sewar Documentation

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Contents:

CHAPTER 1

Full reference metrics

sewar.full_ref.**ergas**(*GT*, *P*, *r=0.25*)
calculates erreur relative globale adimensionnelle de synthese (ergas).

Parameters

- **GT** – first (original) input image.
- **P** – second (deformed) input image.
- **r** – ratio of high resolution to low resolution (default=1/4).

Returns float – ergas value.

sewar.full_ref.**mse**(*GT*, *P*)
calculates mean squared error (mse).

Parameters

- **GT** – first (original) input image.
- **P** – second (deformed) input image.

Returns float – mse value.

sewar.full_ref.**msssim**(*GT, P, weights=[0.0448, 0.2856, 0.3001, 0.2363, 0.1333], ws=11, K1=0.01, K2=0.03, MAX=None*)
calculates multi-scale structural similarity index (ms-ssim).

Parameters

- **GT** – first (original) input image.
- **P** – second (deformed) input image.
- **weights** – weights for each scale (default = [0.0448, 0.2856, 0.3001, 0.2363, 0.1333]).
- **ws** – sliding window size (default = 11).
- **K1** – First constant for SSIM (default = 0.01).
- **K2** – Second constant for SSIM (default = 0.03).

- **MAX** – Maximum value of datarange (if None, MAX is calculated using image dtype).

Returns float – ms-ssim value.

sewar.full_ref.**psnr**(*GT*, *P*, *MAX=None*)
calculates peak signal-to-noise ratio (psnr).

Parameters

- **GT** – first (original) input image.
- **P** – second (deformed) input image.
- **MAX** – maximum value of datarange (if None, MAX is calculated using image dtype).

Returns float – psnr value in dB.

sewar.full_ref.**psnrb**(*GT*, *P*)
Calculates PSNR with Blocking Effect Factor for a given pair of images (PSNR-B)

Parameters

- **GT** – first (original) input image in YCbCr format or Grayscale.
- **P** – second (corrected) input image in YCbCr format or Grayscale..

Returns float – psnr_b.

sewar.full_ref.**rase**(*GT*, *P*, *ws=8*)
calculates relative average spectral error (rase).

Parameters

- **GT** – first (original) input image.
- **P** – second (deformed) input image.
- **ws** – sliding window size (default = 8).

Returns float – rase value.

sewar.full_ref.**rmse**(*GT*, *P*)
calculates root mean squared error (rmse).

Parameters

- **GT** – first (original) input image.
- **P** – second (deformed) input image.

Returns float – rmse value.

sewar.full_ref.**rmse_sw**(*GT*, *P*, *ws=8*)
calculates root mean squared error (rmse) using sliding window.

Parameters

- **GT** – first (original) input image.
- **P** – second (deformed) input image.
- **ws** – sliding window size (default = 8).

Returns tuple – rmse value,rmse map.

sewar.full_ref.**sam**(*GT*, *P*)
calculates spectral angle mapper (sam).

Parameters

- **GT** – first (original) input image.
- **P** – second (deformed) input image.

Returns float – sam value.

sewar.full_ref.**scc**(*GT, P, win=[[-1, -1, -1], [-1, 8, -1], [-1, -1, -1]], ws=8*)
calculates spatial correlation coefficient (scc).

Parameters

- **GT** – first (original) input image.
- **P** – second (deformed) input image.
- **fltr** – high pass filter for spatial processing (default=[[-1,-1,-1],[-1,8,-1],[-1,-1,-1]]).
- **ws** – sliding window size (default = 8).

Returns float – scc value.

sewar.full_ref.**ssim**(*GT*, *P*, *ws=11*, *K1=0.01*, *K2=0.03*, *MAX=None*, *fltr_specs=None*, *mode='valid'*)
calculates structural similarity index (ssim).

Parameters

- **GT** – first (original) input image.
- **P** – second (deformed) input image.
- **ws** – sliding window size (default = 8).
- **K1** – First constant for SSIM (default = 0.01).
- **K2** – Second constant for SSIM (default = 0.03).
- **MAX** – Maximum value of datarange (if None, MAX is calculated using image dtype).

Returns tuple – ssim value, cs value.

sewar.full_ref.**uqi**(*GT*, *P*, *ws=8*)
calculates universal image quality index (uqi).

Parameters

- **GT** – first (original) input image.
- **P** – second (deformed) input image.
- **ws** – sliding window size (default = 8).

Returns float – uqi value.

sewar.full_ref.**vifp**(*GT*, *P*, *sigma_nsq=2*)
calculates Pixel Based Visual Information Fidelity (vif-p).

Parameters

- **GT** – first (original) input image.
- **P** – second (deformed) input image.
- **sigma_nsq** – variance of the visual noise (default = 2)

Returns float – vif-p value.

CHAPTER 2

No reference metrics

sewar.no_ref.**d_lambda**(*ms*, *fused*, *p=1*)
calculates Spectral Distortion Index (D_lambda).

Parameters

- **ms** – low resolution multispectral image.
- **fused** – high resolution fused image.
- **p** – parameter to emphasize large spectral differences (default = 1).

Returns float – D_lambda.

sewar.no_ref.**d_s**(*pan*, *ms*, *fused*, *q=1*, *r=4*, *ws=7*)
calculates Spatial Distortion Index (D_S).

Parameters

- **pan** – high resolution panchromatic image.
- **ms** – low resolution multispectral image.
- **fused** – high resolution fused image.
- **q** – parameter to emphasize large spatial differences (default = 1).
- **r** – ratio of high resolution to low resolution (default=4).
- **ws** – sliding window size (default = 7).

Returns float – D_S.

sewar.no_ref.**qnr**(*pan*, *ms*, *fused*, *alpha=1*, *beta=1*, *p=1*, *q=1*, *r=4*, *ws=7*)
calculates Quality with No Reference (QNR).

Parameters

- **pan** – high resolution panchromatic image.
- **ms** – low resolution multispectral image.
- **fused** – high resolution fused image.

- **alpha** – emphasizes relevance of spectral distortions to the overall.
- **beta** – emphasizes relevance of spatial distortions to the overall.
- **p** – parameter to emphasize large spectral differences (default = 1).
- **q** – parameter to emphasize large spatial differences (default = 1).
- **r** – ratio of high resolution to low resolution (default=4).
- **ws** – sliding window size (default = 7).

Returns float – QNR.

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