

## Denoising Phase Unwrapping Algorithm For Precise Phase

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In this paper, we present a non-iterative Simultaneous Phase Unwrapping and Denoising algorithm for phase imaging, referred to as SPUD. The proposed method relies on the least-squares Discrete...

**(PDF) SPUD: Simultaneous Phase Unwrapping and Denoising ...**

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**Denoising phase unwrapping algorithm for precise phase ...**

Phase unwrapping refers to the process of recovering the absolute phase  $\phi$  from a wrapped phase  $\psi$ . Phase unwrapping arise in many applications, such as wavefront measurements in interferometry, field mapping in magnetic resonance imaging, the interferometry SAR process, measurements in adaptive optics and even a deflectometry. Gaining attention for a long time, many algorithms have been developed in relation to phase unwrapping problem.

**Denoising phase unwrapping algorithm for precise phase ...**

phase unwrapping and denoising algorithm We are interested in finding the phase candidate that minimizes (6), a problem that contains the sum of four lower semicontinuous convex functions from  $\mathbb{R}^D$  to  $\mathbb{R}$  [f+1g, ie, they belong to the space  $\mathcal{C}(\mathbb{R}^D)$  for some dimension  $D \geq 2$ Ng[14]

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overcoming the state-of-the-art algorithms developed for noisy phase unwrap The polynomial modeling is a popular idea for both wrapped phase denoising and noisy phase unwrap ABSTRACT arXiv:1407.8040v1 [math.OA] 30 Jul 2014 phase unwrapping and denoising algorithm We are interested in finding the phase

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phase unwrapping and denoising algorithm We are interested in finding the phase candidate that minimizes (6), a problem that contains the sum of four lower semicontinuous convex functions from  $\mathbb{R}^D$  to  $\mathbb{R}$  [f+1g, ie, they belong to the space  $\mathcal{C}(\mathbb{R}^D)$  for

### [eBooks] Denoising Phase Unwrapping Algorithm For Precise ...

The phase unwrapping is performed using segment-wise, block-wise and pixel-wise phase unwrapping algorithms. The errors in phase unwrapping are shown in figures 3.17 (b)-(d), respectively. The effects of segment-wise, block-wise and pixel-wise methods of phase unwrapping are clearly visible in the error maps.

### Fringe denoising and phase unwrapping - Book chapter ...

The algorithm has two main steps: 1. Phase unwrapping: we input two (or more) different frequency interferograms (of the same scene), which provides an extension of the  $[-\pi, \pi]$  ambiguity interval and, consequently, an increasing of the phase rates that still allow unwrapping to be a well-posed problem.

### PHASE IMAGING: UNWRAPPING AND DENOISING WITH DIVERSITY AND ...

In this paper, we present a noniterative simultaneous phase unwrapping and denoising algorithm for phase imaging, referred to as SPUD. The proposed method relies on the least squares discrete cosine transform (DCT) solution for phase unwrapping with an additional sparsity constraint on the DCT coefficients of the unwrapped solution.

### OSA | SPUD: simultaneous phase unwrapping and denoising ...

However, the phase distribution is computed as modulo  $2\pi$  of the absolute phase due to inverse tangent operation, which makes the phase unwrapping indispensable. The reliability of phase unwrapping depends heavily on the quality of the phase pattern. If the fringe patterns recorded in phase shifting or Fourier transform interferometry setups are not filtered before phase demodulation, the corresponding phase pattern carry the speckle noise that adversely affect the subsequent phase ...

### Fringe denoising algorithms: A review - ScienceDirect

sence of discontinuities. The phase unwrapping equipped with this adaptive LPA prefiltering yields very good accuracy of the phase reconstruction, quite often overcoming the state-of-the-art algorithms developed for noisy phase unwrap. The polynomial modeling is a popular idea for both wrapped phase denoising and noisy phase unwrap.

### Absolute phase estimation: adaptive local denoising and ...

Most of existing unwrapping algorithms implement denoising operations first to obtain noise-free phases and then conduct phase unwrapping pixel by pixel. This approach is sensitive to spikes and prone to unreliable results in practice. In this paper, a robust unwrapping algorithm based on the non-subsampled contourlet transform (NSCT) is developed.

### Phase unwrapping in digital holography based on non ...

Abstract: In the traditional processing flow of interferometric synthetic aperture radar (SAR) technique, the processing of phase is conducted via two separated and successive steps, i.e., phase denoising and phase unwrapping. That is to say, first, wrapped phases without noise are generated, and then, the true phases without  $2\pi$ -ambiguities are reconstructed (here and in the rest of this paper, true phase refers to the information-induced unwrapped phase without noise).

### Integrated Denoising and Unwrapping of InSAR Phase Based ...

\* A discussion of future trends in phase unwrapping research \* Foreword by former NASA scientist Dr. John C. Curlander Two-Dimensional Phase Unwrapping skillfully integrates concepts, algorithms, software, and examples into a powerful benchmark against which new ideas and algorithms for phase unwrapping can be tested.

### Two-Dimensional Phase Unwrapping: Theory, Algorithms, and ...

The paper attacks absolute phase estimation with a two-step approach: the first step applies an adaptive local denoising scheme to the modulo- $2\pi$  noisy phase; the second step applies a robust phase unwrapping algorithm to the denoised modulo- $2\pi$  phase obtained in the first step. The adaptive local modulo- $2\pi$  phase denoising is a new algorithm based on local polynomial approximations.

### [PDF] Absolute phase estimation: adaptive local denoising ...

Phase unwrapping is thus needed to reconstruct the true phase from the wrapped phase. However, noise in a wrapped phase is an obstacle for successful phase unwrapping, especially when a simple phase unwrapping method is used [2,3], and thus denoising is necessary.

### Wrapped phase denoising using convolutional neural ...

```
>>> c0, c1 = np.ogrid [-1: 1: 128 j, -1: 1: 128 j] >>> image = 12 * np.pi * np.exp(-(c0**2 + c1**2)) >>> image_wrapped = np.angle(np.exp(1j * image)) >>> image_unwrapped = unwrap_phase(image_wrapped) >>> np.std(image_unwrapped-image) < 1e-6 # A constant offset is normal True
```

### Module: restoration - skimage v0.18.0.dev0 docs

Abstract. The phase of an image obtained with many magnetic resonance imaging techniques is related to some physical variable of interest. This phase needs to be unwrapped, which is complicated by the presence of noise and multiple objects of irregular shape. A new two-dimensional phase unwrapping algorithm is presented, along with simulation results. © 1992 Academic Press, Inc.

### A new two-dimensional phase unwrapping algorithm for MRI ...

The adaptive local modulo- $2\pi$  phase denoising is a new algorithm based on local polynomial approximations. The zero-order and the firstorder approximations of the phase are calculated in sliding windows of varying size.

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