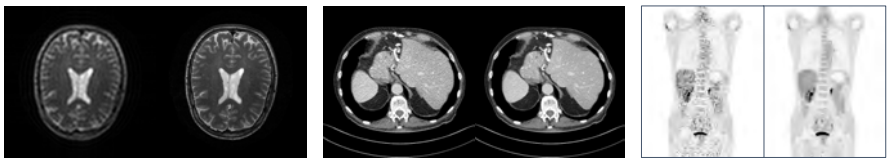
AMIR Supplement

Zhiwen Yang[1], Haowei Chen[1], Ziniu Qian[1], Yang Yi[1], Hui Zhang[2], Dan Zhao[3], Bingzheng Wei[4], and Yan Xu[1(✉,⋆)]

[1] Beihang University
xuyan04@gmail.com
[2] Tsinghua University
[3] Chinese Academy of Medical Sciences and Peking Union Medical College
[4] ByteDance Inc.

(a)



(b)

The Second Block

Task i \ Task j	MRI Super-resolution	CT Denoising	PET Synthesis
MRI Super-resolution	1.00	0.05	0.10
CT Denoising	0.05	1.00	-0.11
PET Synthesis	0.11	-0.12	1.00

The Last Block

Task i \ Task j	MRI Super-resolution	CT Denoising	PET Synthesis
MRI Super-resolution	1.00	-0.20	0.46
CT Denoising	-0.17	1.00	-0.40
PET Synthesis	0.38	-0.30	1.00

Fig. I. (a) Examples of LQ/HQ pairs for three different MedIR tasks. (b) The interference metric of task j on task i at the second and last blocks in Restormer. Red values indicate that task j negatively impacts task i, while green values indicate a positive impact.

Table I. Single task medical image restoration results.

Method	MRI Super-Resolution			Method	CT Denoising			Method	PET Synthesis		
	PSNR↑	SSIM↑	RMSE↓		PSNR↑	SSIM↑	RMSE↓		PSNR↑	SSIM↑	RMSE↓
SRCNN	28.8067	0.8919	41.3488	CNN	32.7600	0.9075	9.3928	Xiang's	35.9268	0.9167	0.0980
VDSR	30.0446	0.9140	36.0508	REDCNN	33.1889	0.9113	8.9427	DCNN	36.2710	0.9243	0.0954
SwinIR	31.5549	0.9334	30.5788	Eformer	33.3496	0.9175	8.8030	ARGAN	36.7272	0.9406	0.0902
Restormer	31.8474	0.9378	29.7005	CTformer	33.2506	0.9134	8.8974	Spach Transformer	37.1371	0.9456	0.0871
AMIR	**31.9923**	**0.9393**	**29.2095**	AMIR	**33.6738**	**0.9183**	**8.4773**	AMIR	**37.2121**	**0.9473**	**0.0863**

⋆ Corresponding author

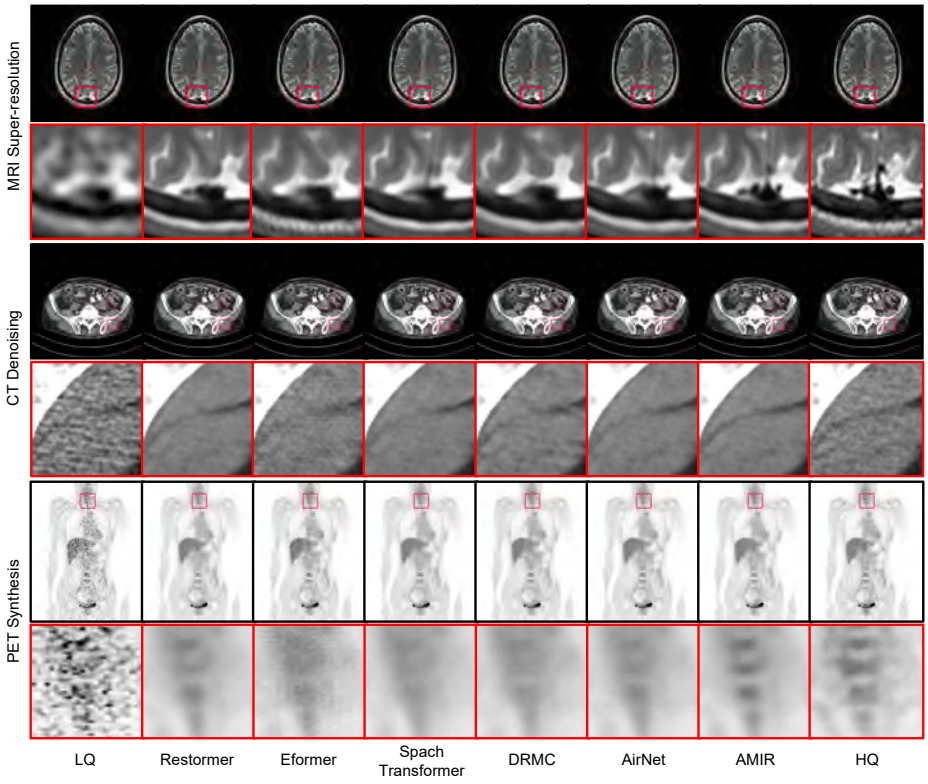
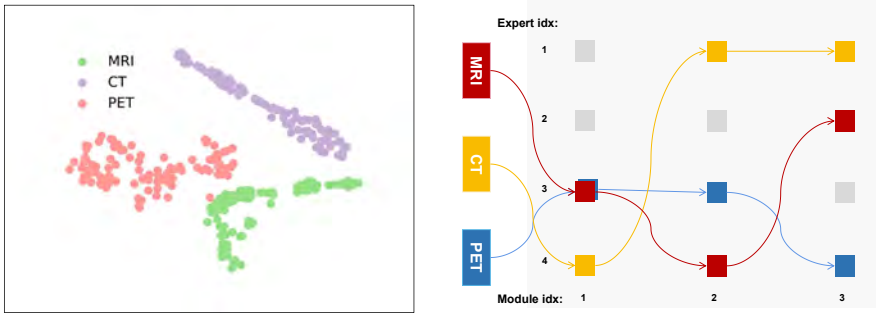


Fig. II. Visual comparison in three different medical image restoration tasks



(a) t-SNE visualization of I^{IR} from different task inputs

(b) Top-1 selected expert of the spatial routing modules

Fig. III. (a) t-SNE visualization of I^{IR} from different tasks, indicating a clear clustering of different task inputs. (b) Top-1 selected expert in each spatial routing module (SRM). In our AMIR network setting, there are 3 SRMs, each incorporating a mixture of experts (MOE) with 4 experts. Within these SRMs, the top-1 selected expert is identified across the 3 SRMs for each task. Remarkably, the top experts selected across SRMs form distinct paths, with variations observed across different tasks.