3D Velocities from Optical Flow

3 questions

1 point

1.

The equation of optical flow given in Lecture is:

$$u = \frac{1}{Z}\begin{pmatrix} xV_z - V_x \\ yV_z - V_y \end{pmatrix} + \begin{pmatrix} xy & -(1+x^2) & y \\ (1+y^2) & -xy & -x \end{pmatrix}\Omega$$

What does the V in this equation represent?

- Angular Velocity
- Heading Direction
- Inverse Depth

1 point

2.

What was the constraint $\mathbf{I}(\mathbf{x}) = \mathbf{J}(\mathbf{x} + \mathbf{d})$ that we used to find the optical flow called?

- $\mathbf{I}$-$\mathbf{J}$ Constancy Constraint
- Brightness Constancy Constraint
- None of the above
- Image Equality Constraint

1 point

3.

In trying to minimize $\|\mathbf{I}(\mathbf{x}) - \mathbf{J}(\mathbf{x} + \mathbf{d})\|$, we use which of the following items?

- [x] The second moment matrix $\frac{\delta \mathbf{J}(\mathbf{x})^T}{\delta \mathbf{x}} \frac{\delta \mathbf{J}(\mathbf{x})}{\delta \mathbf{x}}$
- [ ] The derivative of the second image $\frac{\delta \mathbf{I}(\mathbf{x})}{\delta \mathbf{x}}$
- [ ] The second derivative of the image $\frac{\delta^2 \mathbf{J}(\mathbf{x})}{\delta \mathbf{x}^2}$
- [x] Taylor Expansion $\mathbf{J}(\mathbf{x} + \mathbf{d}) = \mathbf{J}(\mathbf{x}) + \frac{\delta \mathbf{J}(\mathbf{x})}{\delta \mathbf{x}} \mathbf{d}$
- [x] Iterating to get incrementally closer the the optimal solution

2 questions unanswered

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