Digital Image Processing Multiple Choice Questions | MCQs | Quiz

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Digital Image Processing Questions and Answers – Histogram Specification and Use of Histogram Statistics for Image Enhancement

This set of Digital Image Processing online quiz focuses on "Histogram Specification and Use of Histogram Statistics for Image Enhancement".

1. The technique of Enhancement that has a specified Histogram processed image as result, is called?
a) Histogram Linearization
b) Histogram Equalization
c) Histogram Matching
d) None of the mentioned

View Answer

Answer: c
Explanation: Histogram Specification method uses a specified Histogram, i.e. the shape of histogram can be specified by self, to generate a processed image.
And the same is also known as Histogram Matching.

2. In Histogram Matching r and z are gray level of input and output image and p stands for PDF, then, what does $p_z(z)$ stands for?
a) Specific probability density function
b) Specified pixel distribution function
c) Specific pixel density function
d) Specified probability density function
View Answer

Answer: d
Explanation: In Histogram Matching, $p_r(r)$ is estimated from input image while $p_z(z)$ is Specified probability density function that output image is supposed to have.

3. Inverse transformation plays an important role in which of the following Histogram processing Techniques?
a) Histogram Linearization
b) Histogram Equalization
c) Histogram Matching
d) None of the mentioned
View Answer

Answer: c
Explanation: In Histogram Matching or Specification, $z = G^{-1}[T(r)]$, r and z are gray level of input and output image and T & G are transformations.
In Histogram Linearization or Equalization $s = T(r)$, r and s are gray level of input and output image and T is the only transformations.

4. In Histogram Matching or Specification, $z = G^{-1}[T(r)]$, r and z are gray level of input and output image and T & G are transformations, to confirm the single value and monotonous of G^{-1} what of the following is/are required?
a) G must be strictly monotonic
b) G must be strictly decreasing
c) All of the mentioned
d) None of the mentioned
View Answer

Answer: a
Explanation: G being strictly monotonic, confirms that the values of specified histogram $p_z(zi)$ can't be zero. That is G^{-1} is also single valued and monotonic.

5. Which of the following histogram processing techniques is global?
a) Histogram Linearization
b) Histogram Specification
c) Histogram Matching
d) All of the mentioned

View Answer

Answer: d
Explanation: All of the mentioned methods modifies the pixel value by transformations that are based on the gray-level of the whole image.

6. What happens to the output image when global Histogram equalization method is applied on smooth and noisy area of an image?
a) The contrast increases little bit with considerable enhancement of noise
b) The result would have a fine noise texture
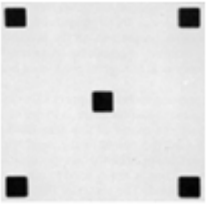c) All of the mentioned
d) None of the mentioned

View Answer

Answer: a
Explanation: To an image's smooth and noisy area, when global histogram method is applied the contrast increases little bit with considerable enhancement of noise, while for local method the result has a fine noise texture.

(https://www.sanfoundry.com/wp-content/uploads/2017/06/digital-image-processing-questions-answers-online-quiz-q6.png)
(a) Original image. (b) Result using global histogram equalization. (c) Result using local histogram equalization using 7*7 neighborhood about each pixel.

7. Let us suppose an image containing a quite small square under a large dark square with both having very close gray level values. If an image contains some of this such that the small squares can't be visualized and some noise blurred enough to reduce its noise content as shown in fig. below, Which of the following method would be preferred for obtaining the small square clear enough?

(https://www.sanfoundry.com/wp-content/uploads/2017/06/digital-image-processing-questions-answers-online-quiz-q7.png)

Figure: original image.

a) Global histogram equalization
b) Local histogram equalization
c) All of the mentioned
d) None of the mentioned

View Answer

Answer: b

Explanation: For global histogram enhancement, the small squares have a very close gray value with larger square and have a very small size to be influenced by global histogram equalization method.
But, local histogram enhancement using a 7*7 neighborhood reveals the small square.

(https://www.sanfoundry.com/wp-content/uploads/2017/06/digital-image-processing-questions-answers-online-quiz-q6.png)

(a) Original image. (b) Result using global histogram equalization. (c) Result using local histogram equalization using 7*7 neighborhood about each pixel.

8. In terms of enhancement, what does mean and variance refers to?
a) Average contrast and average gray level respectively
b) Average gray level and average contrast respectively
c) Average gray level in both
d) Average contrast in both

View Answer

Answer: b

Explanation: In terms of enhancement, mean refers to average gray level and variance to average contrast.
Given by, mean as: $m = \sum_{i=0}^{L-1} r_i \, p(r_i)$ and variance as: $\sigma^2(r) = \sum_{i=0}^{L-1} (r_i - m)^2 \, p(r_i)$.
Where, r_i is histogram component of ith value of r, $p(r_i)$ is probability occurrence of gray level r_i and L is the max gray value allowed.

9. For a local enhancement using mean and variance, there is one condition: $m_{s(x, y)} \leq k_0 M_G$, where, M_G is global mean, k_0 a constant and $m_{s(x, y)}$ a measure of gray value as light or dark at point (x, y). Then, which fact is true for k_0?
a) It is a negative constant with values less than -1.0
b) It is a positive constant with values less than 1.0
c) It is an integer constant with values between -1.0 and 1.0
d) None of the mentioned

View Answer

Answer: b

Explanation: In the condition $m_{s(x, y)} \leq k_0 M_G$, k_0 is a positive constants whose value is always less than 1.0.

10. For a local enhancement using mean and variance, there is one condition: $\sigma s(x, y) \le k_2 D_G$, where, M_{DG} is global standard deviation, k_2 a positive constant and $\sigma s(x, y)$ a measure of contrast at point (x, y). Then, which fact is true for k_2 if its values is less than 1.0?
a) Enhancement is being done on light areas
b) Enhancement is being done on dark areas
c) Enhancement is being done independent of value of k_0
d) None of the mentioned

View Answer

Answer: b
Explanation: In the condition $\sigma_{s(x, y)} \le k_2 D_G$, k_0 is a positive constants that helps in enhancing light areas if value is greater than 1.0 and dark areas if value is less than 1.0.

11. For a local enhancement using mean and variance, there is one condition: $\sigma_{s(x, y)} \le k_2 D_G$, where, M_{DG} is global standard deviation, k_2 a positive constant and $\sigma s(x, y)$ a measure of contrast at point (x, y). Then, which fact is true for k_2 if its values is greater than 1.0?
a) Enhancement is being done on light areas
b) Enhancement is being done on dark areas
c) Enhancement is being done independent of value of k_0
d) None of the mentioned

View Answer

Answer: a
Explanation: In the condition $\sigma_{s(x, y)} \le k_2 D_G$, k_0 is a positive constants that helps in enhancing light areas if value is greater than 1.0 and dark areas if value is less than 1.0.

12. What is standard deviation value for constant area?
a) 0
b) 1
c) -1
d) None of the mentioned

View Answer

Answer: a
Explanation: Standard deviation is given by:

(https://www.sanfoundry.com/wp-content/uploads/2017/06/digital-image-processing-questions-answers-online-quiz-q12.png) that results 0 for constant areas.

13. For a local enhancement using mean and variance, what happens if the lowest value of contrast is not restricted as per the willingness of acceptance of value?
a) There wouldn't be any enhancement
b) Enhancement will occur for areas with standard deviation value > 1
c) Enhancement of the constant areas will also be the part of procedure
d) Enhancement will occur for areas with standard deviation value > 0 and < 1

View Answer

Answer: c
Explanation: If the lowest value of contrast is not restricted as per the willingness of acceptance of value, the Enhancement of the constant areas will also be the part of procedure, since a constant area has standard deviation value 0.

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1

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Manish Bhojasia (https://www.sanfoundry.com/about/), a technology veteran with 20+ years @ Cisco & Wipro, is Founder and CTO at Sanfoundry. He is Linux Kernel Developer and SAN Architect and is passionate about competency developments in these areas. He lives in Bangalore and delivers focused training sessions to IT professionals in Linux Kernel, Linux Debugging, Linux Device Drivers, Linux Networking, Linux Storage & Cluster Administration, Advanced C Programming, SAN Storage Technologies, SCSI Internals and Storage Protocols such as iSCSI & Fiber Channel. Stay connected with him below:

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