

Optical Flow Constraint Equation

$$I(x + \delta x, y + \delta y, t + \delta t) = I(x, y, t) \quad \text{----- (1)}$$

$$I(x + \delta x, y + \delta y, t + \delta t) = I(x, y, t) + I_x \delta x + I_y \delta y + I_t \delta t \quad \text{----- (2)}$$

Subtract (1) from (2): $I_x \delta x + I_y \delta y + I_t \delta t = 0$

Divide by δt and take limit as $\delta t \rightarrow 0$: $I_x \frac{\partial x}{\partial t} + I_y \frac{\partial y}{\partial t} + I_t = 0$

Constraint Equation: $I_x u + I_y v + I_t = 0$ (u, v) : Optical Flow

Applications:

1. Optical Mouse:

Optical Flow is used to
estimate Mouse Movements



