Defocus Blur Detection using novel Local Directional Mean Patterns (LDMP) and segmentation via KNN Matting

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Problems & Ideas

- Detection and segmentation of defocus blur
  - Discriminating sharp smooth and blurred smooth regions, low recognition rate in noisy images.
  - high computational cost without having any prior knowledge of images i.e. blur degree and camera configuration.

- Ideas: Automated detection and segmentation of the defocus blurred regions of the images.
  - Detection of the higher and lower patterns of the images using local sharpness measurements.
  - Extraction of the sharp and blur regions of the image using higher and lower patterns to determine the image trimaps.
  - Segmentation of the extracted sharp and blur regions of the image.

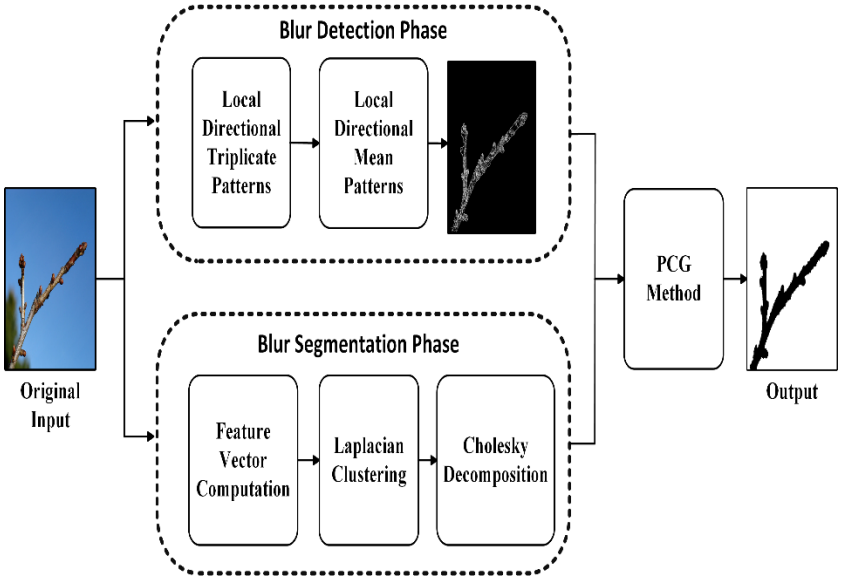

Fig-1: Proposed Framework

Main Contributions

- Local Directional Mean Patterns (LDMP) approach to determine the LDMP-Trimap from the image by utilizing the LDTP higher and lower patterns that are robust to noisy images.
- An image matting based blur segmentation approach to segment the blur and sharp regions of the image from the proposed LDMP-Trimap.
- Rigorous experimentation over multiple datasets containing different distortions and high-dense noisy images to prove the effectiveness of the proposed framework.

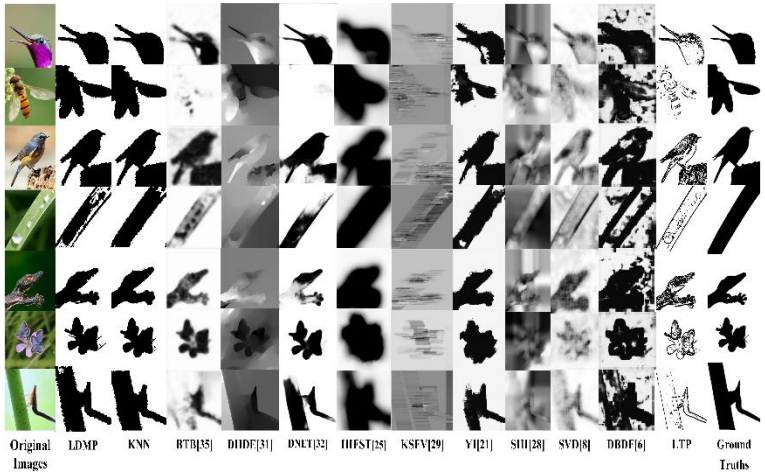

Fig-2: Qualitative comparison of the proposed and comparative methods

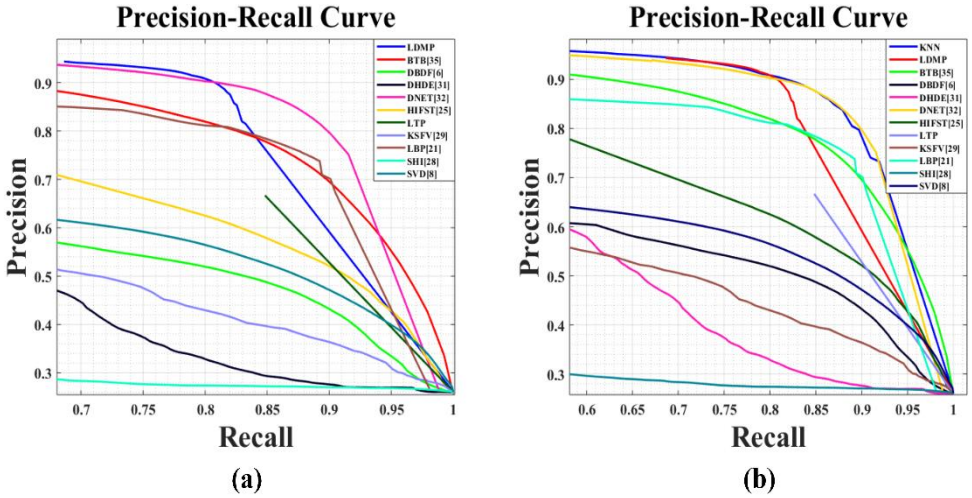

Fig-3: PR-curve comparison of the proposed and comparative methods

Conclusion

- Defocus blur detection and segmentation problem addressed without exploiting any information regarding camera configuration, level, and intensity of the blur.
- Proposed method is robust to noise and is able to generate more accurate defocus maps over comparative methods.
- our method is most efficient among all comparative methods that make it suitable for real-time processing.