

ML for Denoising

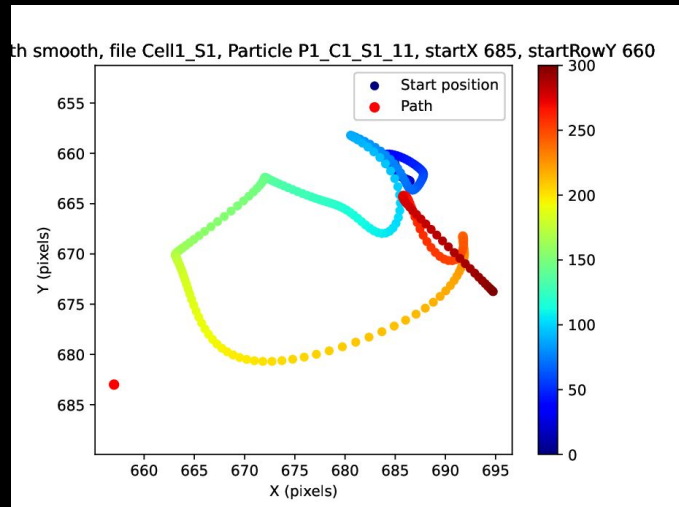
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Bhagawat Chapagain

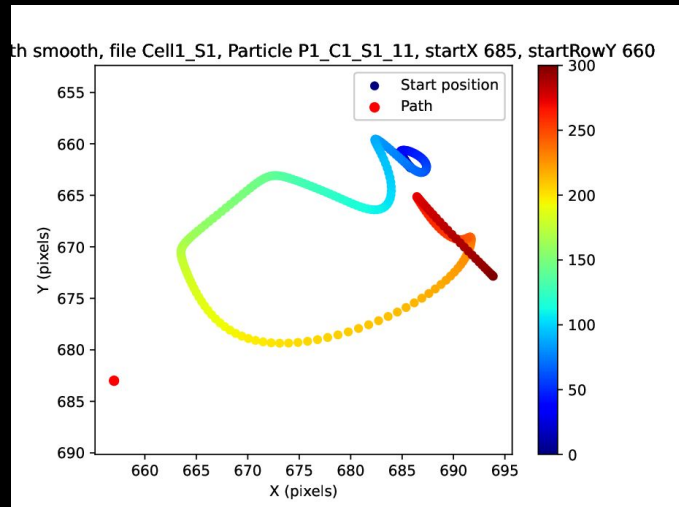
- Small or large values of σ result in lack of clarity
- Trying different values of sigma allows for best results

Optimizing σ

$\sigma=6$



$\sigma=9$



Differing σ

$$I = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \cdots & a_{mn} \end{bmatrix}$$

$$G(x, y) = \frac{1}{2\pi} \cdot \exp \frac{-(x^2 + y^2)}{2}$$

$$C = \begin{bmatrix} (-\sigma, -\sigma) & (0, -\sigma) & (\sigma, -\sigma) \\ (-\sigma, 0) & (0, 0) & (\sigma, 0) \\ (-\sigma, \sigma) & (0, \sigma) & (\sigma, \sigma) \end{bmatrix}$$

$$I'(i, j) = \sum_{x=-k}^k \sum_{y=-k}^k I(i+x, j+y) G(x, y),$$

where $(i+x, j+y)$ are adjacent images.

$$G = \begin{bmatrix} G(-\sigma, -\sigma) & G(0, -\sigma) & G(\sigma, -\sigma) \\ G(-\sigma, 0) & G(0, 0) & G(\sigma, 0) \\ G(-\sigma, \sigma) & G(0, \sigma) & G(\sigma, \sigma) \end{bmatrix}$$

Applying $G(x, y)$

- If we're given some perfect image, we can find the optimal value of Sigma that ensures clarity for object detection

Perfect Image?