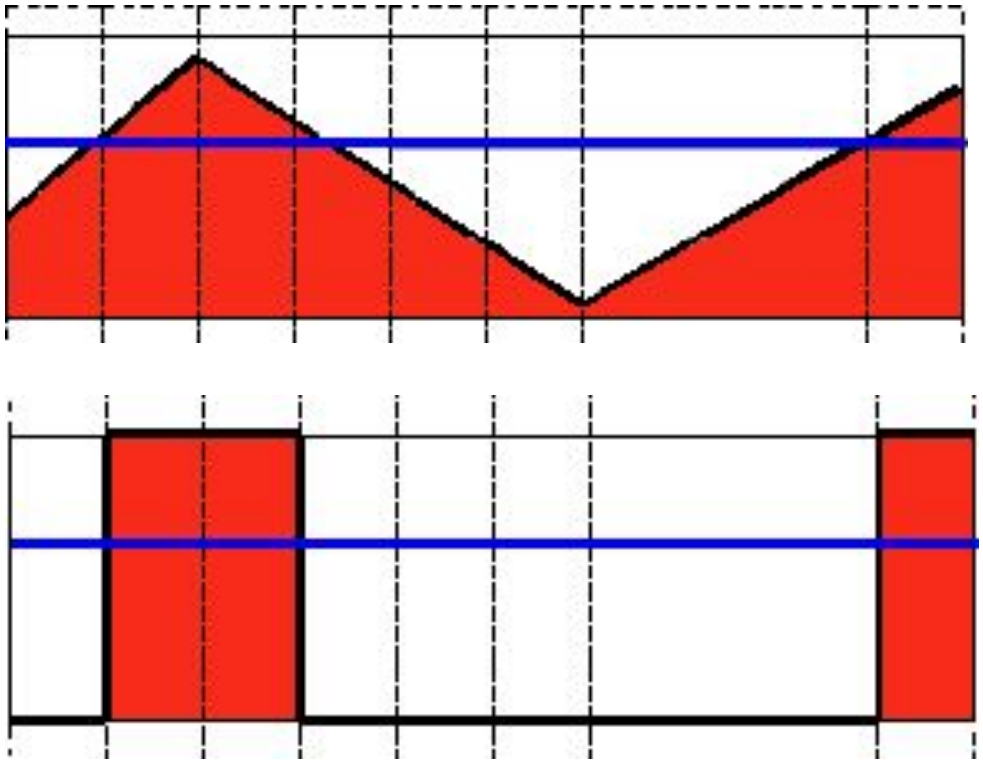
- Método mais simples de segmentação
- Segmentação ocorre com base em um limiar
- No OpenCV:
  - Binary
  - Binary, Inverted
  - Truncate
  - Threshold to Zero
  - Threshold to Zero, Inverted



Algoritmos de Limiarização (do OpenCV)

- Binary

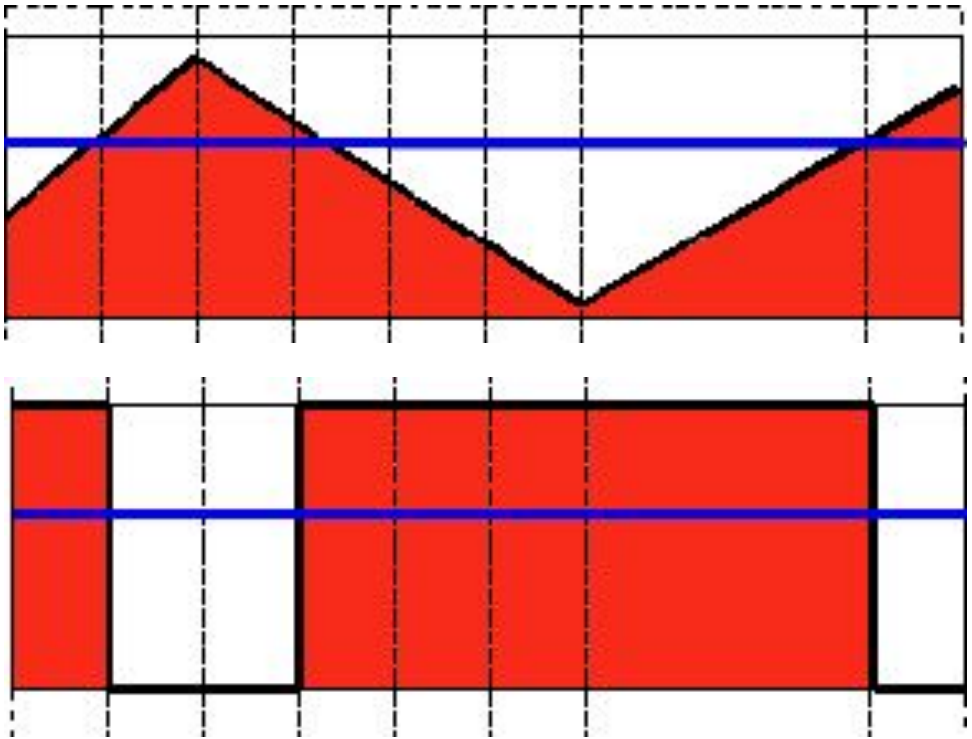
$$\texttt{dst}(x,y) = \begin{cases} \texttt{maxVal} & \text{if } \texttt{src}(x,y) > \texttt{thresh} \\ 0 & \text{otherwise} \end{cases}$$



Algoritmos de Limiarização (do OpenCV)

- Binary, Inverted

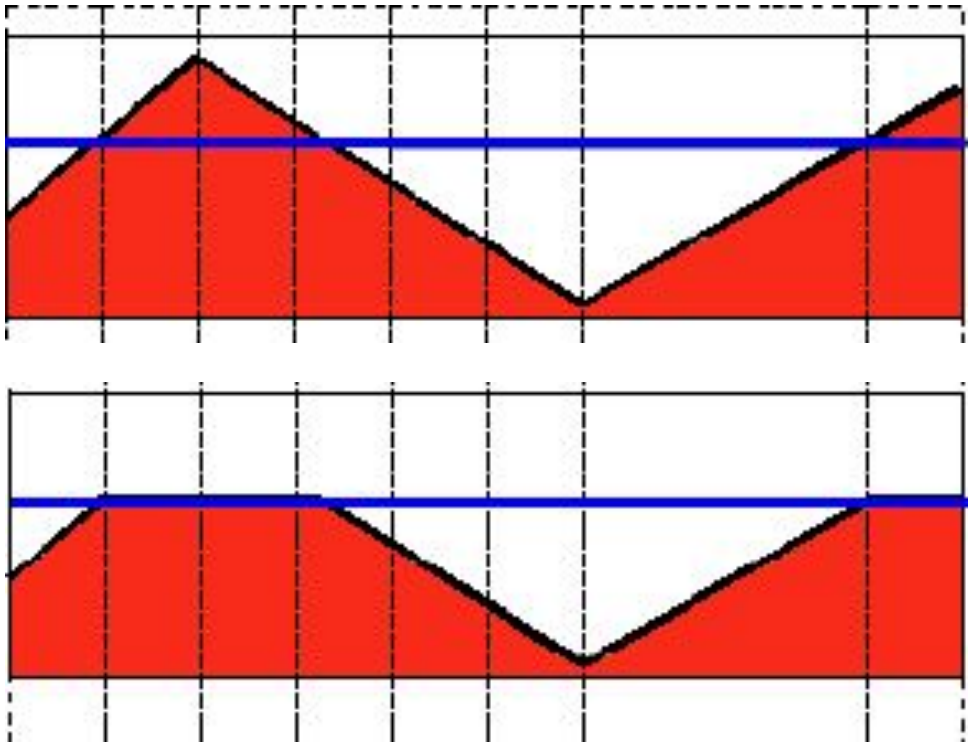
$$\texttt{dst}(x,y) = \begin{cases} 0 & \text{if } \texttt{src}(x,y) > \texttt{thresh} \\ \texttt{maxVal} & \text{otherwise} \end{cases}$$



Algoritmos de Limiarização (do OpenCV)

- Truncate

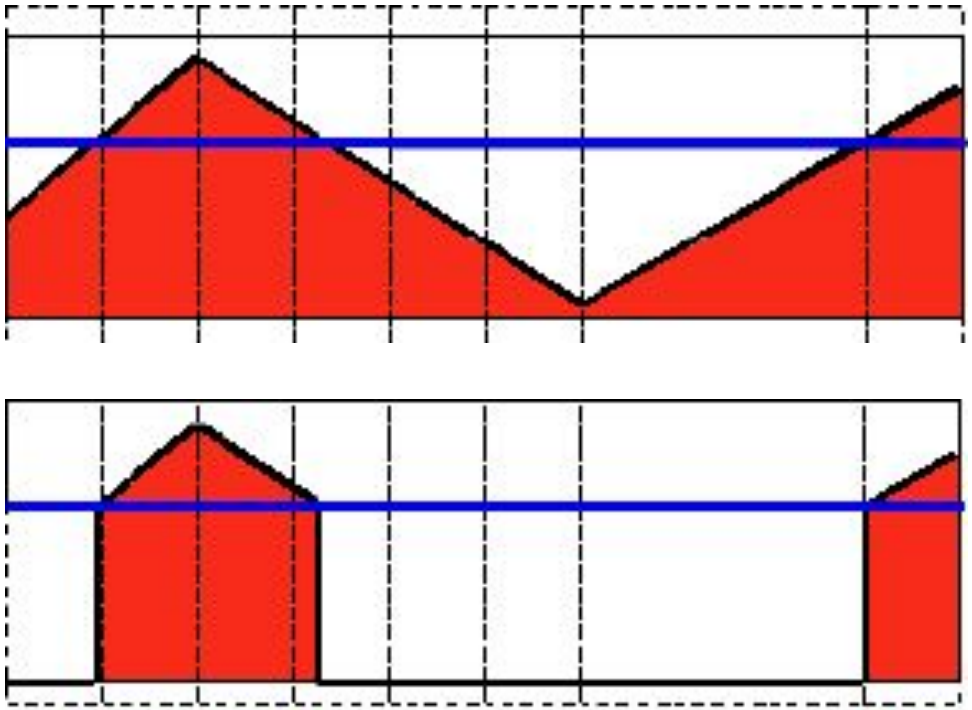
$$\texttt{dst}(x,y) = \begin{cases} \texttt{threshold} & \text{if } \texttt{src}(x,y) > \texttt{thresh} \\ \texttt{src}(x,y) & \text{otherwise} \end{cases}$$



Algoritmos de Limiarização (do OpenCV)

- Threshold to Zero

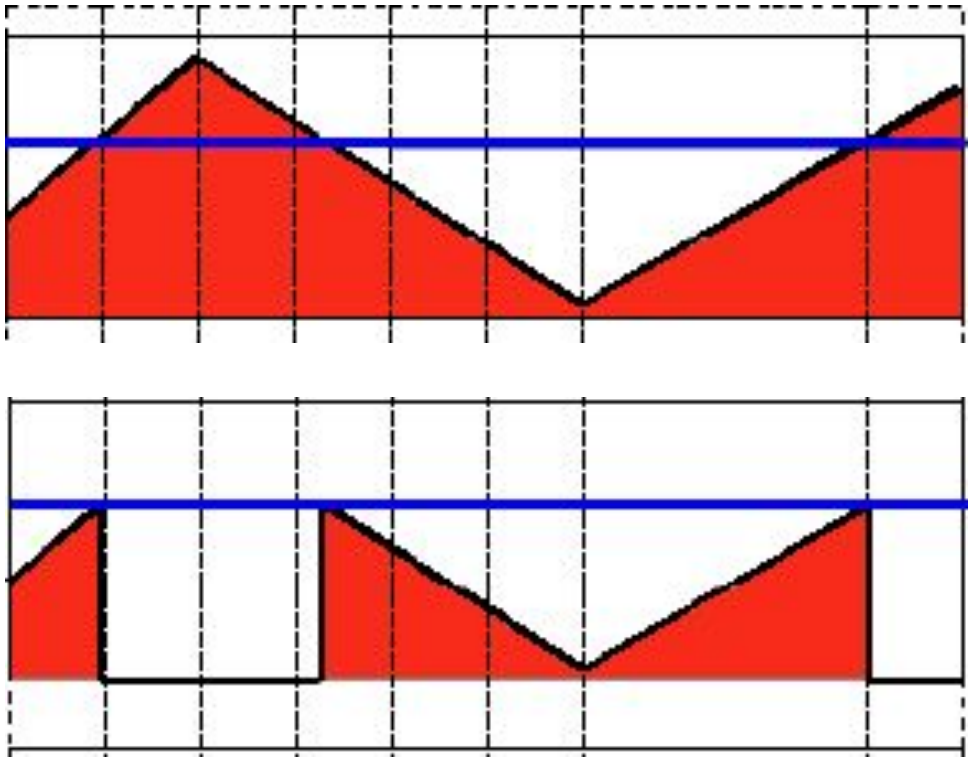
$$\texttt{dst}(x,y) = \begin{cases} \texttt{src}(x,y) & \text{if } \texttt{src}(x,y) > \texttt{thresh} \\ 0 & \text{otherwise} \end{cases}$$



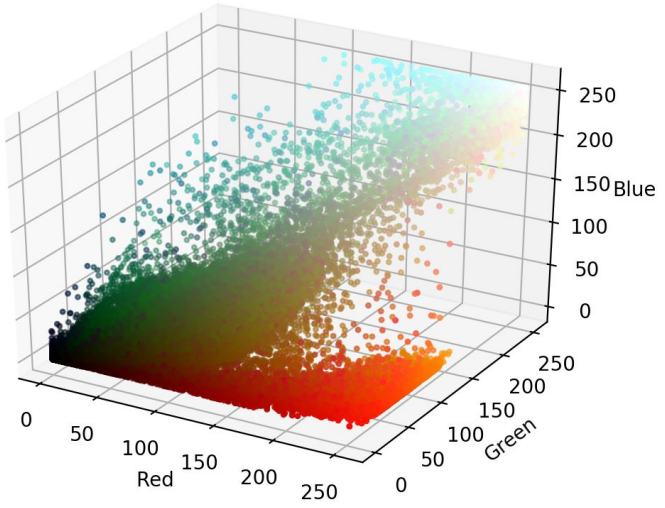
Algoritmos de Limiarização (do OpenCV)

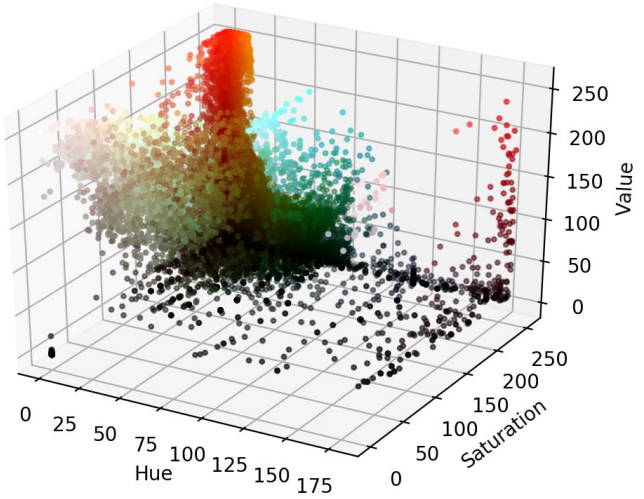
- Threshold to Zero, Inverted

$$\texttt{dst}(x,y) = \begin{cases} 0 & \text{if } \texttt{src}(x,y) > \texttt{thresh} \\ \texttt{src}(x,y) & \text{otherwise} \end{cases}$$



Segmentação por Cor usando HSV

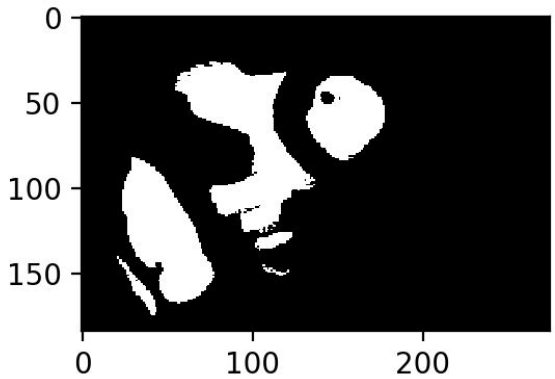


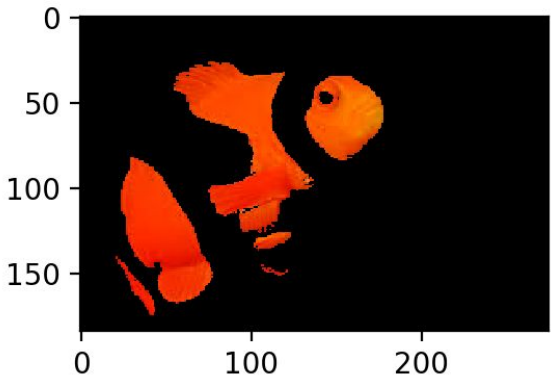


Segmentação por Cor usando HSV

`cv.inRange(src, lowerb, upperb)`

$$\texttt{dst}(I) = \texttt{lowerb}(I)_0 \leq \texttt{src}(I)_0 \leq \texttt{upperb}(I)_0$$





K-means Clustering

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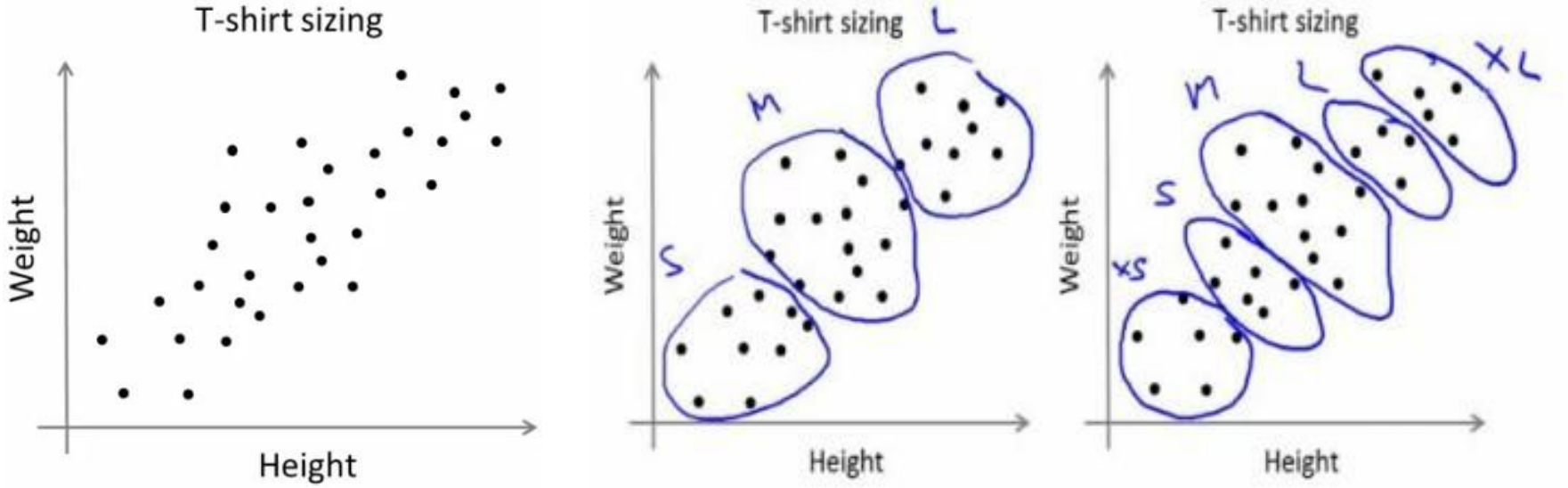
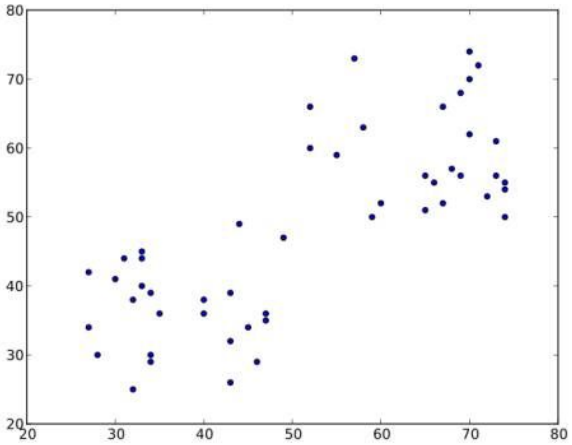
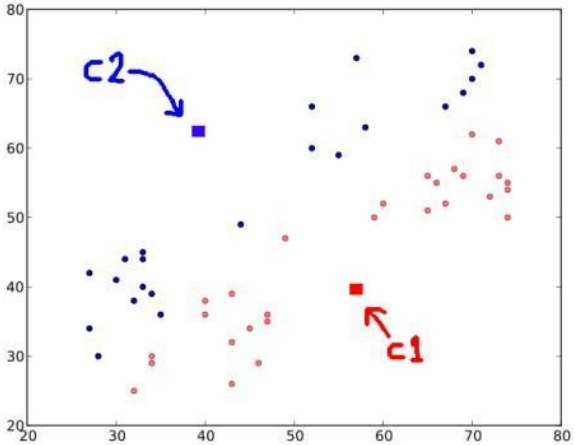
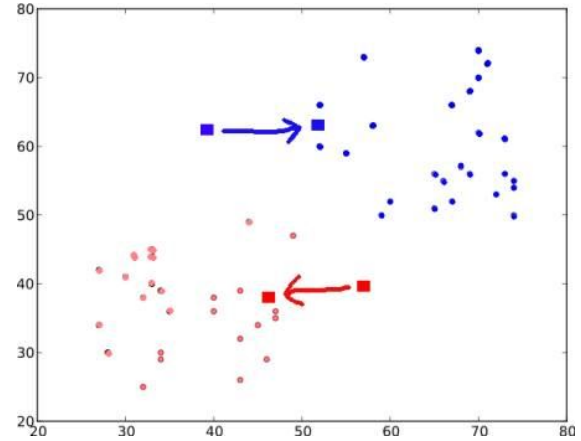
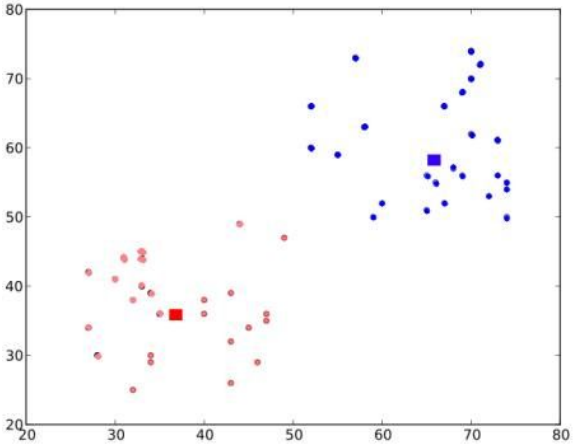


K-means Clustering





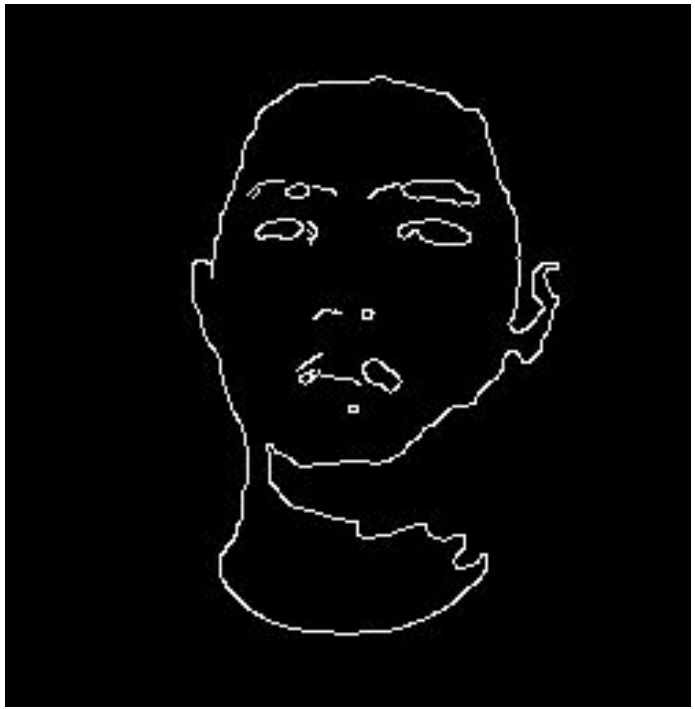


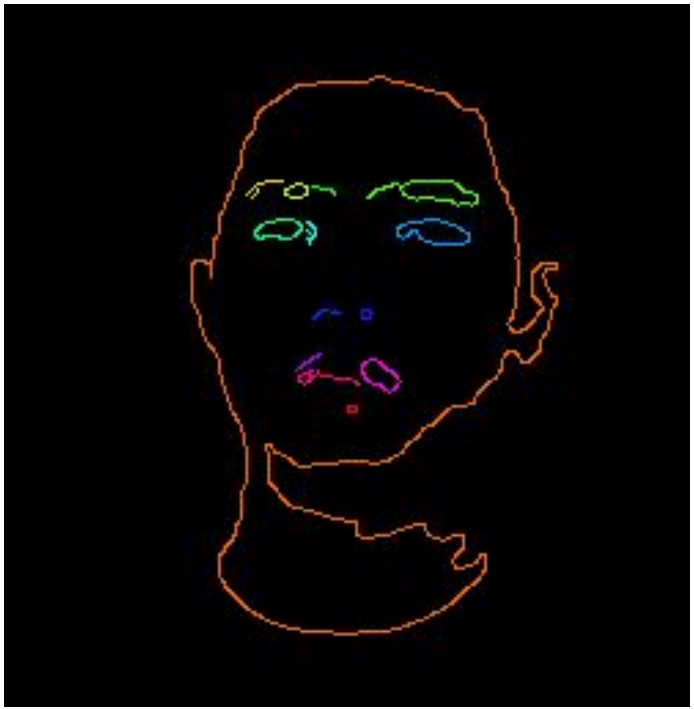


K-means Clustering

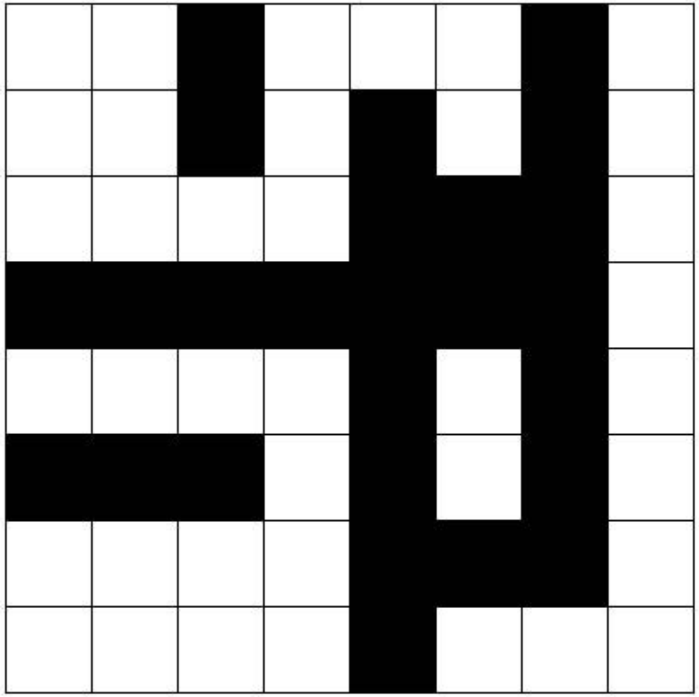
- Quantização de cores

Connected Components Labeling

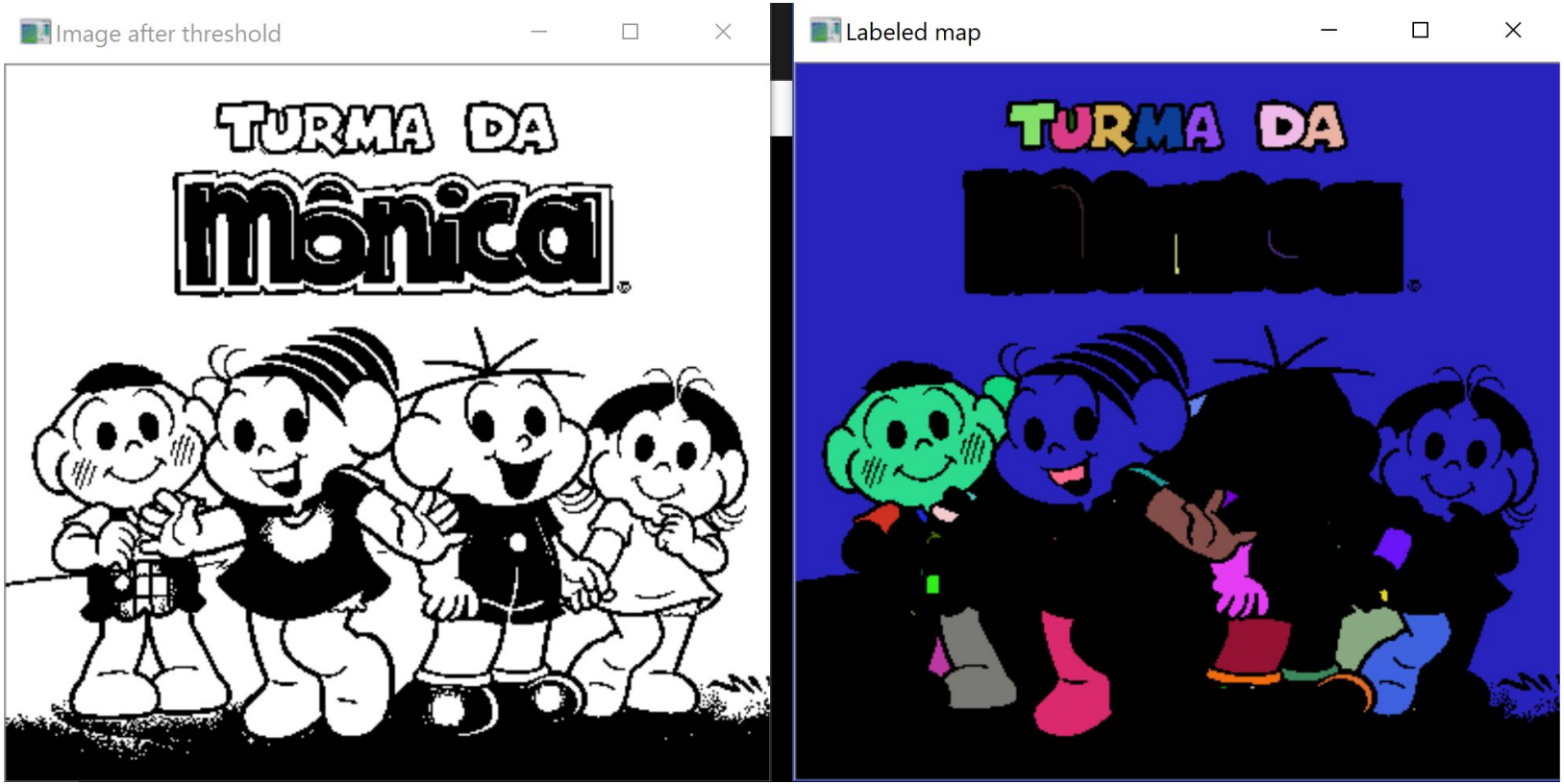




Connected Components Labeling



Connected Components Labeling



REFERÊNCIAS

Rafael C. Gonzalez and Richard E. Woods. 2006. Digital Image Processing (3rd Edition). Prentice-Hall, Inc., Upper Saddle River, NJ, USA.

https://docs.opencv.org/3.4/db/d8e/tutorial_threshold.html

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