

Computer Vision 16720

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HW3

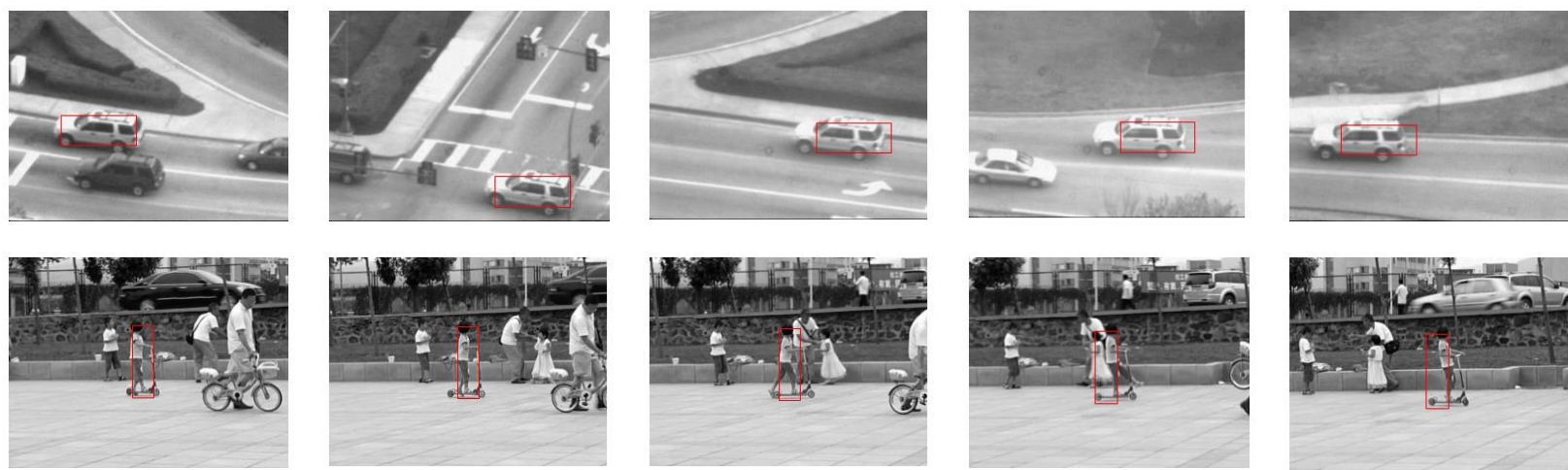
Q1.1

- $\frac{\partial W(x;p)}{\partial p^T}$ is the Jacobian of the warp at $(x;p)$
- $A = \left(\frac{\partial I_{t+1}(x')}{\partial x'^T} \right) \left(\frac{\partial W(x;p)}{\partial p^T} \right)$
 $B = I_t(x) - I_{t+1}(W(x;p))$
- For a unique solution of Δp , $A^T A$ must be invertible

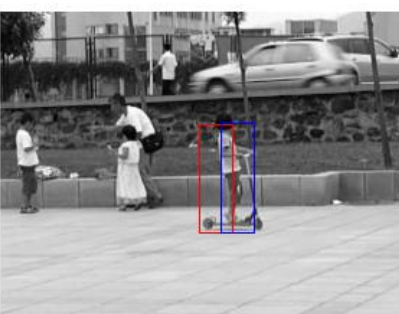
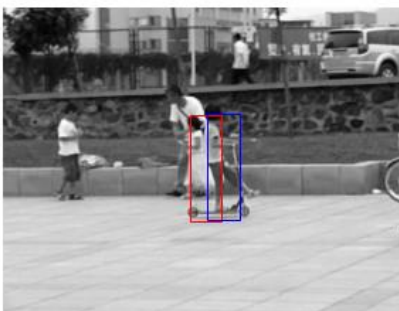
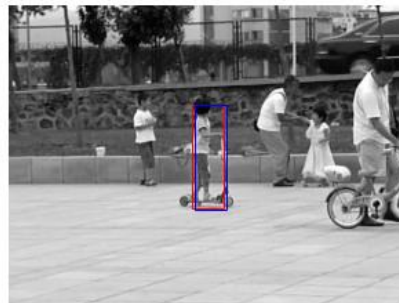
Q1.3

For carseq: Parameters (default): num_iters=1e4, threshold = 1e-2

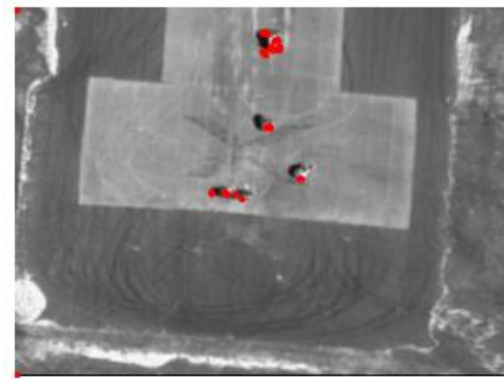
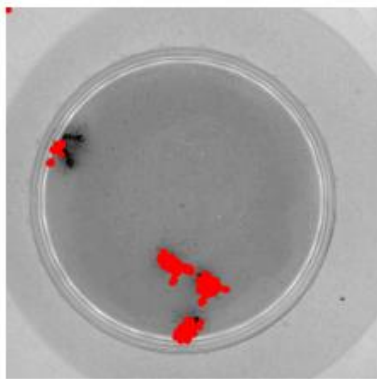
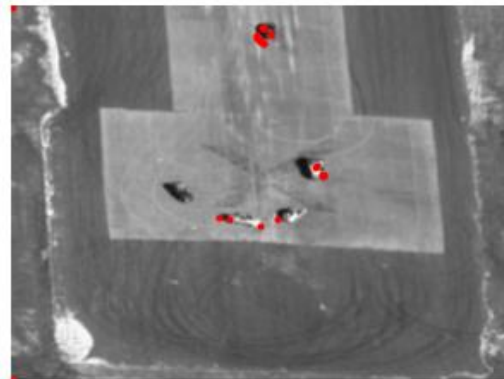
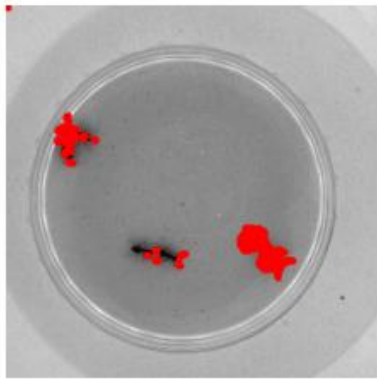
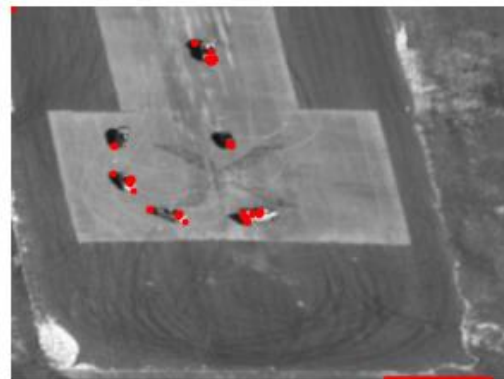
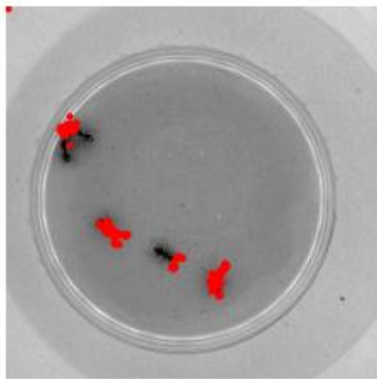
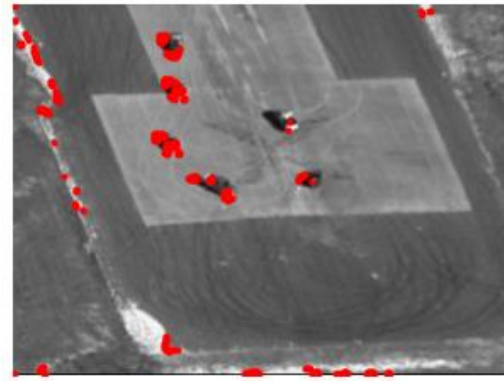
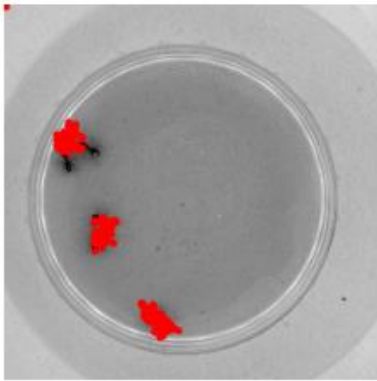
For girlseq: Parameters: num_iters = 1e4, threshold = 5e-2



Q1.4 Blue is the frame with no drift and red is the drifted frame



Q2.3



Q3.1

The inverse compositional approach is more computationally efficient since the A' matrix does not depend on p , which means we do not need to recalculate the A' matrix in every iteration of the descent, and we only have to calculate the matrix once.

Everything other than the error image can be precomputed, which in our case is b' that needs to be computed in every iteration of the descent.