

Fractional Calculus Applications in Image Processing

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ABSTRACT

Fractional calculus extends the idea of derivatives and integrals from integer-order to arbitrary real/complex orders. Moreover, in fractional calculus, the concept of the derivative is nonlocal. This property reflects the memory effects with the use of derivative. In image processing, the memory effect on a processed pixel is directly related to neighbouring pixels. We know that pixels are highly correlated to the neighbouring pixels in the digital image. The use of fractional calculus helps maintain the correlation between neighbouring pixels and preserves the texture and fine details of the image. In this presentation, we will discuss the fundamentals of the fractional calculus, some generalized fractional filters, and an algorithm for image denoising, which uses the fractional filters. All the advantages and the future scope of the designed algorithm will be discussed in this session.

Keywords: Image processing, Fractional calculus, Digital image.

