LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Karya Ilmiah (Artikel) : An algorithm for automated modulation transfer function measurement using an edge of a PMMA phantom: Impact of field of view on spatial resolution of CT images

Jumlah Penulis : 5 Orang

Status Pengusul : Penulis pertama/ ~~Penulis ke~~ / Penulis Korespondesi **

Identitas Jurnal Ilmiah :
a. Nama Jurnal : Journal of Applied Clinical Medical Physics
b. Nomor ISSN : 1526-9914
c. Volume, Nomor, Bulan, Tahun : Vol. 19 No. 6, November 2018
d. Penerbit : American Association of Physicists in Medicine (AAPM)
e. DOI artikel (jika ada) : 10.1002/acm2.12476
f. Alamat web jurnal : https://aapm.onlinelibrary.wiley.com/journal/15269914
g. Terindeks di Scimagojr/Scopus ~~atau di….**~~

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d. Kelengkapan unsur dan kualitas penerbit (30%)	11,9	11,5	11,7
Total = (100%)	**39,5**	**36,7**	38,1
Nilai untuk Pengusul : (60% x 38,1) = 22,86			

Semarang, 1 Desember 2021

Reviewer 1

Prof. Dr. Drs. Muhammad Nur, DEA
NIP. 195711261990011001
Bidang ilmu/Unit kerja : Fisika/Fakultas Sains dan Matematika

Reviewer 2

Dr. Drs. Catur Edi Widodo, M.T.
NIP. 196405181992031002
Bidang ilmu/Unit kerja : Fisika/Fakultas Sains dan Matematika

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel)	:	An algorithm for automated modulation transfer function measurement using an edge of a PMMA phantom: Impact of field of view on spatial resolution of CT images
Nama/ Jumlah Penulis	:	5 Orang
Status Pengusul	:	Penulis pertama/ ~~Penulis ke~~ / Penulis Korespondesi **
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c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	12			11,8
d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12			11,9
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Nilai Pengusul = 60% x 39,7 = 23,70				

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3. **Kecukupan dan kemutakhiran data/informasi dan metodologi:**
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Semarang, 29 Desember 2021
Reviewer 1

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Unit Kerja : Fisika
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LEMBAR
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Nama/ Jumlah Penulis	:	5 Orang
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Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	**Nilai Maksimal Jurnal Ilmiah**			**Nilai Akhir Yang Diperoleh**
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a. Kelengkapan unsur isi jurnal (10%)	4			3,7
b. Ruang lingkup dan kedalaman pembahasan (30%)	12			11
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	12			10,5
d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12			11,5
Total = (100%)	**40**			**36,7**
Nilai Pengusul = 60% x 36,7 = 22.02				

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1. **<u>Kesesuaian dan kelengkapan unsur isi jurnal:</u>**

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2. **<u>Ruang lingkup dan kedalaman pembahasan:</u>**

Substansi artikel yaitu tentang pengukuran resolusi spasial hasil computer tomografi memggunakan algoritma MTF telah sesuai dengan ruang lingkup jurnal, dengan kedalaman pembahasan sangat baik

3. **<u>Kecukupan dan kemutakhiran data/informasi dan metodologi:</u>**

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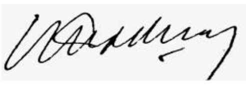
Semarang, 23 Nopember 2021
Reviewer 2



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An algorithm for automated modulation transfer function measurement using an edge of a PMMA phantom: Impact of field of view on spatial resolution of CT images

Anam C.[a], Fujibuchi T.[b], Budi W.S.[a], Haryanto F.[c], Dougherty G.[d]

Save all to author list

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Automated procedure for slice thickness verification of computed tomography images: Variations of slice thickness, position from iso-center, and reconstruction filter

Lasiyah, N. , Anam, C. , Hidayanto, E.
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Anam, C. , Budi, W.S. , Fujibuchi, T.
(2019) Journal of Physics: Conference Series

An improved method of automated noise measurement system in ct images

Anam, C. , Arif, I. , Haryanto, F.

Abstract

Purpose: The purpose of this study was to introduce a new algorithm for automated measurement of the modulation transfer function (MTF) using an edge of a readily available phantom and to evaluate the effect of reconstruction filter and field of view (FOV) on the spatial resolution in the CT images. Methods: Our automated MTF measurement consisted of several steps. The center of the image was established and an appropriate region of interest (ROI) designated. The edge spread function (ESF) was determined, and a suitably interpolated ESF curve was differentiated to obtain the line spread function (LSF). The LSF was Fourier transformed to obtain the MTF. All these steps were accomplished automatically without user intervention. The results of the automated MTF from the edge phantom were validated by comparing them with a point image, and the results of the automated calculation were validated by the standard fitting method. The automated MTF calculation was then applied to the images of two polymethyl methacrylate (PMMA) phantoms and a wire phantom which had been scanned by a Toshiba Alexion 4-slice CT scanner and reconstructed with various filter types and FOVs. Results: The difference in the 50% MTF values obtained from the edge and point phantoms were within ±4%. The values from the automated and fitted methods agreed to within ±2%, indicating that the automated MTF calculation was accurate. The automated MTF calculation was able to differentiate MTF curves for various filters. The spatial resolution values were 0.37±0.00, 0.71±0.01, and 0.78±0.01 cycles/mm for FC13, FC30 and FC52 filters, respectively. The spatial resolution of the images decrease linearly (R^2 >0.98) with increasing FOVs. Conclusion: An automated MTF method was successfully developed using an edge phantom , the PMMA phantom . The method is easy to implement in a clinical environment and is not influenced by user experience.

Author keywords

automated MTF calculation; edge spread function ; field of view; modulation transfer function ; PMMA phantom ; spatial resolution

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MEDICAL IMAGING

WILEY

Merging images with different central frequencies reduces banding artifacts in balanced steady-state free precession magnetic resonance cisternography

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Abstract

Purpose: The aim of this study was to evaluate the utility of merged balanced steady-state free precession (bSSFP) magnetic resonance cisternography images.

Materials and Methods: Twenty ears of 10 healthy volunteers (six men, four women; mean age ± standard deviation, 26.7 ± 1.6 yr) and 10 patients (two men, eight women; mean age, 46.3 ± 10.9 yr) with neoplasm around the sella turcica were included. Two different devices (A and B) were used to confirm the versatility of our method for MR devices with different local magnetic field homogeneity. Images with different central frequencies (±10, ±20, ±30, ±40, and ±50 Hz) were merged with the maximum magnitude of corresponding pixels from the images acquired using both devices. Two neuroradiologists visually graded the image quality of 11 sites in the inner ear and three sites around the sella turcica (scale: 0–2) and compared the quality with that of the corresponding basic image (0 Hz).

Results: The image quality was better in merged images of the vestibule, superior semicircular canal (SCC), posterior SCC, and horizontal SCC ($P = 0.005$ to 0.020 mainly at ±40 and ±50 Hz on devices A and B), as well as in merged images of the sella turcica and right cavernous sinus (±50 Hz, $P = 0.003$ and 0.020 on device B, respectively), than it was in the corresponding basic images.

Conclusions: The maximum magnitude merging of images with different central frequencies makes it possible to reduce banding artifacts on bSSFP images without the need for special pulse sequences and image processing programs.

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KEY WORDS
balanced steady-state free precession, banding artifacts, merged images, off resonance

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Impact of a novel exponential weighted 4DCT reconstruction algorithm

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Abstract

Purpose: This work characterizes a novel exponential 4DCT reconstruction algorithm (EXPO), in phantom and patient, to determine its impact on image quality as compared to the standard cosine-squared weighted 4DCT reconstruction.

Methods: A motion platform translated objects in the superior–inferior (S-I) direction at varied breathing rates (8–20 bpm) and couch pitches (0.06–0.1) to evaluate interplay between parameters. Ten-phase 4DCTs were acquired and data were reconstructed with cosine squared and EXPO weighting. To quantify the magnitude of image blur, objects were translated in the anterior–posterior (A-P) and S-I directions for full-width half maximum (FWHM) analysis between both 4DCT algorithms and a static case. 4DCT sinogram data for 10 patients were retrospectively reconstructed using both weighting factors. Image subtractions elucidated intensity and boundary differences. Subjective image quality grading (presence of image artifacts, noise, spatial resolution (i.e., lung/liver boundary sharpness), and overall image quality) was conducted yielding 200 evaluations.

Results: After taking static object size into account, the FWHM of EXPO reconstructions in the A-P direction was 3.3 ± 1.7 mm (range: 0–4.9) as compared to cosine squared 9.8 ± 4.0 mm (range: 2.6–14.4). The FWHM of objects translated in the S-I direction reconstructed with EXPO agreed better with the static FWHM than the cosine-squared reconstructions. Slower breathing periods, faster couch pitches, and intermediate 4DCT phases had the largest reductions of blurring with EXPO. 18 of 60 comparisons of artifacts were improved with EXPO reconstruction, whereas no appreciable changes were observed in image quality scores. In 18 of 20 cases, EXPO provided sharper images although the reduced projections also increased baseline noise.

Conclusion: Exponential weighted 4DCT offers potential for reducing image blur (i.e., improving image sharpness) in 4DCT with a tendency to reduce artifacts. Future work will involve evaluating the impact on treatment planning including delineation ability and dose calculation.