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Real-time Local Noise Filter in 3D Visualisation of CT Data

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X-ray computed tomography (CT) imaging allows biologists to study the internal structure of living organisms with high spatial and temporal resolution. To control the flow of experiment, the online data visualisation is highly desirable. However, the noise inherent to the tomographic setup deteriorates the visual output preventing users from identifying the features. The problem is further complicated by a narrow dynamic range of the produced tomographic data that prevents simple greyscale thresholding approaches. On the other hand, the iterative approaches are not suitable for online visualisation due to slow speed and parametrisation. In this talk, we present a real-time visualisation service that provides a fast image preview during the data acquisition stage. Our approach suppresses the noise by a modified mean filter approach. To detect noise, we average nine uniformly distributed sub-regions: one central sub-region and eight diagonally spread sub-regions. Each sub-region averages its six adjacent neighbouring voxels. The resulting average (average of 9 sub-regions) is subjected to the Otsu threshold where a value lower than the threshold is treated as noise. To evaluate the efficiency of our filter, we compare against four other local filters regarding entropy and processing time. The results demonstrated significant improvement of the visual quality with processing time still within the millisecond range.

Minioral

Yes

Description

Algo

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