Short Questions

1. What is a signal in the context of multi-dimensional systems?
2. Define transforms in the context of multi-dimensional signals.
3. What characterizes systems in multi-dimensional signal processing?
4. Explain the significance of the sampling theorem.
5. How does the human visual system perceive color?
6. What is digital video?
7. What distinguishes 3D video from traditional 2D video?
8. Name some common digital video applications.
9. How is image and video quality evaluated?
10. What role does the sampling theorem play in digital image and video processing?
11. What are some common transforms used in digital image processing?
12. Explain the concept of spatial domain processing in image processing.
13. How does the human visual system influence image and video compression techniques?
14. What is the purpose of color spaces in digital imaging?
15. How does interpolation contribute to image processing?
16. What factors influence the perceived quality of a digital video stream?
17. Define motion estimation in the context of video processing.
18. How does 3D video capture depth information?
19. What is the role of codecs in digital video compression?
20. How does the human visual system contribute to the design of video compression algorithms?
21. What are some common image enhancement techniques?
22. Explain the concept of image segmentation.
23. How does the Nyquist-Shannon sampling theorem apply to digital audio signals?
24. What is the role of chroma subsampling in digital video compression?
25. Describe the concept of depth perception in 3D video.
26. How does the discrete cosine transform (DCT) contribute to image compression?
27. What is the role of keyframes in video compression?
28. Explain the concept of color gamut in digital imaging.
29. How do digital watermarking techniques contribute to image and video authentication?

30. What are some challenges associated with the transmission of 3D video content?
31. What factors influence the choice between lossy and lossless compression in digital imaging?
32. How does video transcoding contribute to multimedia content delivery?
33. What is the significance of the peak signal-to-noise ratio (PSNR) metric in image and video quality assessment?
34. Describe the concept of motion compensation in video compression.
35. How do digital video formats differ from analog video formats?
36. What role do spatial and temporal redundancy play in video compression?
37. Explain the concept of interlacing in video displays.
38. How does the JPEG compression algorithm achieve image compression?
39. What are some common artifacts introduced by lossy image and video compression?
40. What factors affect the perception of depth in stereoscopic 3D video?
41. How does the choice of video codec impact compression efficiency and playback compatibility?
42. Describe the concept of color subsampling in digital imaging.
43. What role does gamma correction play in digital imaging?
44. How does the choice of video resolution affect streaming quality and bandwidth requirements?
45. Explain the concept of spatial-temporal redundancy in video data.
46. What challenges arise in 3D motion and structure estimation?
47. What techniques are commonly used for 3D motion and structure estimation?
48. How does optical flow estimation contribute to motion analysis?
49. What are some common assumptions made in optical flow estimation?
50. Explain the concept of block matching in motion estimation.
51. How do gradient-based methods assist in motion estimation?
52. What role does regularization play in motion estimation?
53. Describe the Lucas-Kanade method for optical flow estimation.
54. How does the Horn-Schunck method differ from Lucas-Kanade for optical flow estimation?
55. What are some challenges in estimating 3D motion from 2D image sequences?
56. How does the epipolar geometry aid in 3D motion estimation?
57. What role do robust estimation techniques play in motion estimation?

58. What are the advantages of using hierarchical approaches in motion estimation?
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72. Explain the concept of motion compensation in video coding.
73. How do phase correlation methods contribute to motion estimation?
74. What are some limitations of feature-based motion estimation techniques?
75. Describe the process of dense optical flow estimation.
76. How do variational methods improve optical flow estimation?
77. What challenges arise in estimating motion in non-rigid objects or deformable surfaces?
78. Explain the concept of motion magnification in video processing.
79. How does motion estimation contribute to video stabilization?
80. What role do Kalman filters play in motion estimation and tracking?
81. How does motion estimation differ in the context of unmanned aerial vehicles (UAVs) or drones?
82. What challenges are faced in motion estimation for underwater imaging?
83. Explain the concept of motion estimation in medical imaging.
84. How does motion estimation contribute to virtual reality (VR) and augmented reality (AR) applications?
85. What role does motion estimation play in autonomous driving systems?
86. Describe the concept of motion estimation in robotics.

87. How do deep learning techniques contribute to motion estimation?
88. What role does motion estimation play in video surveillance systems?
89. Explain the concept of motion estimation in sports analytics.
90. How does motion estimation contribute to gesture recognition and human-computer interaction?
91. What are some challenges in motion estimation for aerial imaging applications, such as satellite imagery?
92. How does motion estimation contribute to the field of video compression and streaming?
93. Explain the concept of motion estimation in object tracking.
94. What role does motion estimation play in medical image registration?
95. How does motion estimation contribute to the field of computer animation and visual effects?
96. Describe the role of motion estimation in scene understanding and semantic segmentation.
97. How does motion estimation contribute to image registration in remote sensing applications?
98. Explain the concept of motion estimation in industrial automation and robotics.
99. What role does motion estimation play in video editing and post-production?
100. How does motion estimation contribute to the analysis of natural phenomena, such as weather patterns and geological movements?
101. What is video analytics?
102. What are the basics of video?
103. What are the fundamentals for video surveillance?
104. What are scene artifacts in video?
105. How does adaptive background modeling and subtraction contribute to object detection and tracking?
106. What role does pedestrian detection and tracking play in video analytics?
107. How is vehicle detection and tracking implemented in video analytics?
108. What is articulated human motion tracking in low-dimensional latent spaces?
109. How do video analytics algorithms handle occlusions in object detection and tracking?
110. What are some challenges in implementing video analytics for real-time applications?
111. What are the key components of a video analytics system?

112. How do video analytics systems handle varying lighting conditions?
113. Explain the concept of foreground-background segmentation in video analytics.
114. What role does deep learning play in advancing video analytics?
115. How do video analytics systems contribute to retail analytics?
116. What are some privacy concerns associated with video analytics?
117. Describe the role of object detection algorithms in video analytics.
118. How do video analytics systems contribute to smart city initiatives?
119. What challenges arise in tracking objects across multiple cameras in video analytics?
120. How does video analytics aid in anomaly detection and threat identification?
121. What are some ethical considerations in the deployment of video analytics systems?
122. Explain the concept of crowd analysis in video analytics.
123. How do video analytics systems contribute to traffic management and optimization?
124. Describe the role of video analytics in industrial automation and manufacturing.
125. What techniques are used for object tracking in video analytics?