

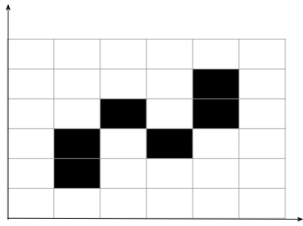
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Department of Electronics and Telecommunication Engineering

Question Bank

Computer Vision and Image Processing (BTETPE801B/ BTETPE802B)

Sr. No.	Question
1	Explain Fundamental Concept of Computer Vision And Image Processing
2	What is computer vision and state its applications?
3	What are the three types of segmentation? Explain them.
4	Explain the structure of human vision system/ explain the features of human vision system
5	Explain the process of image formation
6	What are the steps of image analysis? Explain with diagram.
7	Explain the term histogram equalization, object recognition, segmentation
8	What Are the Basic Parts of Image Formation Process?
9	Give the definition of lambertian and specular surfaces?
10	Explain shape From Shading
11	Explain 2D geometric transformation and 3Dgeometric transformation.
12	How does scaling the projection matrix changes the transformation?
13	Explain perspective and orthographic projection
14	What is camera calibration?
15	Explain the concept of reference frames.
16	Explain area based matching, feature based matching.
17	Explain image reconstruction from series of projection.
18	Explain the concept of image transformation
19	Properties of unitary transformation
20	What is principal component analysis?
21	What is wavelet and explain mother wavelet.
22	Explain CWT for stationary and non-stationary signal
23	Explain the spatial and frequency domain technique for image enhancement.
24	Explain following term for image quality measurement <ul style="list-style-type: none">• MSE• RMSE• SNR• PNSR
25	Explain full color processing and pseudo color processing
26	Explain RGB color model
27	Describe how grey level histograms can be used for image segmentation.
28	Explain the color feature and explain the concept edge detection
29	What is texture and explain primary issues in texture analysis
30	Explain <ul style="list-style-type: none">• Image translation• Image rotation• Image scaling
31	What are the components of pattern recognition system?
32	Explain gesture recognition system. Explain VGR with application
33	What are the application of video surveillance system explain in detail?

34	Explain the concept of video surveillance system.
35	Find the KL transformation matrix for this image patch. 
36	DCT $D(u,v)$; $u,v = 0,1,\dots,255$ is applied to an image $f(x,y)$ for compression. However, DCT coefficients $u,v=0,\dots,n$; are only retained. The percentage of the total energy preserved of the original image is given by $(a+b+75)$. Moreover, the energy preserved for $n=0$ is 85%. Find the constants a and b .
37	The Original Image Patch is given as, $\begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 1 & 1 & 5 & 6 \\ 0 & 0 & 0 & 0 \end{bmatrix}$ <p>The filter is given as</p> $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ <p>After the correlation operation find the output image patch.</p>
38	A 3-bit image patch is given below- $\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 0 \\ 7 & 2 & 1 \end{pmatrix}$ <p>Using bit plane slicing the patch is disintegrated into bit planes and the LSB plane is discarded find the reconstructed image patch.</p>
39	Suppose two cameras placed at 50 cm apart are viewing a scene point placed front of them. The focal length of in the cameras is 20 cm. The scene point is imaged at 19 cm (from the left edge of the first cameras image plane) and 9 cm (from the left edge of the second cameras image plane). Find the depth of the scene point
40	Using Hough Transform we can represent this set of points by a line, whose slope and intercept are- $A=(1,4),(2,3),(3,1),(4,1),(5,0)$ $A=(1,4),(2,3),(3,1),(4,1),(5,0)$.
41	Find matrix M for orthographic projection, if $E \begin{bmatrix} x \\ y \\ 1 \end{bmatrix} = M \begin{bmatrix} x \\ y \\ z \\ 1 \end{bmatrix}$
42	Using least square regression for the following set of points: $\{(0.2),(1,1.5),(2,0),(3,0.5),(4,-1)\}$ $\{(0.2),(1,1.5),(2,0),(3,0.5),(4,-1)\}$, find the value of y for $x=8$.

43	<p>Given a set of five data points $x_1=2, x_2=2.5, x_3=3, x_4=1$ and $x_5=6$, find Parzen probability density function (pdf) estimates at $x = 3$, using the Gaussian function with $\{\sigma=1\}$ as window function.</p>																															
44	<p>For the orthogonal matrix A and transformed Image V, Find the original Image U</p> $A = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}, \quad V = \begin{pmatrix} 4 & 0 \\ 0 & 0 \end{pmatrix}$																															
45	<p>Consider the following image- Compute the Hessian matrix for 3 * 3 highlighted window</p> <p style="text-align: center;">I</p> <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr> <tr><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr> <tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td></tr> </table> <div style="display: inline-block; vertical-align: middle; margin-right: 20px;"> $\frac{d}{dx}$ <table border="1" style="text-align: center;"> <tr><td>-1</td><td>0</td><td>1</td></tr> </table> </div> <div style="display: inline-block; vertical-align: middle;"> $\frac{d}{dy}$ <table border="1" style="text-align: center;"> <tr><td>-1</td></tr> <tr><td>0</td></tr> <tr><td>1</td></tr> </table> </div>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	-1	0	1	-1	0	1
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46	<p>Applying the region splitting and merging on the following Image will lead to how many isolated pixels for a threshold value ≤ 1</p> $\begin{bmatrix} 1 & 1 & 1 & 2 \\ 1 & 1 & 1 & 0 \\ 3 & 1 & 6 & 6 \\ 1 & 1 & 5 & 6 \end{bmatrix}$																															