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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » Computer Vision (course)

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Course outline

How does an NPTEL online course work? ()

Week 0 ()

Week 1 : ()

Week 2 : ()

Lecture 05 : Projective Geometry – Part I (unit?unit=24&lesson=25)

Week 2 : Assignment 2

The due date for submitting this assignment has passed.

Due on 2023-08-09, 23:59 IST.

As per our records you have not submitted this assignment.

1) ***2 points***

Compute the point of intersection of the lines $2x + 1 = 0$ and $x + 3y + 1 = 0$.

a) $(-1/6, 1/6)$

b) $(-2/3, 1)$

c) $(-1/2, -1/6)$

d) $(-2/3, -1)$

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
c)

FOR QUESTIONS 2 AND 3:

Given a homography $H = \begin{bmatrix} 1 & 1 & -2 \\ 2 & 0 & 1 \\ 0 & 2 & -1 \end{bmatrix}$. Based on the given data solve the following questions 2 and 3:

2) ***2 points***

Find the transformation of the point $(-1, 7)$.

a) $(1, -4, -10)$

b) $(4, -1, 13)$

c) $(4, 1, -10)$

d) $(2, -1, 13)$

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
b)

3) ***2 points***

Find the transformation of the line passing through the points $p1 = (2, 0)$ and $p2 = (1, -3)$.

a) $4x - 0.5y - 2.5 = 0$

b) $4x - y + 2.5 = 0$

c) $0.5x - y + 2.5 = 0$

d) $4x + 0.5y - 2.5 = 0$

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
a)

4) ***2 points***

Transcripts ()

Books ()

Problem Solving Session - July 2023 ()

Given the circle of radius 5 with centre at $(-3, 2)$ in R^2 and homography $H = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$.

Which of the following represents the circle by a conic C?

a) $C = \begin{bmatrix} 1 & 0 & -3 \\ 0 & 1 & -2 \\ -3 & -2 & -12 \end{bmatrix}$

b) $C = \begin{bmatrix} 1 & 0 & 3 \\ 0 & 1 & -2 \\ 3 & -2 & -12 \end{bmatrix}$

c) $C = \begin{bmatrix} -1 & 0 & -3 \\ 0 & 1 & -2 \\ 3 & -2 & -12 \end{bmatrix}$

d) $C = \begin{bmatrix} 1 & 0 & 3 \\ 0 & -1 & -2 \\ -3 & -2 & -12 \end{bmatrix}$

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
b)

5) ***2 points***

Given a homography $H = \begin{bmatrix} 1 & 1 & -2 \\ 2 & 0 & 1 \\ 0 & 2 & -1 \end{bmatrix}$. Find the vanishing line.

a) $(1, 1, 0)$

b) $(-0.5, 0.25, 0.25)$.

c) $(-1, 0.5, 0.5)$.

d) $(0, 0, 1)$.

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
b)

FOR QUESTIONS 6 AND 7:

Given a homography $H_1 = \begin{bmatrix} 1 & 1 & -2 \\ 2 & 0 & 1 \\ 0 & 2 & -1 \end{bmatrix}$. Based on the given data solve the following questions 6 and 7:

6) ***2 points***

Compute the transformation of dual conic $C_\infty^* \ (I.J^T + J.I^T)$ under H_1.

a) $\begin{bmatrix} 2 & 2 & 2 \\ 2 & 4 & 0 \\ 2 & 0 & 4 \end{bmatrix}$.

b) $\begin{bmatrix} 1 & 1 & 2 \\ 1 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}$.

c) $\begin{bmatrix} 1 & 1 & 2 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}$.

d) $\begin{bmatrix} 2 & 2 & 4 \\ 2 & 4 & 0 \\ 2 & 0 & 2 \end{bmatrix}$.

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
a)

7) ***2 points***

A point $p(1, 2, 1)$ in plane P_1 is transformed using H_1 to get a point in plane P_2. The transformed point in P_2 is subjected to another transformation using H_2 matrix to get a point in plane P_3. Given $H_2 = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 1 \end{bmatrix}$. Find the transformed point in plane P_3.

a) $(-1, 5, -9)$

b) $(-1, 9, -5)$.

c) $(1, 9, 5)$.

d) $(1, -5, 9)$.

- a)
- b)
- c)

d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
c)

8)

Given two lines $l(2, 1, 3)$ and $m(1, 0, -2)$ meet at a point p. Find the Euclidean angle between these two lines. Answer should be in nearest degrees. Discard the decimal values.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 27

2 points

9) ***2 points***

Recollect Direct Linear Transform (DLT) algorithm for non-homogeneous equation $Ah = 0$. The matrix A is formed from the following equations relating a point X_i and its transformed point X_i' in 2D projective spaces.

$$\begin{bmatrix} 0^T & -w_i' X_i^T & y_i' X_i^T \\ w_i' X_i^T & 0^T & -x_i' X_i^T \\ -y_i' X_i^T & x_i' X_i^T & 0^T \end{bmatrix} \begin{pmatrix} h^1 \\ h^2 \\ h^3 \end{pmatrix} = 0$$

where $X_i' = (x_i', y_i', w_i')^T$ and $X_i = (x_i, y_i, w_i)^T$, $i = 1, 2, \cdots n$. Choose the correct options.

a) Dimension of A= $2n \times 9$
Dimension of h: 9×1
Rank: 9

b) Dimension of A= $2n \times 8$
Dimension of h: 8×1
Rank: 8

c) If the origin of the plane lies on the vanishing line, no solution exists.

d) If the origin of the plane lies on the vanishing line, unique solution exists.

a)
b)
c)
d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
b)
c)

10) ***2 points***

Which of the following statements are true?

a) The cosine angle between two lines are preserved under homography.

b) The circular points are fixed points under homography.

c) Colinearity is preserved under homography.

d) Affine group have 5 degree of freedom.

- [ ] a)
- [ ] b)
- [ ] c)
- [ ] d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
a)
c)