

AI Engineering Assessment (2nd Revision)

Khor Kean Teng

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Introduction

This document provides an overview of the implementation and evaluation of the SRResNet and SRGAN models for super-resolution tasks. The models are evaluated on three datasets: Set 5, Set 14, and BSD 100. The results include both PSNR and SSIM metrics, along with visual comparisons of the model outputs against the original images.

Source of Data:

- BSD100, Set5, Set14
- Research Paper Output

Evaluation Metrics

From the table we can see that our model slightly underperforms compared to the original paper. The PSNR and SSIM values are lower for both SRResNet and SRGAN models when compared to the values reported in the paper.

- The result cannot be taken as is as the original paper only evaluate on 1 channel with cropping of 4 pixels at the border of images. Further Original SRGAN Paper, the authors used a randomly selected set of 350,000 images from the ImageNet database. While in my Implementation, I am using the DIV2K dataset, which consists of 800 training images. The slightly poorer image quality can be attributed to lack of training data and epochs.
- Upon visual inspection, the re-implementation image fidelity is slightly worse than the original paper. Longer training time and further investigation is needed to improve the results.

SRResNet-MSE

Model	Data	PSNR	SSIM	Type
SRResNet	Set 5	32.05	0.9091	Paper
SRResNet	Set 5	26.20	0.8092	Self
SRResNet	Set 14	28.49	0.8184	Paper
SRResNet	Set 14	24.00	0.6676	Self
SRResNet	BSD 100	27.58	0.7620	Paper
SRResNet	BSD 100	24.76	0.6713	Self

SRGAN-VGG54

Model	Data	PSNR	SSIM	Type
SRGAN	Set 5	29.40	0.8472	Paper
SRGAN	Set 5	19.29	0.7146	Self
SRGAN	Set 14	26.20	0.7397	Paper
SRGAN	Set 14	18.63	0.5789	Self
SRGAN	BSD 100	27.58	0.7620	Paper
SRGAN	BSD 100	19.14	0.5928	Self

Visualization - BSD100

- Note that the above image is from my own implementation and the image below corresponding to it is from the original paper.

Comparison for img_037_SRF_4_HR.png



196073 - Image Comparison



Comparison for img_043_SRF_4_HR.png



219090 - Image Comparison



Comparison for img_044_SRF_4_HR.png



220075 - Image Comparison



Comparison for img_081_SRF_4_HR.png



45096 - Image Comparison



Comparison for img_082_SRF_4_HR.png

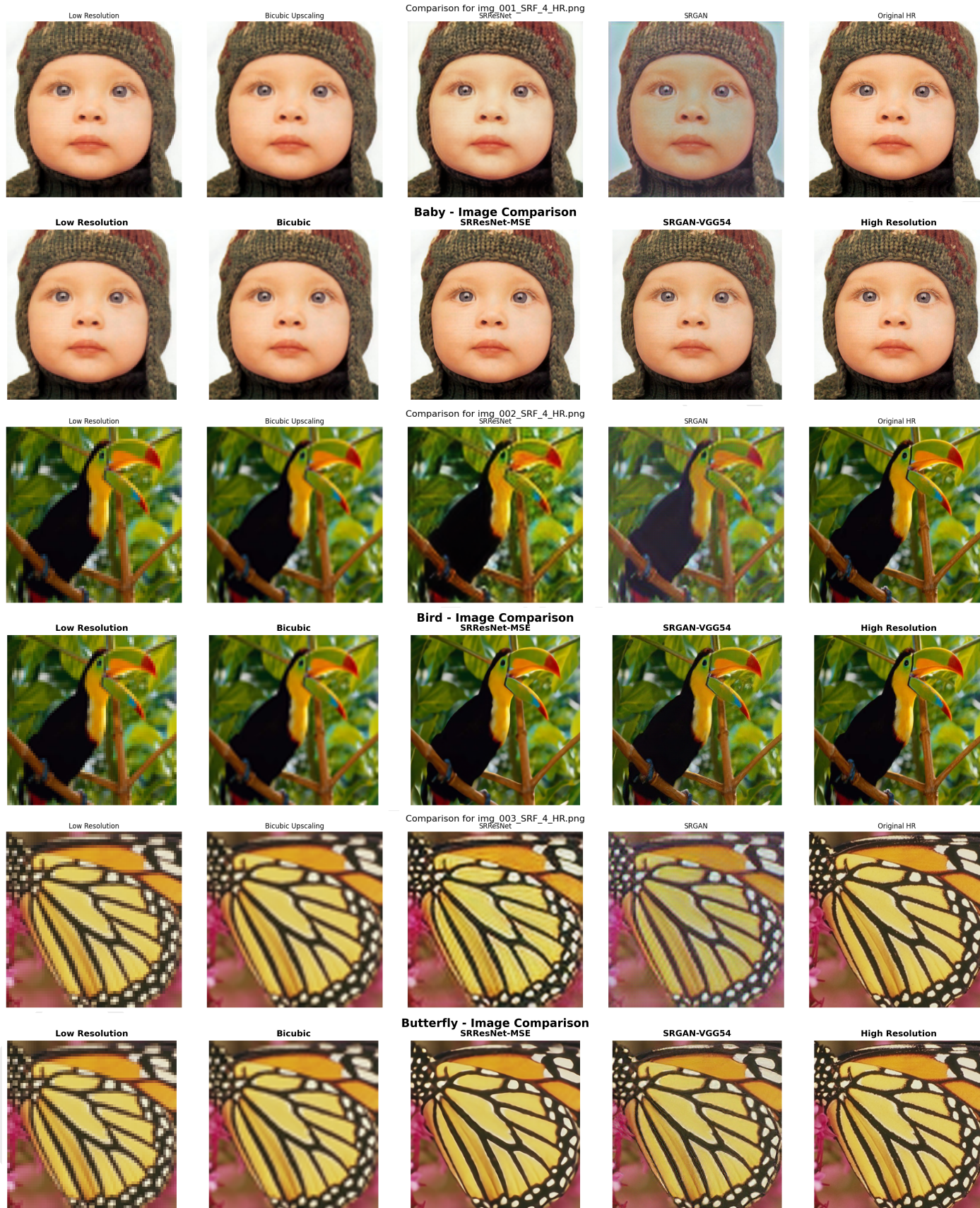


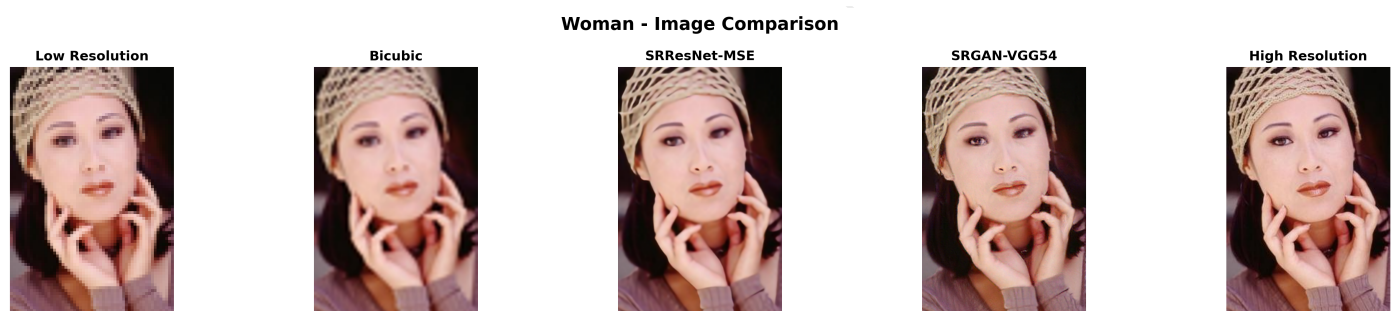
54082 - Image Comparison



Visualization - Set 5

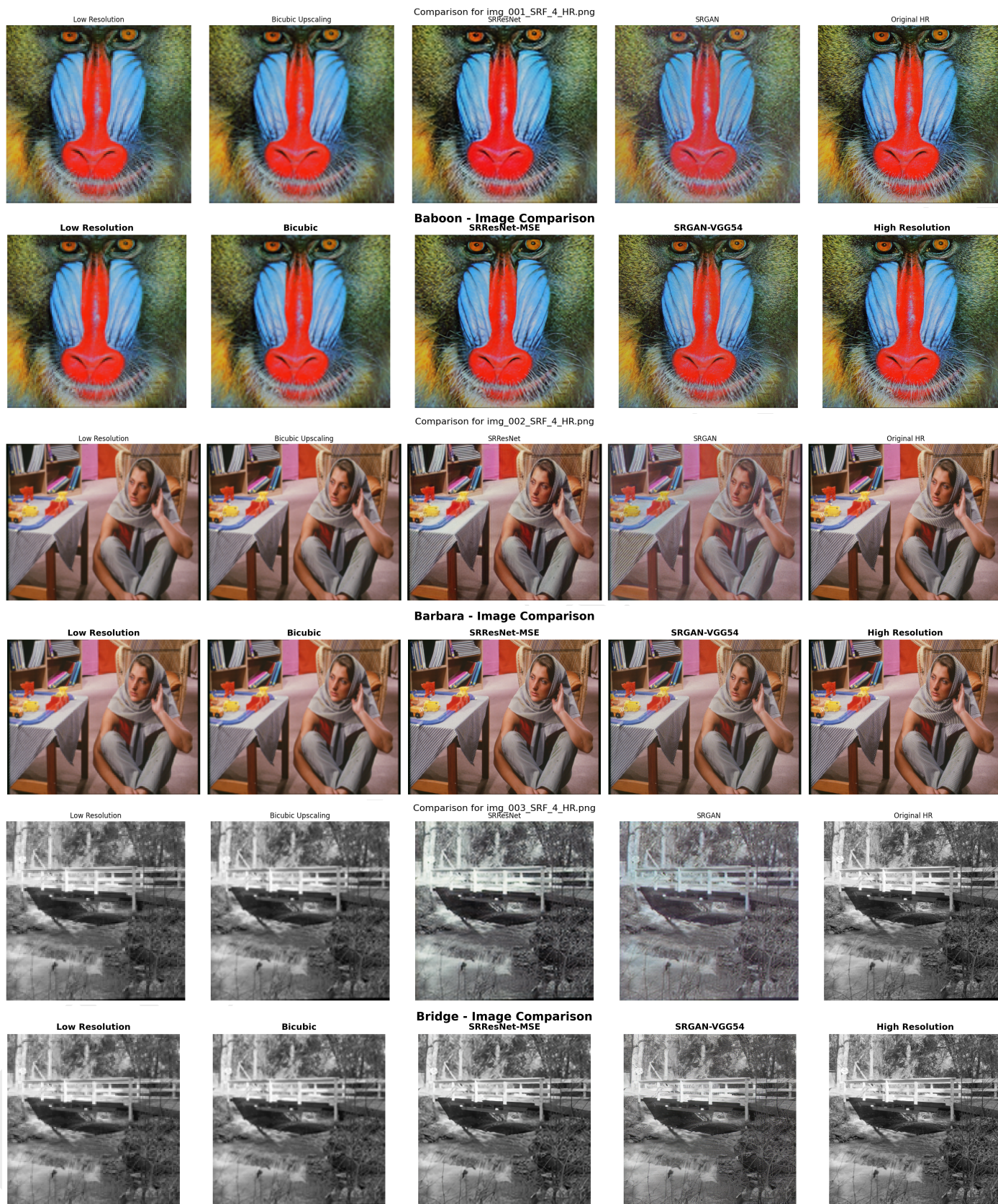
- Note that the above image is from my own implementation and the image below corresponding to it is from the original paper.

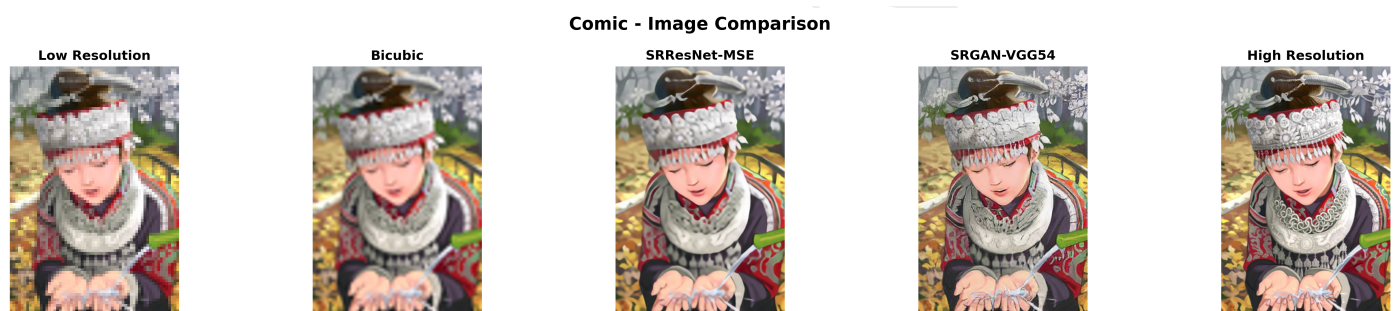
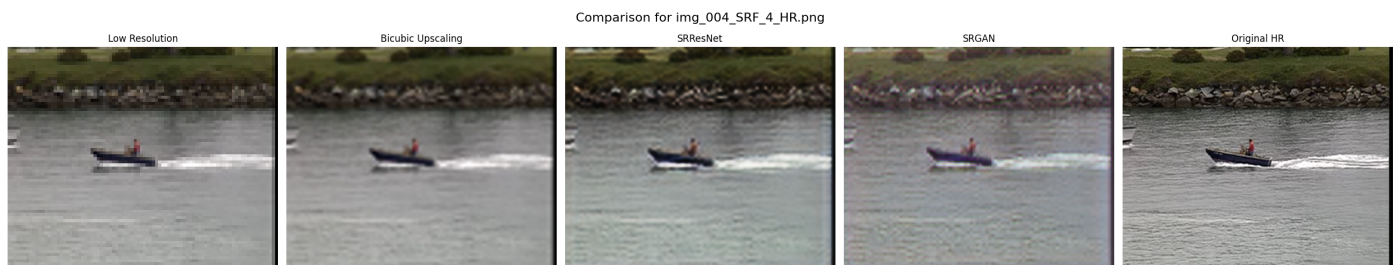




Visualization - Set 14

- Note that the above image is from my own implementation and the image below corresponding to it is from the original paper.





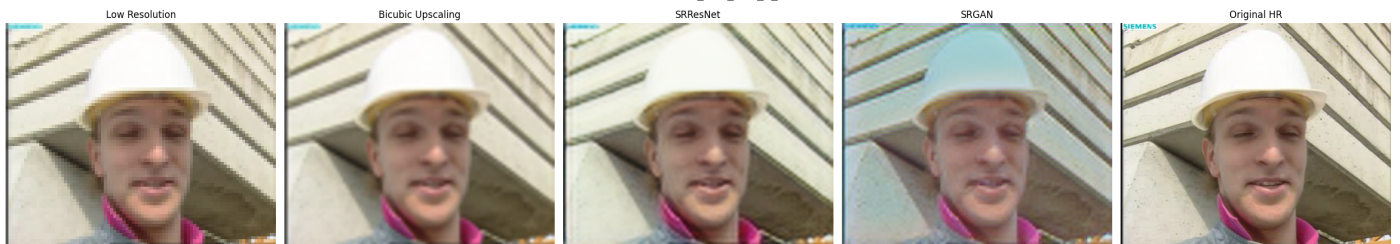
Comparison for img_007_SRF_4_HR.png



Flowers - Image Comparison



Comparison for img_008_SRF_4_HR.png



Foreman - Image Comparison

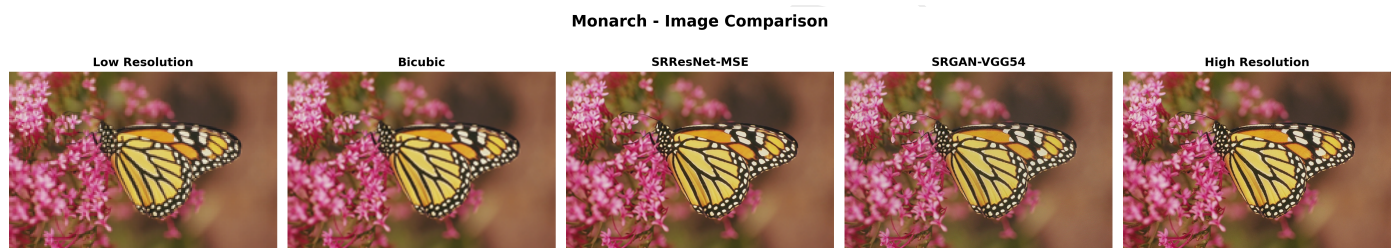
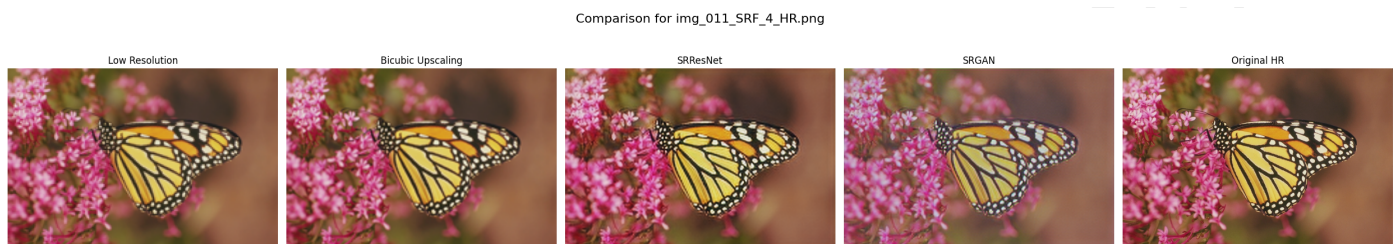


Comparison for img_009_SRF_4_HR.png

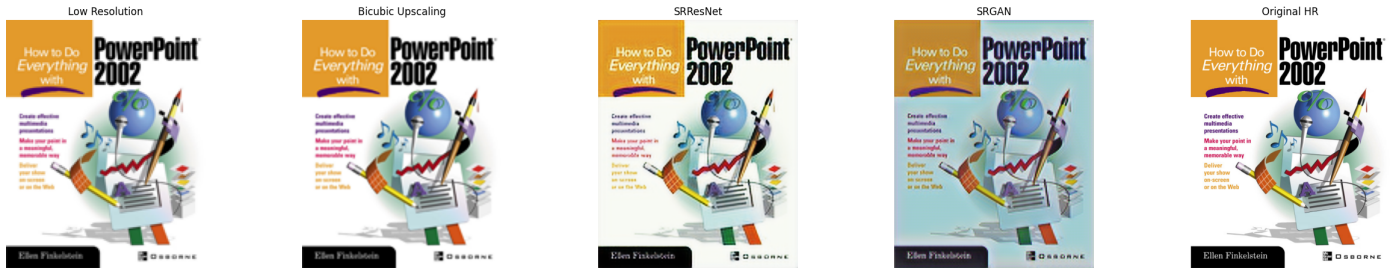


Lenna - Image Comparison

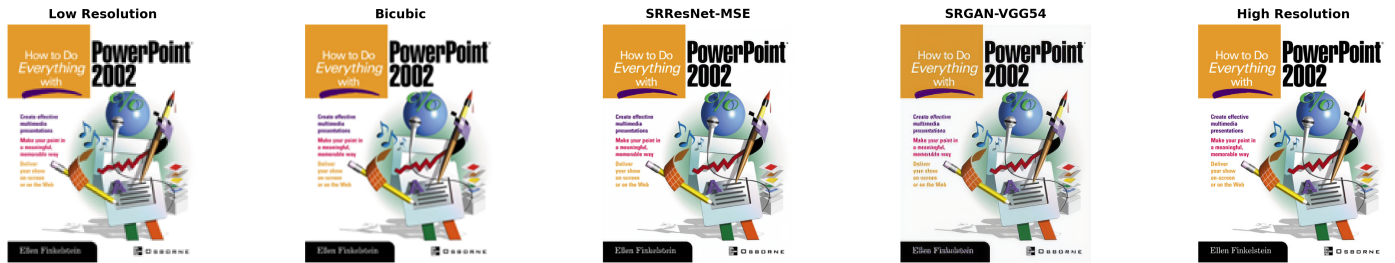




Comparison for img_013_SRF_4_HR.png



Ppt3 - Image Comparison



Comparison for img_014_SRF_4_HR.png



Zebra - Image Comparison

