

# Wide-Range MRI Artifact Removal with Transformers

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## 1 Appendix

### 1.1 Artifact types

We use  $L = 8$  different artifact types of the TorchIO [1] library. The artifact types are illustrated in Figure 1.

### 1.2 Model architectures

The specific hyperparameters of the models were picked to maximally utilize an NVIDIA RTX 3090 with 24 GiB of memory. The chosen hyperparameters can be found in Table 1. The loss function is  $\mathcal{L}_1$  for each model except for CycleGAN and BicycleGAN.

### 1.3 Experiment I - Qualitative assessment

Additional samples can be found in Figure 2. Each column represents a difference map with exception of the last two columns.

### 1.4 Experiment II - Quantitative assessment

In addition to the PSNR scores found in the main paper, we also feature SSIM scores in Figure 3 with a window size of 11. We observe no fundamental differences to the evaluation w.r.t. the PSNR metric.

<i>Architecture</i>	<i>Hyperparameter</i>	<i>S</i> = 128	<i>S</i> = 256
W-G2L-ART	Number of blocks	12	10
	Patch size	4	8
	Window size	4	4
	Embedding size	256	512
W-SW-MSA-ART	<i>same as for W-G2L-ART</i>	-	-
ResNet	Number of blocks	10	8
	Number of channels	10	8
DenseNet	Number of blocks	10	6
	Number of channels	10	6
MobileNet-v2	Number of blocks	10	6
	Number of channels	24	12
CycleGAN	Number of blocks	5	2
	Number of features ( <i>Generator</i> )	16	4
	Number of features ( <i>Discriminator</i> )	16	4
BicycleGAN	Number of blocks	10	3
	Number of channels	10	4
	Dimension of latent space	128	32

Table 1: **Hyperparameters**

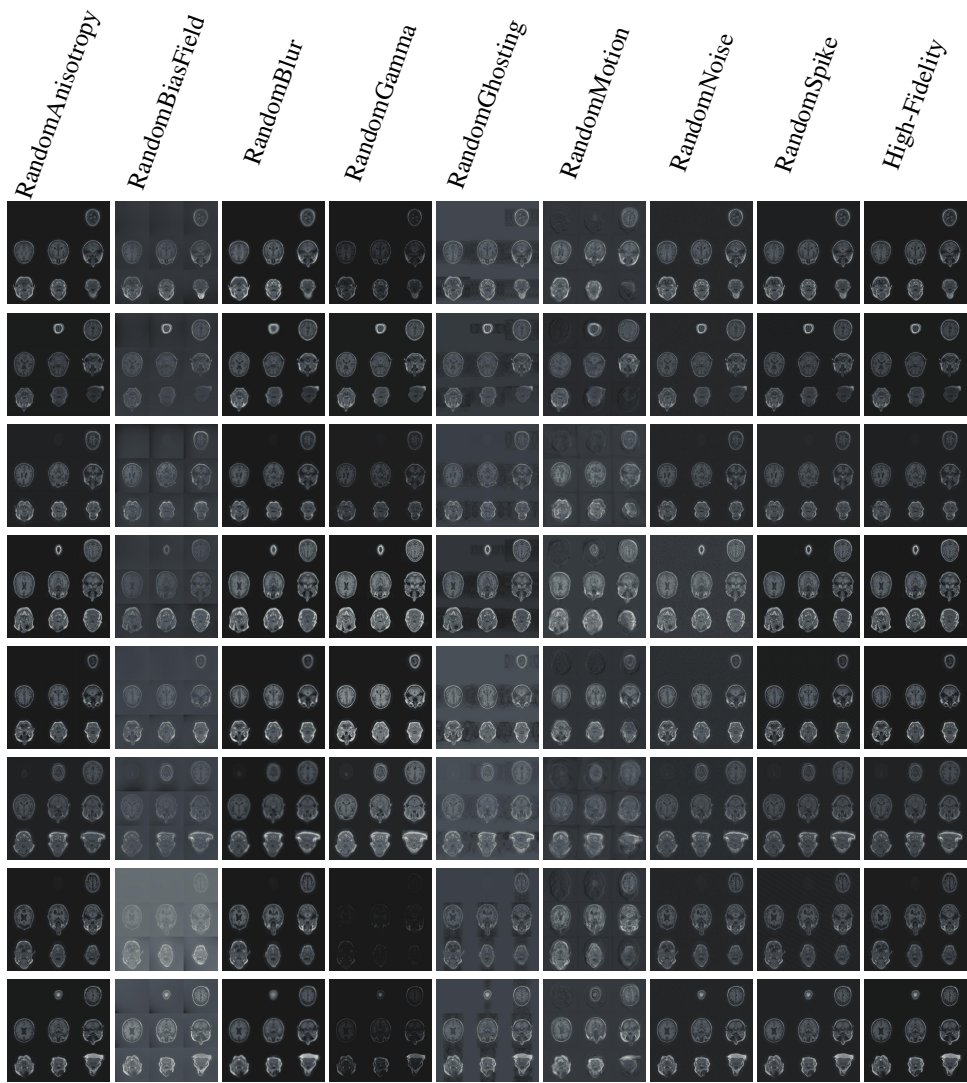


Figure 1: **Artifact types:** Each artifact type is itself stochastic in nature.

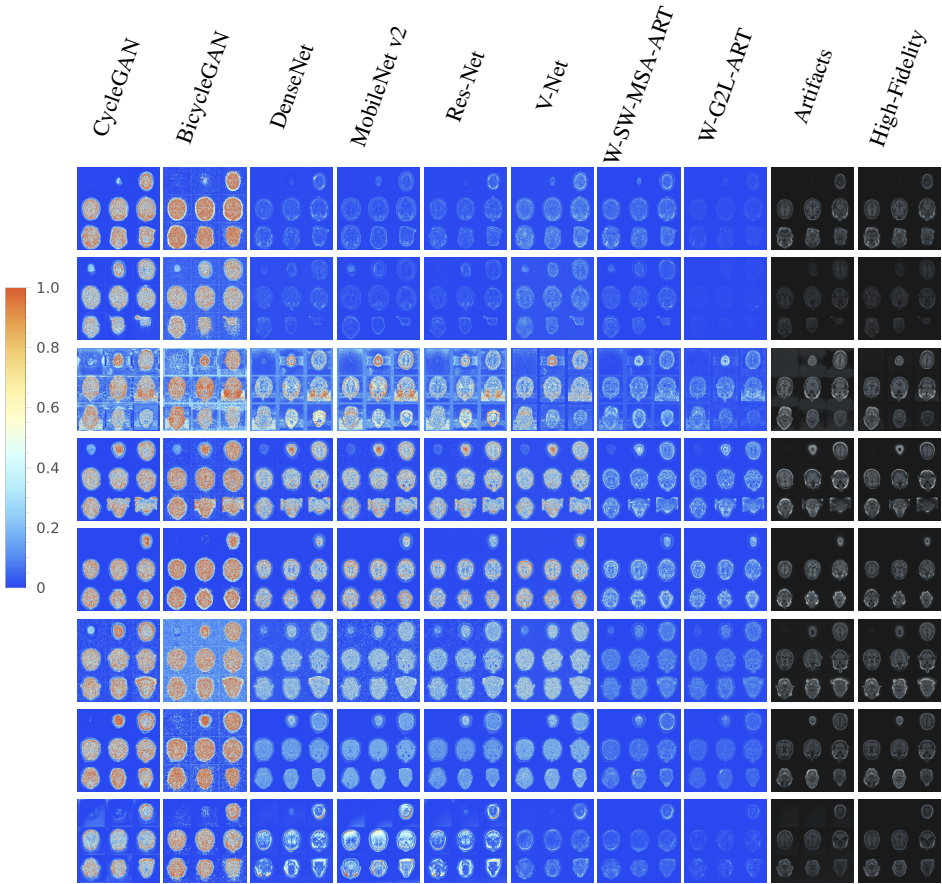


Figure 2: **Experiment I - Visual Quality:** Eight additional *absolute difference* maps.

	SSIM $\uparrow$	
	$S = 128$	$S = 256$
BicycleGAN	$0.357 \pm 0.0514$	$0.324 \pm 0.0464$
CycleGAN	$0.420 \pm 0.1041$	$0.326 \pm 0.0728$
DenseNet	$0.497 \pm 0.1744$	$0.402 \pm 0.1040$
MobileNet	$0.503 \pm 0.1429$	$0.450 \pm 0.1151$
ResNet	$0.499 \pm 0.1948$	$0.427 \pm 0.1120$
V-Net	$0.487 \pm 0.1642$	$0.398 \pm 0.0882$
W-SW-MSA-ART	$0.498 \pm 0.1867$	$0.433 \pm 0.1772$
W-G2L-ART	<b><math>0.507 \pm 0.2233</math></b>	<b><math>0.454 \pm 0.2004</math></b>

Figure 3: **Experiment II - Quantitative assessment:** SSIM scores

## References

- [1] Fernando Pérez-García, Rachel Sparks, and Sébastien Ourselin. TorchIO: A python library for efficient loading, preprocessing, augmentation and patch-based sampling of medical images in deep learning. *Comput. Methods Programs Biomed.*, 208(106236): 106236, 2021.