

Eulerian Video Magnification

for Revealing Subtle Changes in the World

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Outline

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- Overview of Methods
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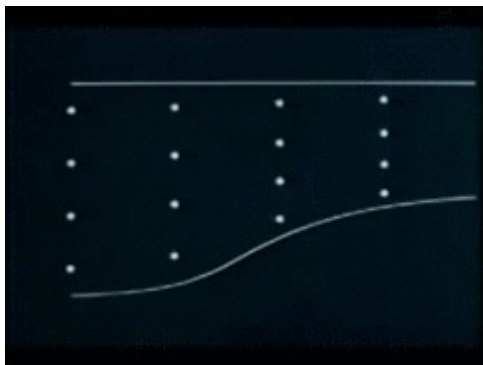
Project Recap

Mobile Perfusion Analysis - Generate an integrated software-and-hardware solution that allows a clinician to extract a usable metric assessing local blood flow using a images/video captured via mobile device.

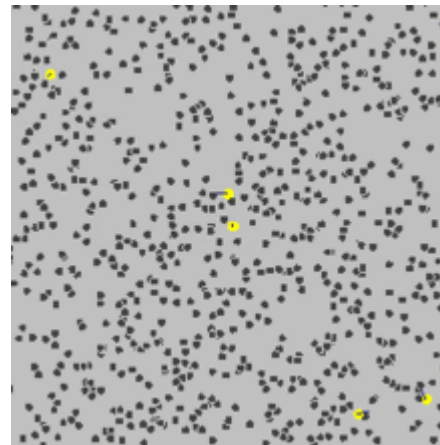


Background

- What is 'Eulerian' Video magnification?
 - Eulerian vs Lagrangian specification of fluid flow fields
 - Eulerian: observations at fixed points.
 - Lagrangian: observation by tracking.

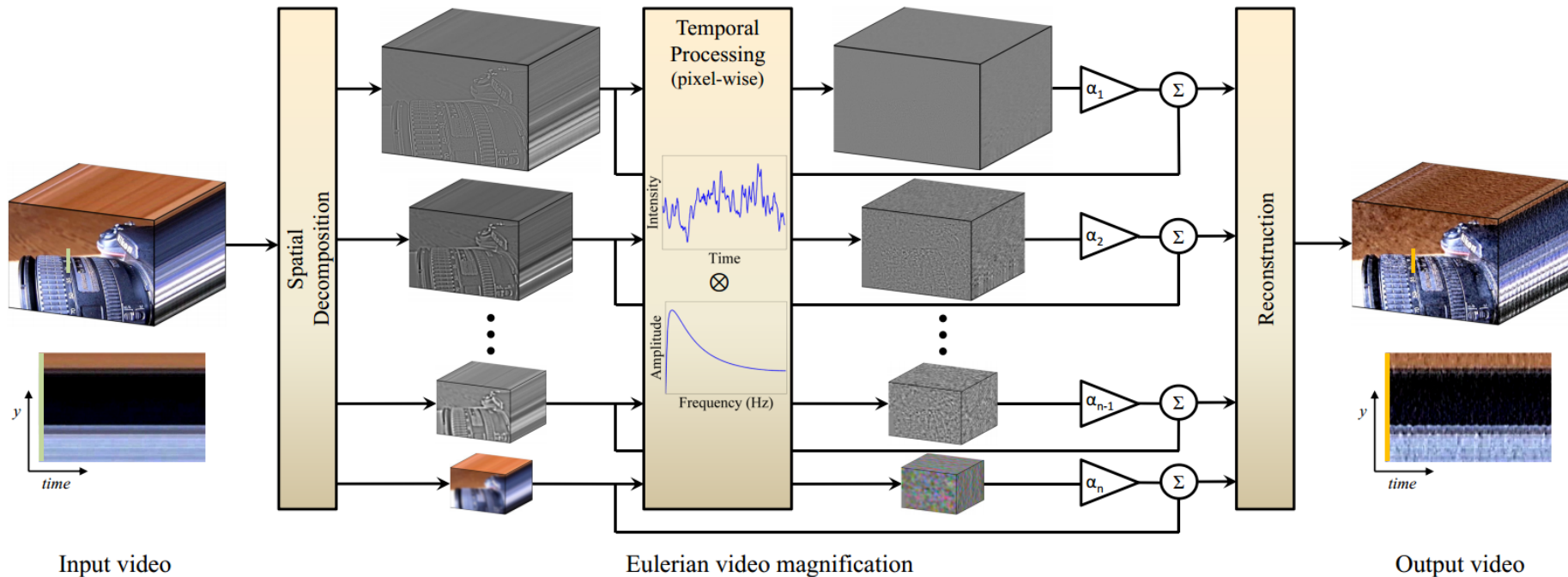


Eulerian



Lagrangian

Overview of Methods



Discussion of Findings

Overall: No objective/quantitative overall results, but subjectively observed magnifications that appeared correct and matched ground truths when available (pulse, guitar string vibrations, SLR camera mirror flips)

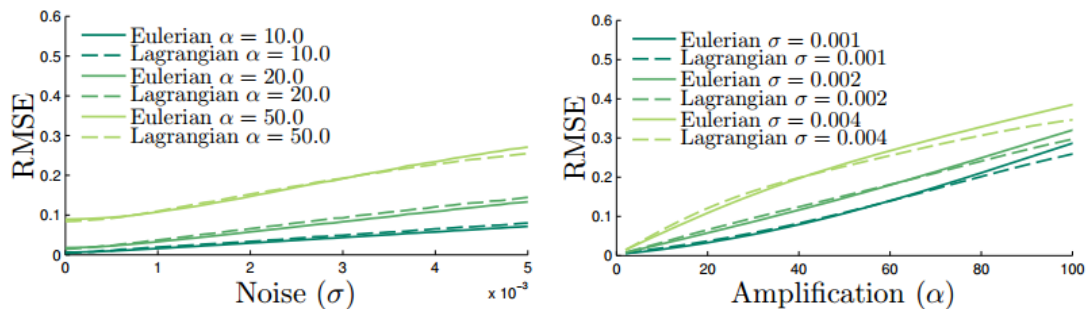
Lagrangian

- Better for enhancing motion of fine point features, larger amplification factors
- Sensitive to increases in spatial noise

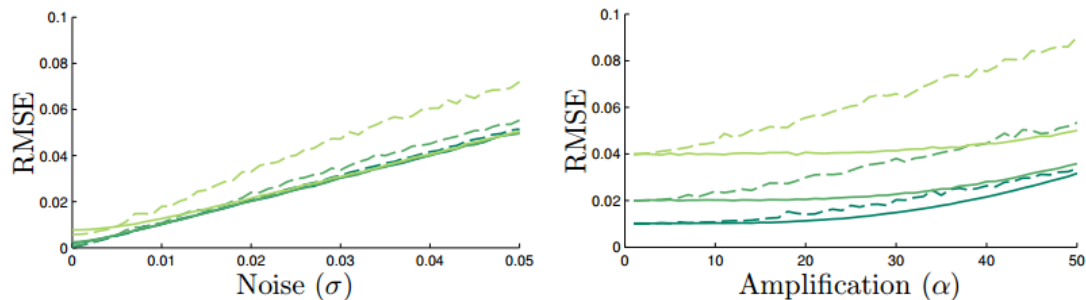
Eulerian

- Better for smoother structures and small amplifications
- Capable of color amplification
- For small amplifications, “strikes a better balance between performance and efficiency”

Discussion of Findings (cont'd)



(b) Error as function of σ and α , Spatiotemporal noise



(c) Error as function of σ and α , Spatial noise only

Impact/Relevance

- Much simpler and less computationally intensive method to amplify small changes in real world videos.
- Single framework that can be used to amplify both spatial motion and purely temporal changes (color).
- No-contact pulse measurement.
- Potentially a more accessible measure of local blood flow (perfusion), which can help characterize healing of chronic wounds and assist physicians in developing appropriate treatment plans for patients.

Critique

Good things

- Theoretical and analytical comparison of EVM and Lagrangian based methods
- Very thorough explanation of theoretical basis
- Enough detail (and web-based resources) to easily replicate experiments

Not-So-Good things

- Lack of empirical evidence to substantiate claims
 - Analytical comparison with 'ground truth' (for pulse, etc)
 - Maybe include experimentation with program parameters on various inputs
- Did not discuss effects of lighting/unstable video/other non-ideal settings
- Few applications mentioned

Questions/Comments?