International Institute of Information Technology, Hyderabad Spring 2024 CS7.505: Computer Vision

Quiz 1

31 January 2024 10:20 – 11:00 [40 minutes]

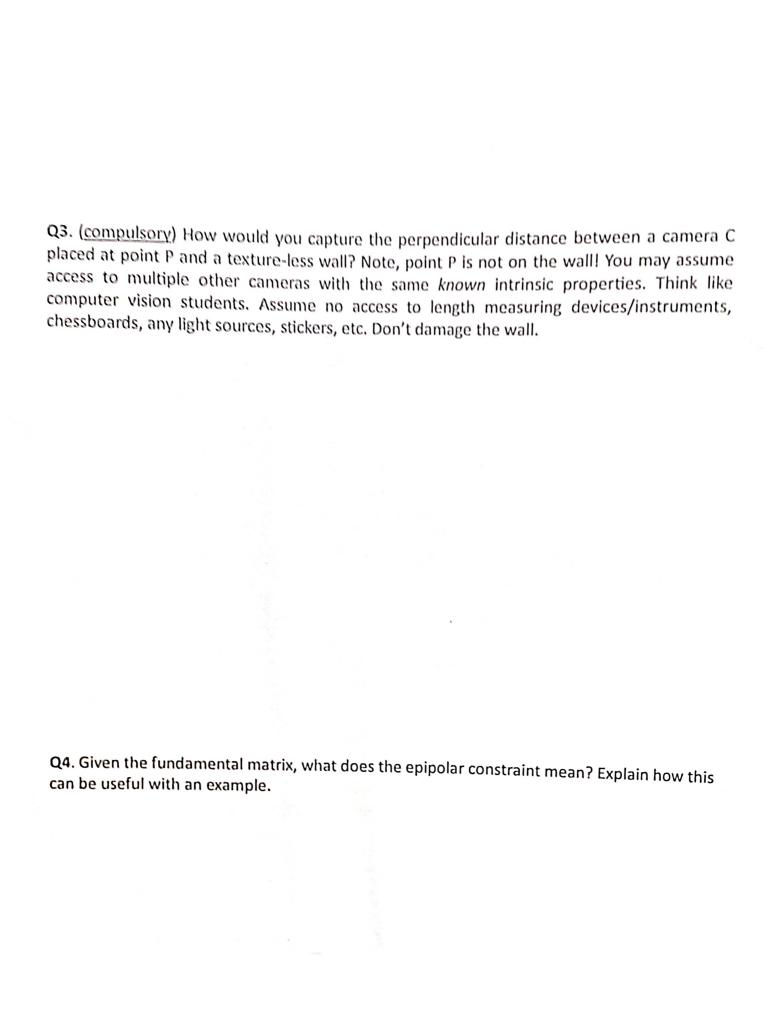
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Instructions:

- The quiz is of 6 points. There are 7 questions, each of 1 point.
- Questions Q1-Q3 are compulsory.
- Among questions Q4-Q7, you can attempt any 3.
- Feel free to draw over the gray lines for answering questions.
- Please answer within the provided space, no extra sheets will be given. There is some extra space on the last page.

Q1. (compulsory) Explain with an example why parallel lines in the real world converge to a point on the image plane. Hint: You may assume the camera is at the world origin.

Q2. (compulsory) Provide and explain three different reasons due to which the bag of visual words representations may perform poorly at image retrieval.



| Q5. How does a square came square resolution, such as HD | ra sensor of 1.08cm x O 1920 x 1080? How is | 1.08cm capture in this codified in th | nages or videos at a i e camera intrinsics? | non- |
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| Q6. Under what assumption example where this assumpt | is can we rewrite the tion is reasonable in th | ne real-world. | atrix as 3x3? Provide | e an |
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Q7. Mathematically, what differentiates an edge from a corner? Use the relationships between eigen vectors and eigen values of the following matrix: $H = \begin{bmatrix} I_x^2 & I_x I_y \\ I_x I_y & I_y^2 \end{bmatrix},$ where I_x is the image gradient in the x-direction and I_y is the gradient in the y-direction.

$$H = \begin{bmatrix} I_x^2 & I_x I_y \\ I_x I_y & I_y^2 \end{bmatrix},$$