Computer vision

Question bank for chapter 1

1. What is computer vision? Explain with an example.
2. How is light considered as electromagnetic wave?
3. Mention any 10 applications of computer vision.
4. Write a short note on the history of computer vision.
5. Explain with examples of computer vision algorithms in 1970s.
6. Explain with examples of computer vision algorithms in 1980s.
7. Explain with examples of computer vision algorithms in 1990s.
8. Explain with examples of computer vision algorithms in 2000s.

Question bank for chapter 2

1. Explain the basic set of 2D planar transformations.
2. Describe hierarchy of 2D coordinate transformations with a note of degree of freedom and what they preserve.
3. What are quarternions? Explain any use of it with examples.
4. With neat diagrams, illustrate 5 types of 3D to 2D projection models.
5. Elucidate the difference between calibration matrix and camera matrix.
6. What is meant by normalized device coordinates and where are they used?
7. Explain 3 types of lens distortions.
8. Explain BRDF with an example.
9. What is meant by a Lambertian surface? How is it connected with BRDF?
10. With a neat diagram, explain the image sensing pipeline in a digital camera.
11. Give examples of colour spaces. Write the equation of converting from one colour space to another.
12. Write a short note on image compression.

Problems:

1. Given a object distance and image distance, derive lens formula.
2. Given the focal length as 20 cm and image distance is 10 cm, compute the object distance.
3. Given a 3D point (1,-1,2), rotate the point about x axis through an angle of 30 degree and compute the coordinates of resultant point.
4. Given a 3D point (1,-1,2), rotate the point about y axis through an angle of 45 degree and compute the coordinates of resultant point.
5. Given a 3D point (1,-1,2), rotate the point about z axis through an angle of 60 degree and compute the coordinates of resultant point.
6. Prove or disprove that rotation about two axes are commutative.
7. When any 2\*2 matrix of form ( a -b and b a) can be a rotation matrix?
8. Given a letter “A” written on a yz plane, what is the result form if is first rotated about y axis followed by z axis with 180 degree in each case?
9. Determine the image of the point (1;􀀀1; 2) under the rotation by an angle of 60 degree about an

axis in the yz-plane that is inclined at an angle of 60 degree to the positive y-axis using quarternions.

1. Determine the image of the point (1;􀀀1; 2) under the rotation by an angle of 30 degree about an

axis in the xz-plane that is inclined at an angle of 45 dgree to the positive y-axis using quarternions.

**<All the best and Godspeed>**