

Super-Resolution Neural Operator

L'CADAME Weekly Meetings

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The SRNO is a super-resolution model, with a key difference in the sense that as opposed to more traditional models, it can receive input of any size, and upscale it by an arbitrary factor.

- **Lifting Layer:** Encoder to a higher-dimensional latent space.
- **Kernel Integral:** T layers of Galerkin type attention
- **Projection:** Project to the RGB space.

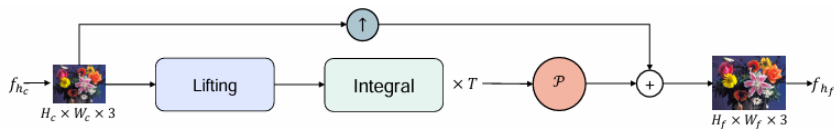


Fig. 1: SRNO architecture.

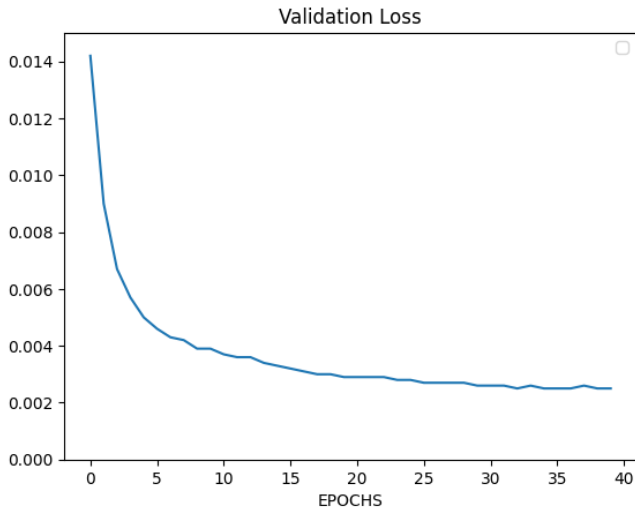


Fig. 2: Validation Loss

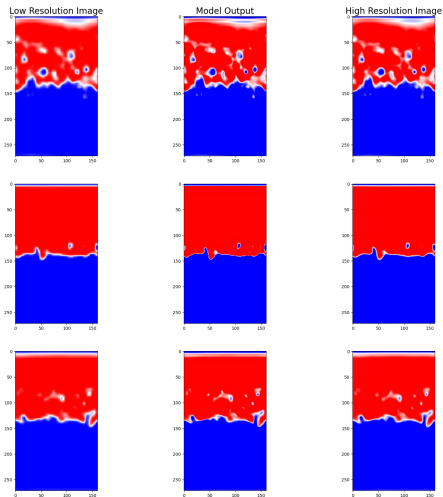


Fig. 3: Output from x4 smaller samples

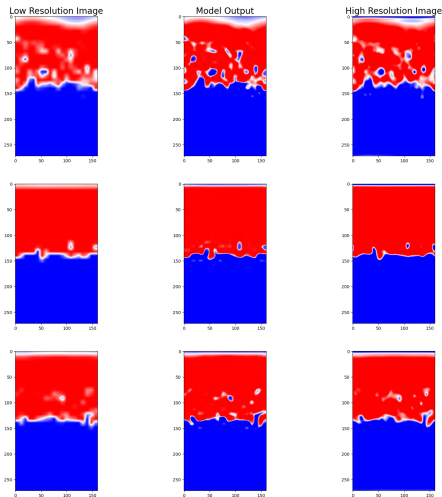


Fig. 4: Output from x8 smaller samples

Model Comparison for 4x scaling



Model	Average MSE (LR-HR)	Average MSE (Model Output-HR)	Average SSIM (LR-HR)	Average SSIM (Model Output-HR)
psi2 best epoch 4x	0.000845	0.001251	0.974124	0.976347
psi2 edsr 4x	0.000845	0.001237	0.974124	0.978156
psi2 rdn 4x	0.000845	0.001411	0.974124	0.975773

Model	Average EK (LR-HR)	Average EK (Model Output-HR)	Average Acc (LR-HR)	Average Acc (Model Output-HR)
psi2 best epoch 4x	6.063435	7.379695	0.968712	0.956344
psi2 edsr 4x	6.063435	7.336948	0.968712	0.956110
psi2 rdn 4x	6.063435	7.836295	0.968712	0.950226

Table 1: Model Comparison for 4x scaling

Model Comparison for 8x scaling



Model	Average MSE (LR-HR)	Average MSE (Model Output-HR)	Average SSIM (LR-HR)	Average SSIM (Model Output-HR)
psi2 best epoch x8	0.006680	0.003661	0.923994	0.914030
psi2 edsr x8	0.006680	0.003042	0.923994	0.951032
psi2 rdn x8	0.006680	0.003370	0.923994	0.946266

Model	Average EK (LR-HR)	Average EK (Model Output-HR)	Average Acc (LR-HR)	Average Acc (Model Output-HR)
psi2 best epoch x8	17.050837	12.622340	0.719878	0.860631
psi2 edsr x8	17.050837	11.506152	0.719878	0.877660
psi2 rdn x8	17.050837	12.564892	0.719878	0.856813

Table 2: Model Comparison for 8x scaling

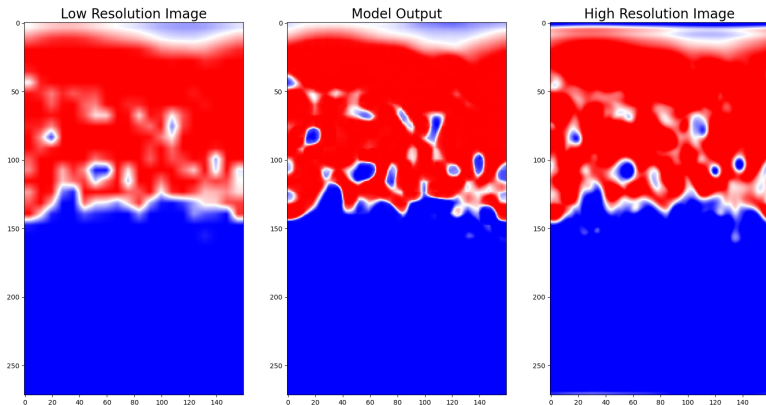


Fig. 5: Output from x8 smaller sample