1. Which of the following image representation schemes is based on the intensity levels of pixels?
a) Histogram representation
b) Boundary descriptors
c) Region descriptors
d) Binary representation
Answer: a) Histogram representation
Explanation: Histogram representation involves plotting the frequency distribution of pixel intensity levels in an image.

2. What technique is used to separate foreground objects from the background in image processing?
a) Segmentation
b) Connected component labeling
c) Spatial clustering
d) Split & merge
Answer: a) Segmentation
Explanation: Segmentation is the process of partitioning an image into multiple segments to extract meaningful information.

3. Which segmentation technique involves merging adjacent regions based on certain criteria?
a) Hierarchical segmentation
b) Connected component labeling
c) Split & merge
d) Motion-based segmentation
Answer: c) Split & merge

Explanation: Split & merge segmentation involves recursively splitting regions into smaller ones and then merging them based on certain criteria.

4. What segmentation technique utilizes motion information to partition an image?
a) Hierarchical segmentation
b) Connected component labeling
c) Spatial clustering
d) Motion-based segmentation
Answer: d) Motion-based segmentation
Explanation: Motion-based segmentation separates objects in an image based on their motion characteristics.

5. Which method is commonly used to convert a grayscale image into a binary image?
a) Hierarchical segmentation
b) Connected component labeling
c) Thresholding
d) Spatial clustering
Answer: c) Thresholding
Explanation: Thresholding involves converting a grayscale image into a binary image by selecting a threshold value to classify pixels as either foreground or background.

6. Which technique is used to identify and label distinct objects in a binary image?
a) Hierarchical segmentation
b) Connected component labeling
c) Spatial clustering
d) Split & merge
Answer: b) Connected component labeling

Explanation: Connected component labeling assigns a unique label to each connected component in a binary image.

7. What method involves partitioning an image into a hierarchy of regions with nested relationships?
a) Hierarchical segmentation
b) Connected component labeling
c) Split & merge
d) Motion-based segmentation
Answer: a) Hierarchical segmentation
Explanation: Hierarchical segmentation organizes image regions into a tree-like structure based on their similarity.

8. Which technique groups spatially close pixels together based on certain criteria?
a) Hierarchical segmentation
b) Connected component labeling
c) Spatial clustering
d) Split & merge
Answer: c) Spatial clustering
Explanation: Spatial clustering groups pixels together based on their spatial proximity and similarity.

9. Which segmentation approach uses predefined rules or conditions to partition an image?
a) Hierarchical segmentation
b) Rule-based segmentation
c) Spatial clustering
d) Split & merge

Answer: b) Rule-based segmentation
Explanation: Rule-based segmentation divides an image based on predefined rules or conditions.

10. Which technique is used to extract prominent edges in an image?
a) Connected component labeling
b) Hough transform
c) Spatial clustering
d) Split & merge
Answer: b) Hough transform
Explanation: The Hough transform is a technique used to detect straight lines or curves in an image, often used for edge detection.

11. In image processing, what method is employed to find the best-fitting line through a set of points?
a) Edge detection
b) Line fitting
c) Connected component labeling
d) Thresholding
Answer: b) Line fitting
Explanation: Line fitting determines the best-fitting line that minimizes the distance between the line and a set of points.

12. Which technique is utilized for fitting curves to a set of data points by minimizing the sum of the squared differences between the data points and the curve?
a) Edge detection
b) Line fitting

c) Curve fitting (Least-square fitting)
d) Spatial clustering
Answer: c) Curve fitting (Least-square fitting)
Explanation: Curve fitting, specifically least-square fitting, minimizes the sum of the squared differences between data points and the fitted curve.

13. What method is used for organizing connected pixels into meaningful lines or contours?
a) Edge detection
b) Connected component labeling
c) Thresholding
d) Motion-based segmentation
Answer: a) Edge detection
Explanation: Edge detection identifies and represents the boundaries of objects in an image.

14. Which segmentation technique is primarily based on the grouping of neighboring pixels into regions?
a) Hough transform
b) Line fitting
c) Connected component labeling
d) Rule-based segmentation
Answer: c) Connected component labeling
Explanation: Connected component labeling groups neighboring pixels with the same value into distinct regions.

15. What data structure is commonly used to represent the adjacency relationships between pixels in image processing?
a) Queue

b) Stack
c) Graph
d) Array
Answer: c) Graph
Explanation: Graphs are often used to represent the adjacency relationships between pixels in image processing algorithms.

16. Which technique involves recursively dividing an image into smaller regions until certain criteria are met?
a) Hierarchical segmentation
b) Connected component labeling
c) Spatial clustering
d) Split & merge
Answer: d) Split & merge
Explanation: Split & merge segmentation recursively divides an image into smaller regions and then merges them based on certain criteria.

17. What method is used to group similar pixels together based on their spatial proximity and intensity values?
a) Hierarchical segmentation
b) Connected component labeling
c) Spatial clustering
d) Split & merge
Answer: c) Spatial clustering
Explanation: Spatial clustering groups pixels based on their spatial proximity and similarity.

18. Which technique involves dividing an image into regions based on motion characteristics?

a) Hierarchical segmentation
b) Connected component labeling
c) Spatial clustering
d) Motion-based segmentation
Answer: d) Motion-based segmentation
Explanation: Motion-based segmentation partitions an image into regions based on their motion characteristics.

19. What approach is used to segment an image based on predefined rules or conditions?
a) Hierarchical segmentation
b) Rule-based segmentation
c) Spatial clustering
d) Split & merge
Answer: b) Rule-based segmentation
Explanation: Rule-based segmentation partitions an image using predefined rules or conditions.

20. Which method is employed to identify and label distinct objects in a binary image?
a) Hierarchical segmentation
b) Connected component labeling
c) Spatial clustering
d) Split & merge
Answer: b) Connected component labeling
Explanation: Connected component labeling assigns a unique label to each distinct object or region in a binary image.

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