(TECHNOLOGISTS PROGRAM)

(Proposed to be presented as Oral Communication or as a Poster)

Abstracts List of Topics:

Physics & Instrumentation & Data Analysis

102. Image Reconstruction

Abstract Title:

Image upsampling algorithms applied on Nuclear Medicine: Comparison of *hqnx* and *nxSal* algorithms families with two interpolation algorithms - *nearest neighbor* and *bicubic interpolation*

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Abstract Text:

Introduction: Image resizing is a normal feature incorporated into the Nuclear Medicine digital imaging. Upsampling is done by manufacturers to adequately fit more the acquired images on the display screen and it is applied when there is a need to increase - or decrease - the total number of pixels. This paper pretends to compare the "hq*n*x" and the "*n*xSaI" magnification algorithms with two interpolation algorithms – "nearest neighbor" and "bicubic interpolation" – in the image upsampling operations.

Material and Methods: Three distinct Nuclear Medicine images were enlarged 2 and 4 times with the different digital image resizing algorithms (nearest neighbor, bicubic interpolation *nx*SaI and hq*n*x). To evaluate the pixel's changes between the different output images, 3D whole image plot profiles and surface plots were used as an addition to the visual approach in the 4x upsampled images.

Results: In the 2x enlarged images the visual differences were not so noteworthy. Although, it was clearly noticed that bicubic interpolation presented the best results. In the 4x enlarged images the differences were significant, with the bicubic interpolated images presenting the best results. Hq*n*x resized images presented better quality than 4xSaI and nearest neighbor interpolated images, however, its intense "halo effect" affects greatly the definition and boundaries of the image contents.

Conclusion: The hq*n*x and the *n*xSaI algorithms were designed for images with clear edges and so its use in Nuclear Medicine images is obviously inadequate. Bicubic interpolation seems, from the algorithms studied, the most suitable and its each day wider applications seem to show it, being assumed as a multi-image type efficient algorithm.

Foi decidido que não será apresentada a versão integral deste documento.

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