Considered methods for signal processing methods for noise and trends eliminations:

**Fourier Transform**

Fourier filters are very good choice to apply for the processing of smooth signals and images if high-frequency components of signal interference are caused only by noise. The filtering properties of the algorithms depend on the smoothing parameter, which is common for all processed coefficients of the discrete Fourier transform into signal interference. This determines the main contradiction of linear filtering algorithms: when increasing the smoothing parameter α, the random filtering error decreases, but the systematic error increases; as α decreases, the random filtering error increases, but the systematic error decreases. Therefore, an important element of Fourier algorithms is to determine the optimal smoothing parameter.

**Gaussian Filter**

Gaussian filter is a filter whose pulse transient function is a Gaussian function. The Gaussian filter is designed so as not to have an overregulation in the transition function and to maximize the time constant. This behavior is closely related to the fact that the Gaussian filter has the minimum possible group delay. Also, the filter is typically used digitally to process two-dimensional signals (images) to reduce noise. However, resample will cost you image quality in form of really bad blur.

**Wavelet Transforms**

To analyze signal structures of very different sizes, it is necessary to use timefrequency atoms with different time supports. The wavelet transform decomposes signals over dilated and translated wavelets. As a result, the initial function can be restored. The main problem is to choose the correct coefficient threshold level in order to leave the main features of data unchanged. The standard methods, which are victorious with the suppressed noise in the images, such as the media filter and the Gauss filter of low frequencies, are simpler to use, however, the quality of signal is not good enough because of inability to track signal features.

**Anisotropic Filtering and Diffusion**

Anisotropic diffusion is the nonlinear and spatial-variant transformation of the original image that used in image processing and computer vision as method aimed to redue image noise without removing significant parts of the image content, usually edges, lines or other details that are important for image interpretation. The diffusion process is a linear and spatially invariant transformation of the original image. Anisotropic filtering is a generalization of this process: it creates a family of parameterized images, but each resulting image is a combination between the original image and the filter, depending on the local content of the original image.

**Non-local means**

Non-local mean is an image processing algorithm that reduces image noise. Unlike "local mean" filters, which take the mean value of a group of pixels surrounding a target pixel to smooth the image, nonlocal means that filtering takes the average of all pixels in the image, estimating how similar those pixels are to the target pixel. This results in much greater clarity after filtering and less loss of image detail compared to the "local average" algorithm.

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