CAPTURE-GAN: Conditional Attribute Preservation through Unveiling Realistic GAN for artifact removal in dual-energy CT imaging

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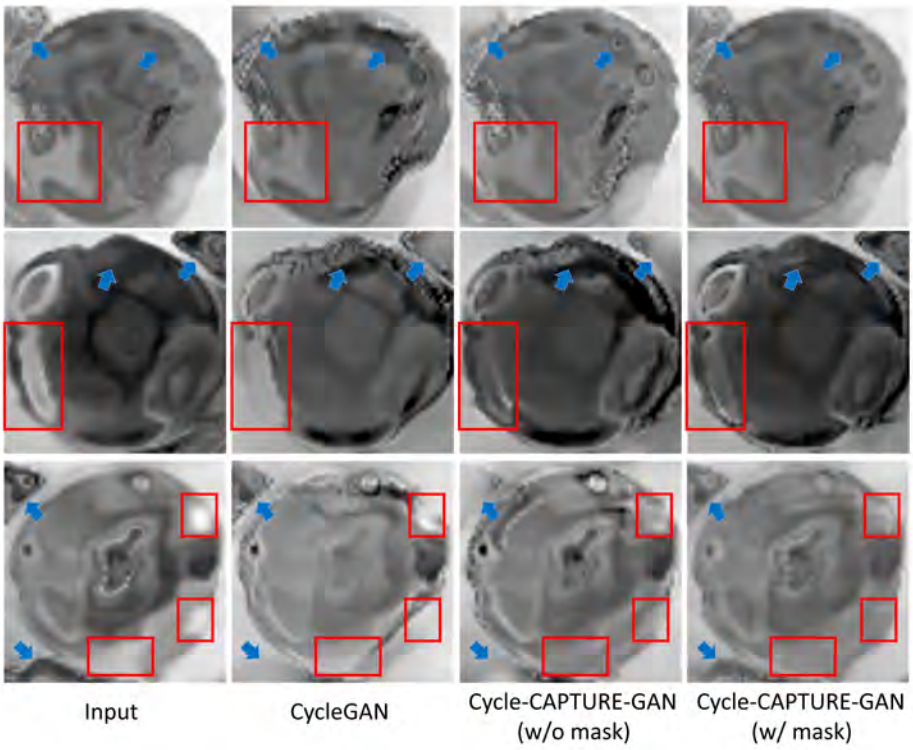

Fig. 1. Images generated using each model. Two bone sections were randomly selected for visualization. The filtered images were created by each model from an artifact-corrupted input image. The images in the leftmost column are the input images, and the other images are the output images. The red boxes in the images represent the areas containing artifacts. The blue arrows highlight the preserved patterns in the bone, illustrating how each model preserved them differently.

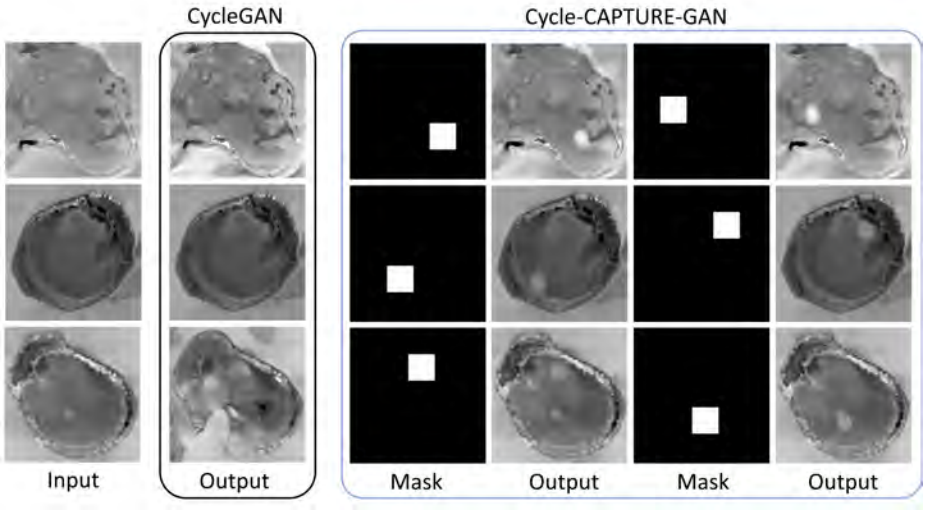

Fig. 2. Comparison of output variations based on changes in the mask. The first column represents the input image. The second column represents the output of the artifact generator for the input image in CycleGAN. The columns 3 to 6 represent the output of the artifact generator in Cycle-CAPTURE-GAN with varying masks.

Table 1. Metric scores of Cycle-CAPTURE-GAN varying with reconstruction-related loss weights in Eq. 6. Increasing weights lead to decreased artifact removal performance, while better preserving complex bone and tissue structures.

Method	Input: Artifact-free			Input: Artifact-corrupted
	PSNR ↑	SSIM ↑	MAE ↓	ACC (aritfact) (%)
Cycle-CAPTURE-GAN (λ_{cycle}=10, λ_{ident}=5)	32.99	0.9715	0.0190	83.34
Cycle-CAPTURE-GAN (λ_{cycle}=20, λ_{ident}=10)	38.89	0.9774	0.0131	87.30
Cycle-CAPTURE-GAN (λ_{cycle}=30, λ_{ident}=15)	39.52	0.9860	0.0110	87.70
Cycle-CAPTURE-GAN (λ_{cycle}=50, λ_{ident}=25)	40.44	0.9873	0.0091	65.08
Cycle-CAPTURE-GAN (λ_{cycle}=100, λ_{ident}=50)	42.20	0.9931	0.0087	62.90