UNIT-2

1. What is the process of breaking an image into groups?
   a. Edge detection   b) Smoothing c) Segmentation d) None of the above   Answer: c

2. For edge detection we observe
a.intensity transition   **b.**shape transition   **c.**color transition   **d.**signtransition

Answer: (d).

3. For diagonal edge detection we use
a.1D mask **b.**2D mask **c.**3D mask **d.**4D mask   Ans:b

4. Intersection between zero intensity and extreme of second derivative is called
a.Discontinuity **b.**Similarity **c.**Continuity **d.**zero crossing   Ans: d

5. Edge detection has fundamental a
a.2 points **b.**3 points **c.**4 points **d.**5 points   Answer: (b)

6. Regions of the image must be
a.Joint **b.**Disjoint **c.**Connected **d.**Overlapped   Ans: b

7. The direction of angle to the gradient is
a.Orthogonal **b.**Isolated **c.**Isomorphic **d.**Isotropic   Ans:a

8. Second derivative approximation says that value at end of ramp must be
a.Nonzero **b.**Zero **c.**Positive **d.**Negative   Ans: a

9. In Canny edge detection, we will get more discontinuous edges if we make the followingchange to the hysteresis thresholding:
(a) increase the high threshold   (b) decrease the high threshold
(c) increase the low threshold   (d) decrease the low threshold   Ans: c

10. Suppose we are using a Hough transform to do line fitting, but we notice that our system is detecting two lines where there is actually one in some example image. Which of the following most likely to alleviate this problem?
(a)   Increase the size of the bins in the Hough transform.
(b)   Decrease the size of the bins in the Hough transform.
(c)   Sharpen the image.
(d)   Make the image larger   Ans: a

11. Edge detection in images is commonly accomplished by performing a spatial ---------------- of the image field.
a)   Smoothing Filter b) Integration c) Differentiation d) Min Filter   Ans: c

12. What is a perspective anomaly?
a)   Oblique b) vanishing point c) cavalier d) none of these   Ans:b

13.. N sift descriptors are indexed using a randomized KD-tree then, What is the complexity(in terms of N) of finding an approximate nearest neighbour to a query sift descriptor?
a. N2 b. N c. log N   d. log log N   Ans:c

14 Example of Edge Detection Methods is
a) Neural Networks Segmentation b) Graph Partitioning Methods
c) Watershed Transformation d) Multi-scale Segmentation   Ans: c

15. Edge based segmentation algorithm is using

a) Discontinuity and similarity b) Threshold value c) Edge linking and boundary
d) None of the above   ans:c

16. Segmentation is usually not perfect due to number of factors such as
a) Noise, Bad illumination b) Object Contain several region
c) Due to boundary-filling d)Due to closed contour   Ans:a

17. A gradient operator for edge detection is
a) Roberts b) Second order derivative c) Zero crossing operator d) None   Ans:a

18. In histogram-based segmentation, we measure the
a) Color or intensity of objects b) Region of objects c) All of the above d) None of the above   Ans:a

19. A Classical edge detector uses
a) Prewitt operator b) Robert operator c) Threshold operator d) Gaussian operator   Ans: a

 20. Identify the approach used to find feature points and their correspondences
 a.   finding features in one image that can be accurately tracked using a local search technique,
such as correlation or least squares.
b.   independently detect features in all the images under consideration and then match features
based on their local appearance
c.   Both of the above
d.   None of the above   Answer: c

21. What are good features to track?
a.   Patches with large contrast changes (gradients) are easier to localize, although straight line
segments at a single orientation suffer from the aperture problem.
b.   Patches with gradients in at least two (significantly) different orientations are the easiest to
localize.
c.   Both of the above
d.   None of the above   Answer: c

22. The feature descriptors describe elementary characteristics such as
a.   the shape
b.   the color
c.   the texture or the motion
d.   all of the above   Answer: d

23. In feature matching, which of the following is true?
a.   Select matching strategy, which determines which correspondences are passed on to the next
stage for further processing.
b.   Devise efficient data structures and algorithms to perform this matching as quickly as possible
c.   Both a and b
d.   None of the above   Answer: c

24. To rapidly search for features near a given feature, which of the following can be devised?
a.   multi-dimensional search tree
b.   a hash table
c.   Either (a) or (b)
d.   None of the above   Answer: c

25. In video tracking applications, the expected amount of motion and appearance deformation between
adjacent frames is expected to be
a.   Small
b.   Large
c.   Average
d.   None of the above   Answer: a

26. Examples of edge detectors are
a.   Sobel Edge detector and Threshold edge detector
b.   Scale-space edge detector and Sobel Edge detector

c.   Sobel Edge detector, Scale-space edge detector, Threshold edge detector
d.   None of the above   Answer: c

27. Which of the following is true?
a.   The finer (smaller kernel) Gaussian is a noise-reduced version of the original image
b.   The coarser (larger kernel) Gaussian is an estimate of the average intensity over a larger region.
c.   Both (a) and (b) are true
d.   Option (a) is true but (b) ifalse   Answer: c

28. To accelerate the neighbor finding in edge linking, what can be done?
a.   Use a sorted list of edgels (sorted first by x coordinates and then by y coordinates, for example)
b.   Use a 2D array
c.   Use a long unsorted list
d.   Option (a) and (b)   Answer: d

PART B

1.   Assess the principles of MOPS and SIFT feature descriptor algorithms.
2.   Explain the stages involved in keypoint detection and feature matching
3.   Elucidate the chain code and arc length parameterization approaches of edge linking.
4.   Explain the significance of successive approximation algorithm.
5.   Identify the stages of image processing and explain in brief.
6.   Explain briefly about vanishing points detection approach
7.   Explain how confusion matrix is used to quantify the performance of feature matching.
8.   Discuss the role of Hough transform in noisy image edge detection.objects.
9.   What is feature detection? Explain the following feature detectors: i)Forstner-Harris Hessian
        i. Adaptive non-maximal suppression
        ii. Affine invariant detectors
10. What are feature descriptors? Explain the following feature descriptors:
i)   Bias and Gain normalization   ii)   SIFT   iii)GLOH

UNIT-3(MCQ)

1. Which is a computer-generated curve that moves within images to find object boundaries?
a.Active contours   b. scissors   c. shifts   d.set

2. The overall internal energy of a curve is calculated using first and second derivative of thesnake method,
a.   The energy can be used to evolve the curve
b.   The energy can't be used to evolve the curve
c.   The energy can be used to evolve the sphere
d.   The energy can't be used the evolve the semi-sphere

3. Condensation is the principal application of computer vision
a.   to detect and track the contour of objects moving in a cluttered environment
b.   only to detect the contour of objects moving in a cluttered environment
c.   to detect and track the contour of objects moving in a systemized environment
d.   only to detect the contour of objects moving in a systemized environment

4.   which is the image segmentation method?
a.   normalized cut
b.   Histogram of oriented Gradients.
c.   Viola-Jones algorithm

d.   Image editing.

5. _____ allow objects within digital images to be extracted quickly and accurately using simple gesture motions with a mouse.
a.   **scissors**   b. snake   c.counters   d.sets

6. The 2D Alignment using least squares is
a**. x'=f(x;p)**   b. x'=f(x)   c.x'=f(p)   d.x'=f(y)

7. Speeding up of finding a likely good set of inliers is called
a.   **PROSAC**   b.RANSAC   c.RANSOM   d. SOMRAM

8. Many computer applications require the alignment of _____
a.   **3D points**   b. 2D points   c. 1 point   d.2 points

9. The algorithm that helps in computing the single value decomposition of the 3X3correlation matrix is
      a. Orthogonal Procrustes algorithm   b. absolute orientation algorithm
      c. approximate algorithm   d.angular algorithm

10. As the user draws a rough outline the system computes and draws a better curve thatclings to high-contrast edges are_____.
a) Active Contour   **b)intelligent scissors**   **c)**Snakes   d)level sets

12. Involve active shape and appearance models, active contours and deformable templatesis called
a)   Model based Segmentation   b) Semi-automatic Segmentation
c) All of the above   d) None of the above   Ans: a

13 Techniques like Livewire or Intelligent Scissors are used in
a)   Model based Segmentation   b) Semi-automatic Segmentation
c) Threshold based Segmentation   d) None of the above.   Ans:b

14. Normalized cuts is an NP-hard problem. To get around this problem, we do the following:
(a) apply k-means as an initialization
(b) allow continuous eigenvector solutions and discretize them
(c) converting from a generalized eigenvalue problem to a standard one
(d) constraining the number of cuts we make
Ans : b and c

    15. An interesting application that is closer to computer animation and visual effects   is _____which uses the tracked contours to deform a set of hand drawn animations
Rotoscoping

16. _____ are a two dimensional generalization of the 1D energy minimizingsplines
a)   Snakes   **b)** scissors   c) grapcut   d)levelset

17. which one of the following allows the association between constraints and curves pointsto evolve over time?
Slippery spring

18. one of the simplest applications of image alignment is a special form image stitchingcalled _____
   a) panography b) morphology c) cardiology d) none of the above

 19. The pose estimation problem is also known as
    a. Extrinsic Calibration   b. Intrinsic calibration   **c.** Direct linear transform d. Both A and B

20. How can we produce the best estimate of the motion parameters P?
   a) **Use Least Squares**
   b) Sum squares
   c) Both a and b only
   d) None of the above

21. The energy corresponding to a segmentation problem can be written as _____

$$E(f) = \sum_{i,j} E_r(i, j) + E_b(i, j),$$

22. The Harris detector extracts interest points for a given image. Select the properties whichare correct?
a) The detector is based on the auto-correlation matrix.
b) The detector selects the characteristic scale.
c) The detector finds discriminant points.
d) The detector is invariant to rotation.

23. In feature matching, which of the following is true?
a)   Select matching strategy, which determines which correspondences are passed on tothe next stage for further processing.
b)   Devise efficient data structures and algorithms to perform this matching as quickly aspossible
c)   **Both a and b**   d) None of the above.

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a)   finding features in one image that can be accurately *tracked using a local searchtechnique,* such as correlation or least squares.
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c)   **Both of the above**
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a)   Patches with large contrast changes (gradients) are easier to localize, although straightline segments at a single orientation suffer from the aperture problem.
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b)   Use a *2D array*
c)   Use a long unsorted list
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29. In video tracking applications, the expected amount of motion and appearancedeformation between adjacent frames is expected to be
a)   **Small**
b)   Large
c)   Average
d)   None of the above

30. Which of the following is true?

a)   The finer (smaller kernel) Gaussian is a noise-reduced version of the original image
b)   The coarser (larger kernel) Gaussian is an estimate of the average intensity over alarger region.
c)   **Both (a) and (b) are true**
d)   Option (a) is true but (b) Is false

31. Multi-dimensional hashing maps descriptors into_____based on somefunction applied to each descriptor vector
a)   **fixed size buckets** b) stacks c) queue d) large buckets

32. Isolated edge points can also be grouped into_____
a) longer curves or contours, as well as straight line segments
b) edges   c)   Corners   d) straight lines only

33. Successive approximation is also known as _____
a)   **Line simplification** b) circle approximation c) parabolic model d) b and c

34. A global descriptor describes_____
     a)a complete object or point cloud b) Regions only c) edges and corners d) none of theabove

35. Many computer applications require the alignment of _____
a)   **3D points**   b) 2D points   c) 1 point   d)2 points

36. Which is a computer-generated curve that move within images to find object boundaries.?
a)   **Active contours**   b)scissors   c) shifts   d)set

37.. Slippery spring allows the association between_____and _____
a)   **Constraints and curve**
b) gradient and orientation
c)   Splines and lines
d)   none of the above

38. Active contours allow a user to roughly specify a _____
a)   **boundary of interest**
b)   edge points
c)   pixel intensity
d)   dimension

39. Alpert, Galun, Basri et al. (2007) develop a probabilistic merging algorithm based on twocues, namely _____
a)   Color images and gray level
b)   **gray-level similarity and texture similarity**
c)   texture similarity and key points
d)   none of the above

40.   Mean-shift techniques try to find clusters of _____using mode finding
a)   **similar pixels**
b)   neighbouring pixels
c)   immediate pixels

41. Snakes can be very good at capturing the_____shape in many real-world contours.
fine and irregular

42.   To compute a good solution to the TSP, the slippery spring data association energy is combined with a regular_____to define the cost of a tour.
first-order internal smoothness energy

43.   A more common way to estimate a set of_____on the typical distribution of the control points $\{x_k\}$.
Shape priors

44.   Active contours allow a user to roughly specify a _____
boundary of interest

PART – B
1.   Assess the significance of mean shift and mode finding.
2.   Explore the implications of level sets in image processing
3.   Examine the merits and demerits of different split and merge algorithms and explain them in brief.
4.   Analyze the significance of dynamic contour in medical image processing.
5.   Explain the techniques used to minimize the energy in contour detection.
6.   Illustrate the expectation maximization algorithm in K-means and mixture of Gaussians.
7.   Elaborate the process of computing the internal energy of snakes for image segmentation.
8.   Explain the normalized cut algorithm and its improvements to determine the shape of the objects.