Digital Image Processing Questions and Answers – Smoothing Nonlinear Spatial Filter

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This set of Digital Image Processing Multiple Choice Questions & Answers (MCQs) focuses on “Smoonthing Nonlinear Spatial Filter”.

1. Which of the following filter(s) has the response in which the central pixel value is replaced by value defined by ranking the pixel in the image encompassed by filter?
a) Order-Statistic filters
b) Non-linear spatial filters
c) Median filter
d) All of the mentioned

View Answer

Answer: d
Explanation: An Order-Statistic filters also called non-linear spatial filters, response is based on ranking the pixel in the image encompassed by filter that replaces the central pixel value. A Median filter is an example of such filters.

2. Is it true or false that “the original pixel value is included while computing the median using gray-levels in the neighborhood of the original pixel in median filter case”?
a) True
b) False

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Answer: a
Explanation: A median filter the pixel value is replaced by median of the gray-level in the neighborhood of that pixel and also the original pixel value is included while computing the median.

3. Two filters of similar size are used for smoothing image having impulse noise. One is median filter while the other is a linear spatial filter. Which would the blurring effect of both?
a) Median filter effects in considerably less blurring than the linear spatial filters
b) Median filter effects in considerably more blurring than the linear spatial filters
c) Both have the same blurring effect
d) All of the mentioned

View Answer

Answer: a
Explanation: For impulse noise, median filter is much effective for noise reduction and causes considerably less blurring than the linear spatial filters.

4. An image contains noise having appearance as black and white dots superimposed on the image. Which of the following noise(s) has the same appearance?
a) Salt-and-pepper noise
b) Gaussian noise
c) All of the mentioned
d) None of the mentioned

View Answer

Answer: c
Explanation: An impulse noise has an appearance as black and white dots superimposed on the image. This is also known as Salt-and-pepper noise.

5. While performing the median filtering, suppose a 3*3 neighborhood has value (10, 20, 20, 20, 15, 20, 20, 25, 100), then what is the median value to be given to the pixel under filter?
a) 15
b) 20
c) 100
d) 25

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Answer: b
Explanation: The values are first sorted and so turns out to (10, 15, 20, 20, 20, 20, 20, 25, and 100). For a 3*3 neighborhood the 5th largest value is the median, and so is 20.

6. Which of the following are forced to the median intensity of the neighbors by n*n median filter?
a) Isolated cluster of pixels that are light or dark in comparison to their neighbors
b) Isolated cluster of pixels whose area is less than one-half the filter area
c) All of the mentioned
d) None of the mentioned

View Answer

Answer: c
Explanation: The isolated cluster pixel value doesn't come as a median value and since are either are light or dark as compared to neighbors, so are forced with median intensity of neighbors that aren't even close to their original value and so are sometimes termed "eliminated".
If the area of such isolated pixels are < n2/2, that is again the pixel value won't be a median value and so are eliminated.
Larger cluster pixels value are more pronounced to be a median value, so are considerably less forced to median intensity.

7. Which filter(s) used to find the brightest point in the image?
a) Median filter
b) Max filter
c) Mean filter
d) All of the mentioned

View Answer

Answer: b
Explanation: A max filter gives the brightest point in an image and so is used.

8. The median filter also represents which of the following ranked set of numbers?
a) 100th percentile
b) 0th percentile
c) 50th percentile
d) None of the mentioned

View Answer

Answer: c
Explanation: Since the median filter forces median intensity to the pixel which is almost the largest value in the middle of the list of values as per the ranking, so represents a 50th percentile ranked set of numbers.

9. Which of the following filter represents a 0th percentile set of numbers?
a) Max filter
b) Mean filter
c) Median filter
d) None of the mentioned

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Answer: d
Explanation: A min filter since provides the minimum value in the image, so represents a 0th percentile set of numbers.

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