



Computer Vision Project

Topic **Image Super Resolution**

TA assigned **Gowri Lekshmy**

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Paper Implementation:

Image Super-Resolution Using Deep Convolutional Networks

Paper By:

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2. Objectives

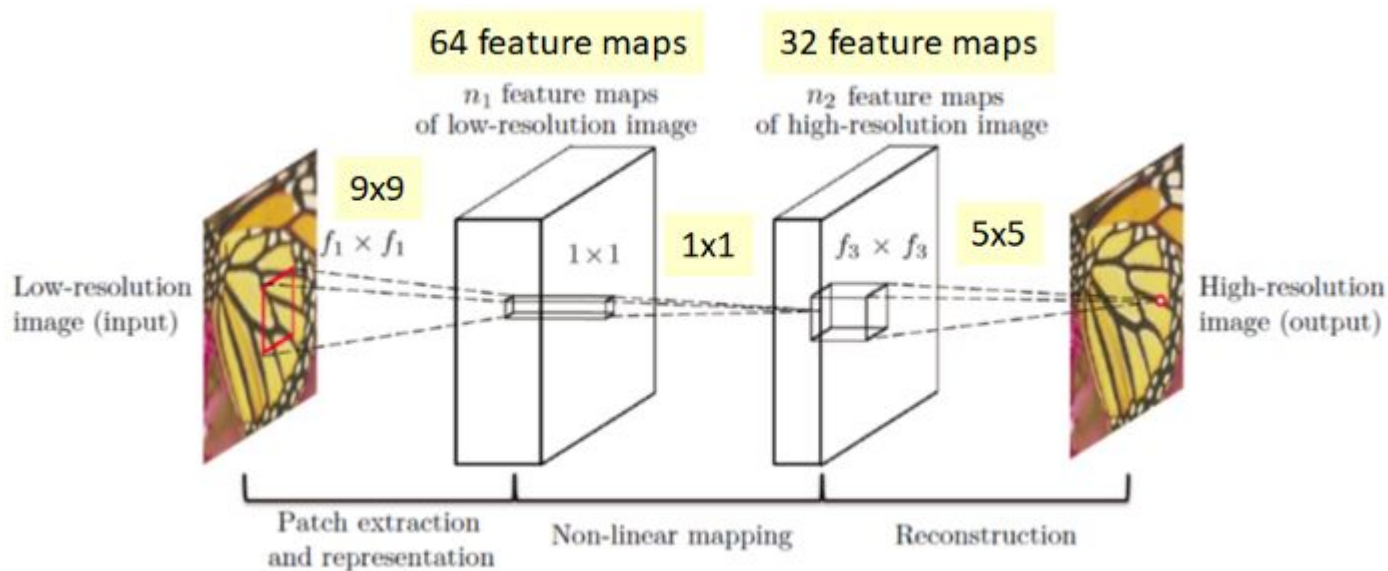
- **Implement algorithm** given in paper and test it on images.
- **Compare algorithm to classic CV methods** including:
 - Yang, J., Wright, J., Huang, T.S., Ma, Y.: Image super-resolution via sparse representation. IEEE Transactions on Image Processing 19(11), 2861–2873 (2010)
 - Chang, H., Yeung, D.Y., Xiong, Y.: Super-resolution through neighbor embedding. In: IEEE Conference on Computer Vision and Pattern Recognition (2004)
 - Kim, K.I., Kwon, Y.: Single-image super-resolution using sparse regression and natural image prior. IEEE Transactions on Pattern Analysis and Machine Intelligence 32(6), 1127–1133 (2010)
 - Timofte, R., De Smet, V., Van Gool, L.: Anchored neighborhood regression for fast example-based super-resolution. In: IEEE International Conference on Computer Vision. pp. 1920–1927 (2013)



2. Objectives (cont'd)

- Use metrics such as PSNR, SSIM, IFC, NQM, WPSNR, MSSSIM for comparison with classic CV methods.
- Try variations of algorithm as given in paper by varying depth of network, number of channels and other hyperparameters. Compare results based on output quality and time taken.
- Visualize and interpret the channels learnt.

3. Method overview





3. Method overview (cont'd)

- This paper illustrates the use of CNN's for image super-resolution.
- The basic version of this algorithm uses a 3-layer CNN.
- Dataset to be used: ImageNet
- Input will be made as a part of preprocessing, in which the images of ImageNet will be converted to lower resolution images. This is sent to feed-forward network.
- Output will be original high resolution image.
- Loss function: MSE loss
- Iterations and other hyperparameters: to be tested as part of experiment.



4. Goals

- To build a network for image super-resolution.
- To survey classic CV methods for image super-resolution and compare it with SRCNN.
- To try variations of the proposed network by changing hyperparameters and analyzing the results.



5. Expected Timeline

- **Mid Evals:** Implement SRCNN and validate the results.
- **End Evals:** Review classical algorithms and present comparison results.



Thank You.