# Adversarial MRI Defense System Report

# MRI Adversarial Purification Report

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### Image: mri_healthy_6_20250329195851_fgsm_eps0.05.jpg

### Error adding comparison image: '_io.BytesIO' object has no attribute 'rfind'

## Purification Metrics

**PSNR:** 27.04 dB

**SSIM:** 0.6476

### Interpretation of Metrics:

PSNR (Peak Signal-to-Noise Ratio): 27.04 dB

This indicates good image quality after purification. PSNR values above 20 dB typically indicate acceptable quality.

SSIM (Structural Similarity Index): 0.6476

This indicates moderate structural preservation. There may be noticeable structural differences from the original.

## Technical Details

### Purification Model:

This purification was performed using a U-Net based deep learning model with attention mechanisms. The model was trained in two phases:

1. Phase 1: Initial training with pixel-wise and perceptual losses to learn the mapping from adversarial to clean images.

2. Phase 2: GAN-based fine-tuning with a PatchGAN discriminator for improved sharpness and detail preservation.

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The model incorporates self-attention mechanisms, residual connections, and multi-scale feature fusion to effectively remove adversarial perturbations while preserving important diagnostic features.