Computer vision

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Question bank for chapter 9

1. Explain M¨uller-Lyer illusion with a neat diagram.
2. Explain Gestalt factors leading to grouping.
3. Write down the steps of a background subtraction algorithm.
4. Describe in brief a variety of standard techniques for computing a distance in Shot Boundary Detection.
5. What is super pixel? How it is used in segmentation?
6. Mention the steps involved in Agglomerative Clustering or Clustering by Merging.
7. Mention the steps involved in Divisive Clustering, or Clustering by Splitting.
8. Explain the watershed algorithm for segmentation.
9. Briefly describe k-means algorithm for segmentation.
10. Mention the steps involved in mean shift clustering.
11. Explain Agglomerative Clustering with Graphs.
12. Tabulate the Different affinity functions comparing pixels for a graph based segmenter.

Question bank for chapter 10

1. Enumerate the difficulties involved in Hough transform.
2. Differentiate least square and total least square method of fitting line given a set of points.
3. Mention the steps involved in Incremental Line Fitting.
4. Mention the steps involved K-means Line Fitting.
5. What is RANSAC algorithm? Where it is used in computer vision?
6. Explain a method of fitting using probabilistic models.
7. Describe motion segmentation and its uses in computer vision.
8. Derive the formula to compute time to contact in Optical flow method.
9. Explain one flow model for motion segmentation.
10. How can a model be selected to be the best fit for the problem mentioned?

Question bank for chapter 11

1. Explain mean shift algorithm for tracking.
2. Describe briefly any five applications for tracking in computer vision.
3. Mention the steps involved in Tracking by Detection algorithm.
4. What is meant by Matching Summary Representations and explain a strategy for the same?
5. Explain Kalman filter with the equations.
6. Set the equations for constant velocity and acceleration model for tracking in linear dynamics.

Question bank for chapter 12

1. What is meant by pose consistency and camera consistency?
2. How can rigid objects be registered?
3. Explain bundle adjustment algorithm.
4. Explain active appearance model.
5. Give an example and explain how registration is used in medical imaging.

Problems:

1. Given the following image sequence, derive inference about the movement, background, foreground and distance to camera.

A tree in front of a house

Description automatically generated

Draw the dendrogram obtained by agglomerative clustering

using single-link clustering for the data clusters given below.

A diagram of numbers and points

Description automatically generated

**<All the best and Godspeed>**