Module: Computer Vision - Session 3

Computer Vision

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Online Training & Certification Course on Artificial Intelligence & Machine Learning
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Computer Vision

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Image Thresholding Techniques

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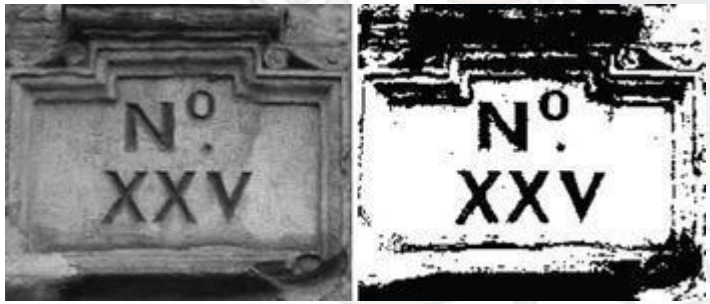
Outline of Presentation

- Image Thresholding
- Adaptive Thresholding Algorithm
- Otsu Thresholding Algorithm
- Image Segmentation

Simple Image Thresholding

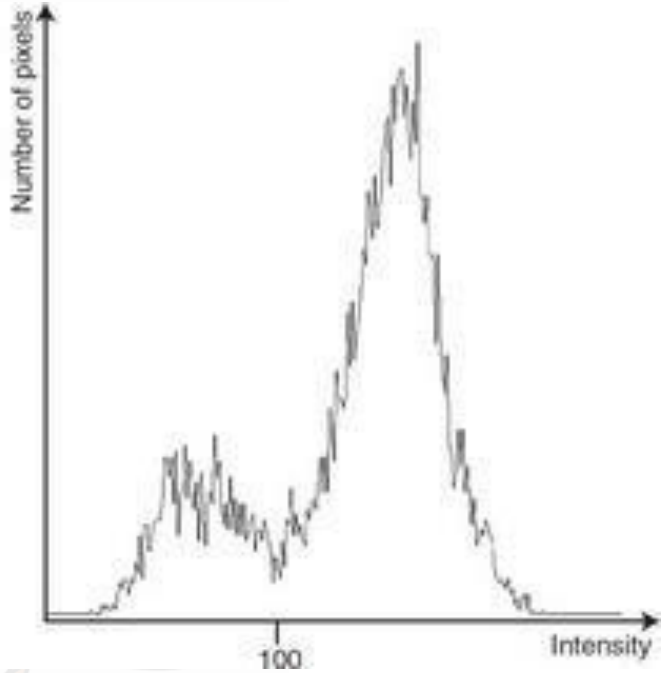
- used in order to separate some objects of interest from the background.



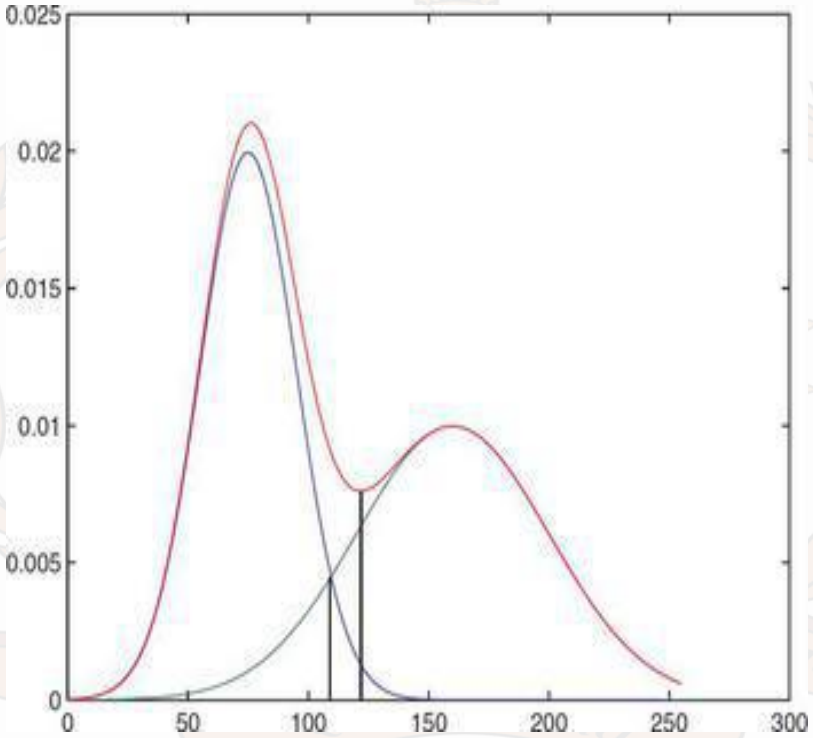
Adaptive Image Thresholding

$$h(g) = \sum_{i,j} \begin{bmatrix} 1 & f(i,j) = g \\ 0 & otherwise \end{bmatrix}$$

$$p(g) = h(g) \Big/ \sum_g h(g)$$



Optimal Thresholding Algorithm



Otsu Thresholding–python demo

perform automatic image thresholding
returns a single intensity threshold that separate pixels into two classes, foreground and background.
This threshold is determined by minimizing intra-class intensity variance/maximizing inter-class variance.

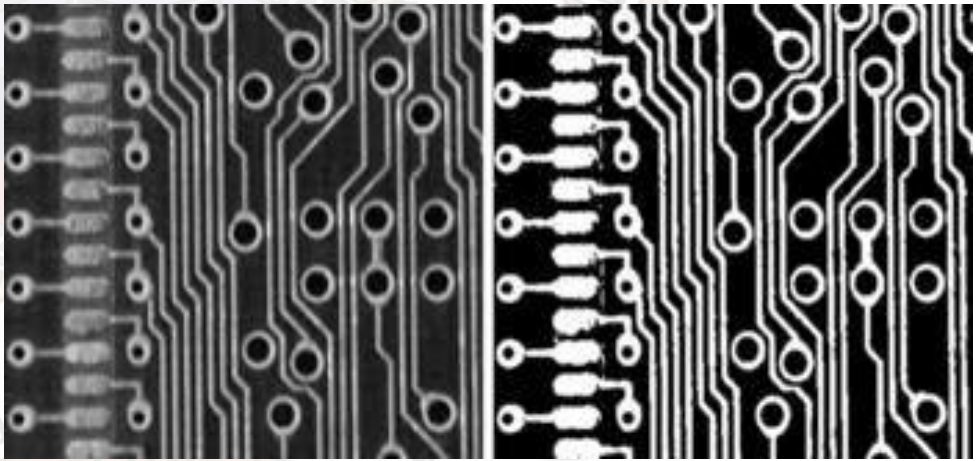
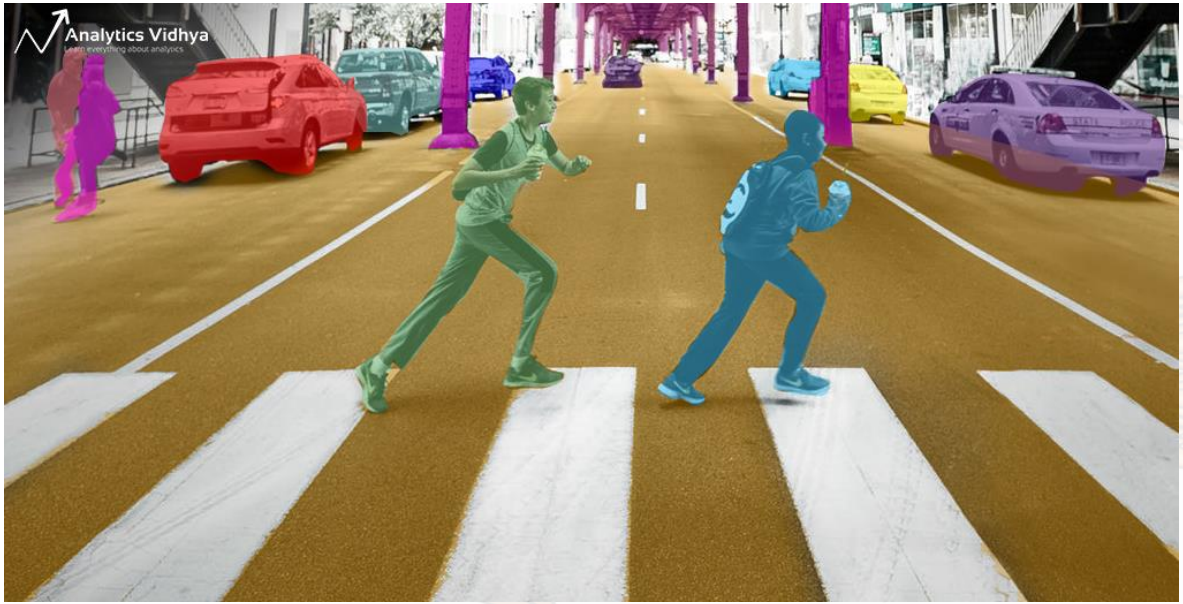


Image Segmentation



- Source of Figure: https://www.analyticsvidhya.com/blog/2019/04/introduction-image-segmentation-techniques-python/

Reference Material

- 1. E. R. Davies, “Computer & Machine Vision”, Fourth Edition, Academic Press, 2012.
- 2. R. Szeliski, “Computer Vision: Algorithms and Applications”, Springer 2011.
- 3. Simon J. D. Prince, “Computer Vision: Models, Learning, and Inference”, Cambridge University Press, 2012.
- 4. Mark Nixon and Alberto S. Aquado, “Feature Extraction & Image Processing for Computer Vision”, Third Edition, Academic Press, 2012.
- 5. Sunita Dhavale, “Advanced Image-Based Spam Detection and Filtering Techniques”, Book Published by CyberTech: An Imprint of MKP Technologies, Hershey, PA, USA IGI Global, March 2017, ISBN13: 9781683180135|ISBN10: 1683180135|EISBN13: 9781683180142|DOI: 10.4018/978-1-68318-013-5.
- Gonzalez and R. Woods Digital Image Processing, Addison-Wesley Publishing Company, 1992, p 442.

<<Epilogue>>

- We will meet in next scheduled lecture.
- Implement algorithms using python.
- Feel free to ask your questions.
- Email: sunitadhavale@diat.ac.in

Thank You!