Image Super-Resolution Using Deep Convolutional Networks

Visual Computing Lab

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Order

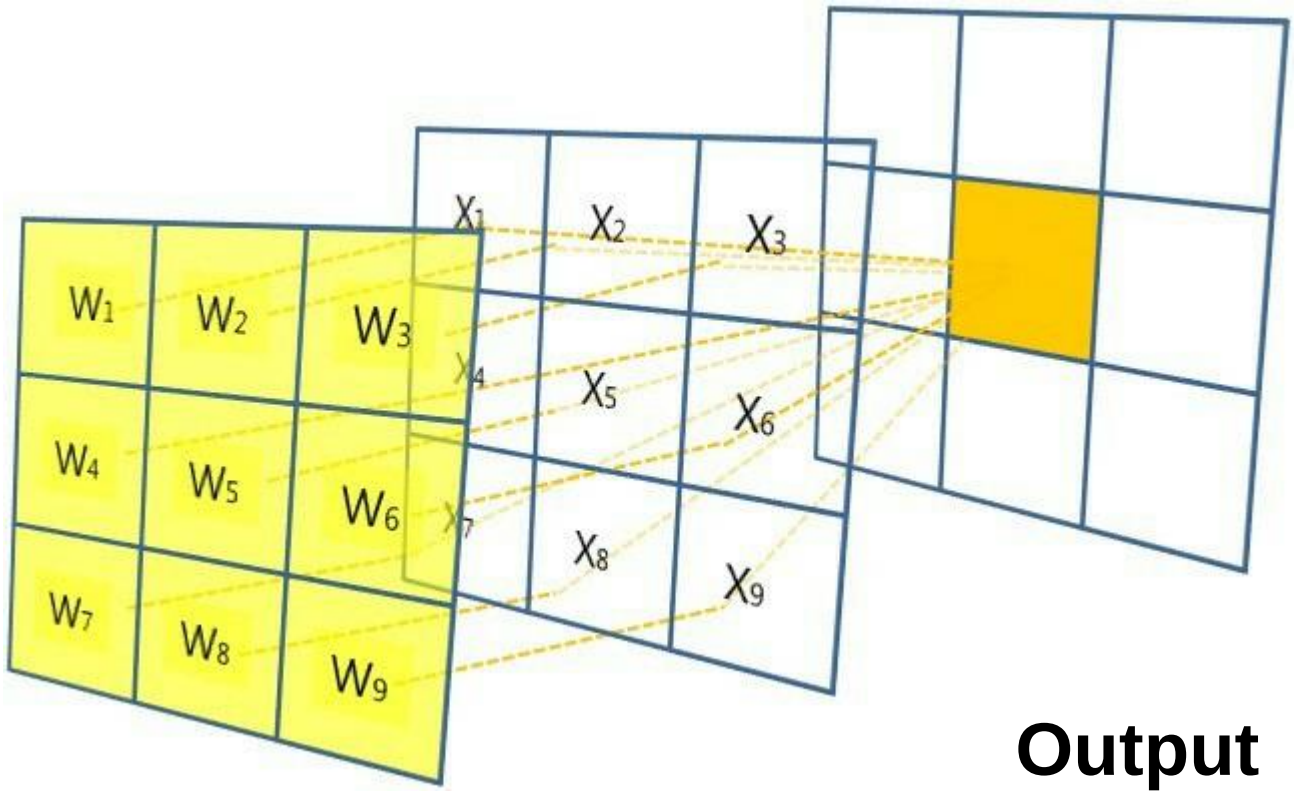
- Terms
- Object
- Formulation
- Result
- Experiments
- Future works

Terms

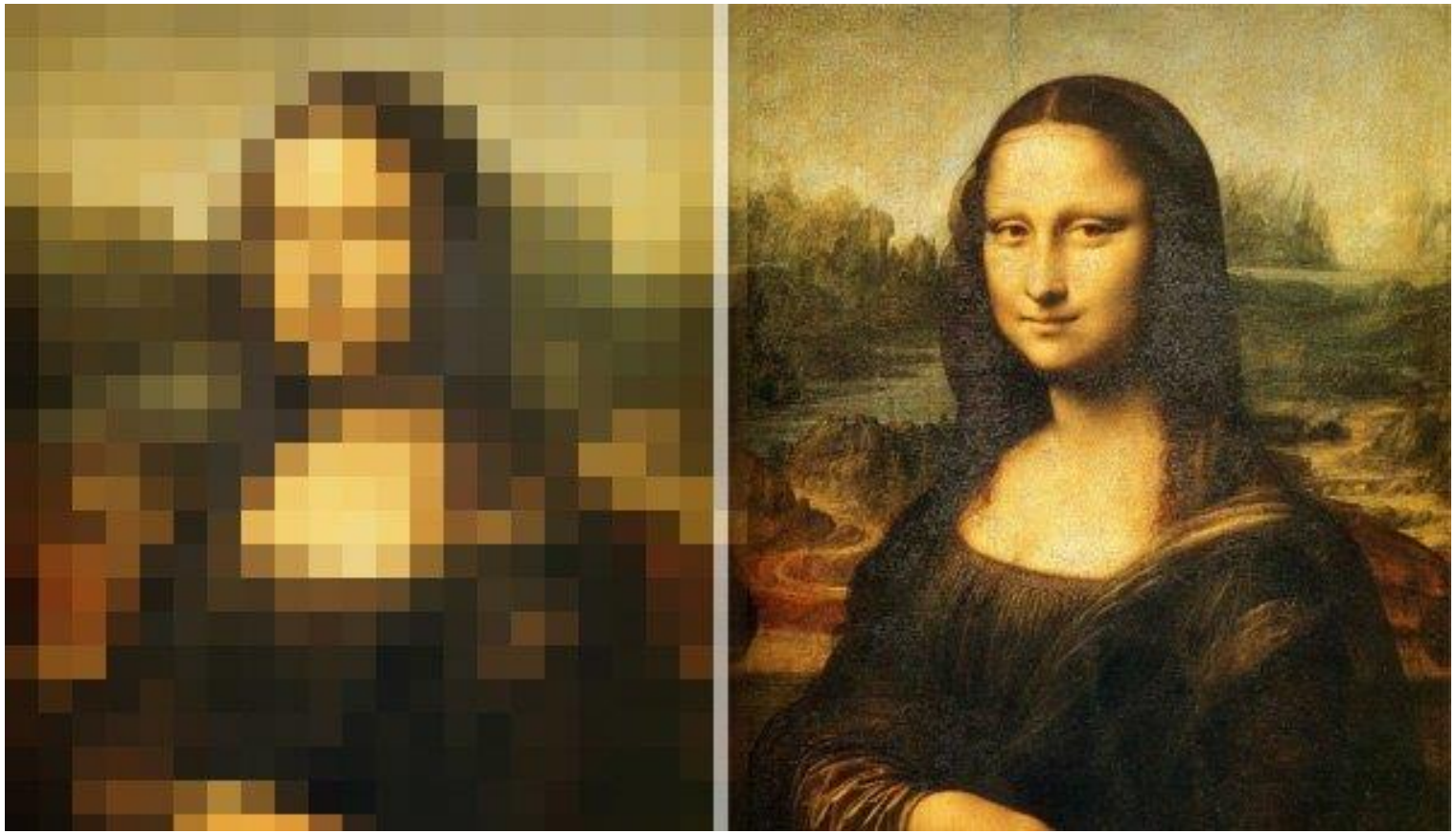
Image Super-Resolution Using Deep Convolutional Networks

- Resolution
- Low-resolution
- High-resolution
- Super-resolution
- Convolutional Networks

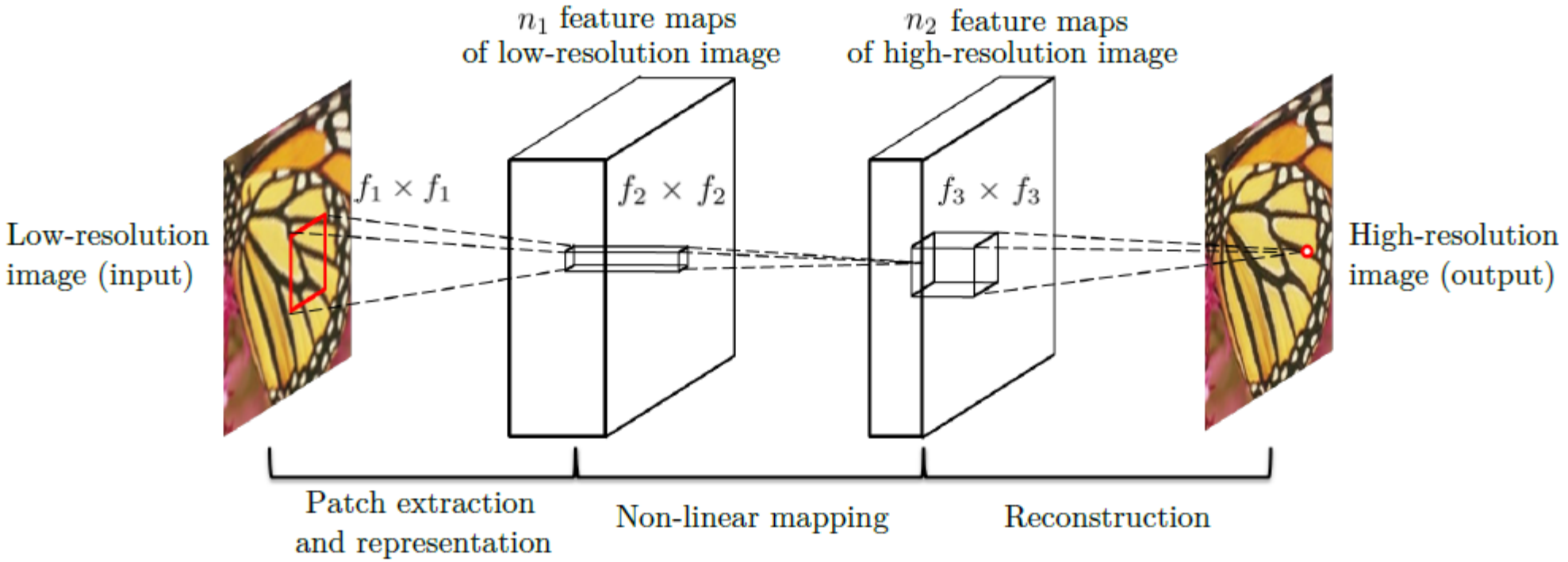
Convolution



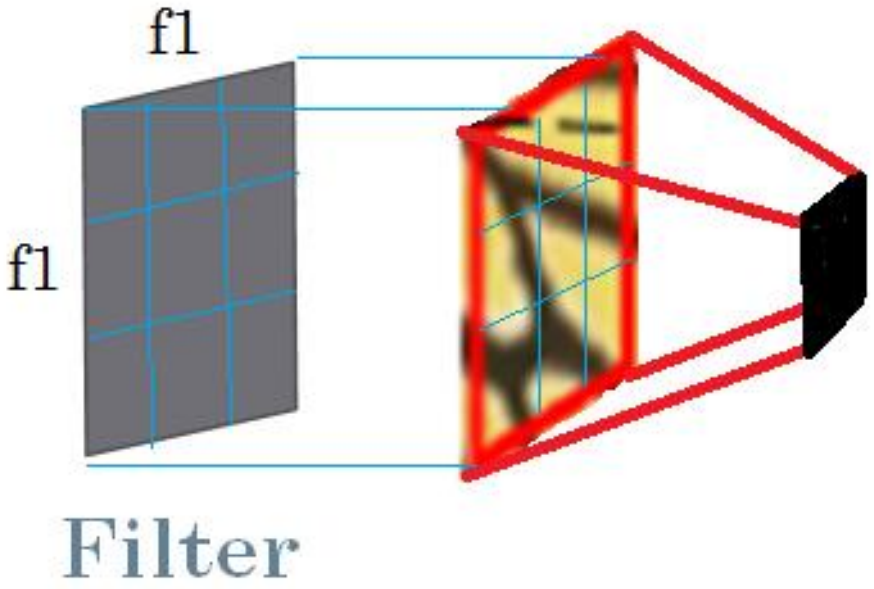
Object

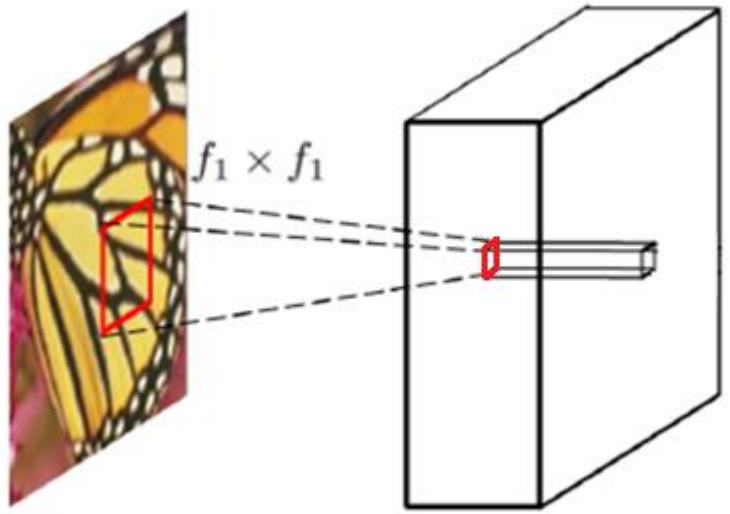


Formulation

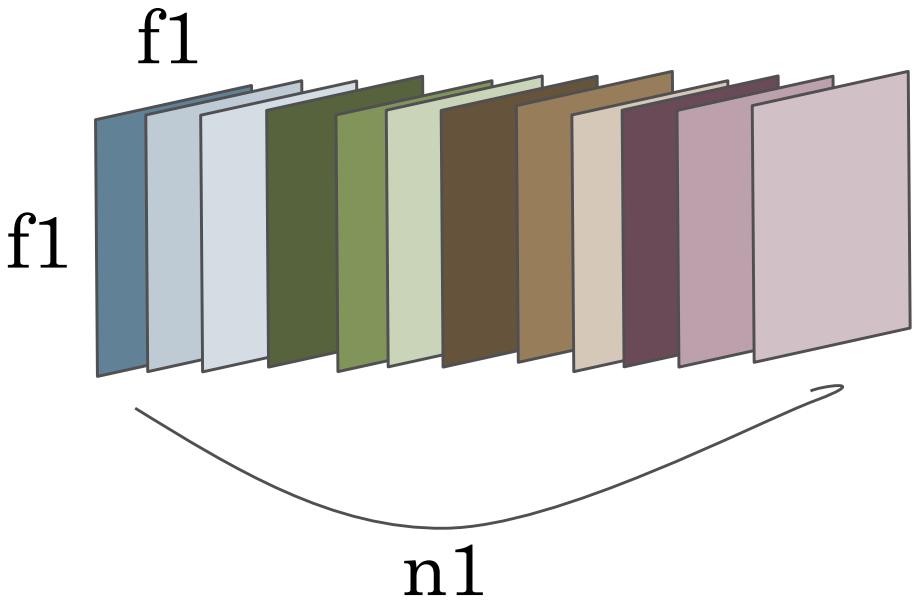


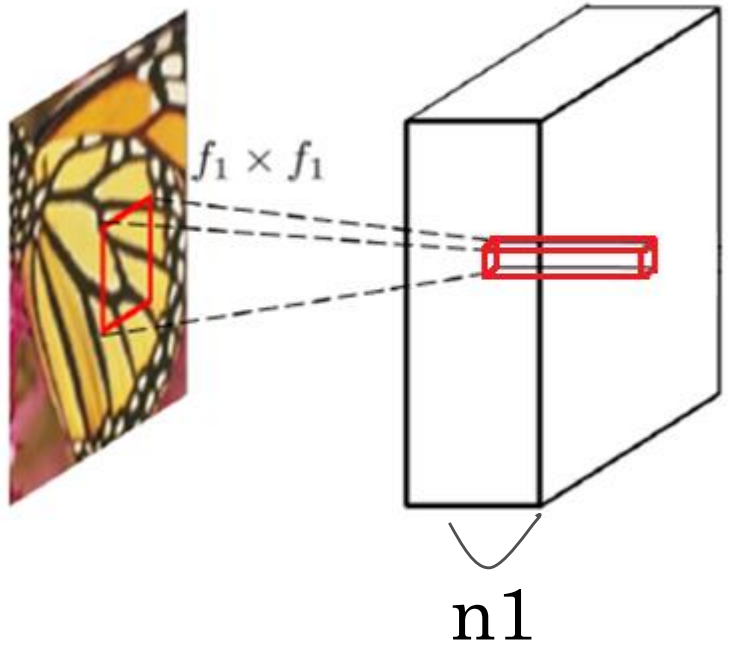
Patch extraction and representation

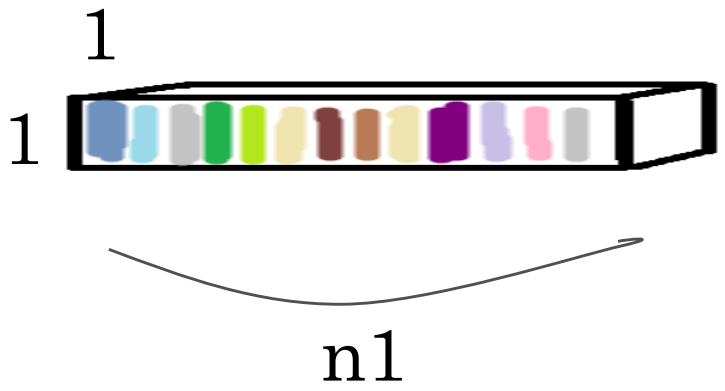




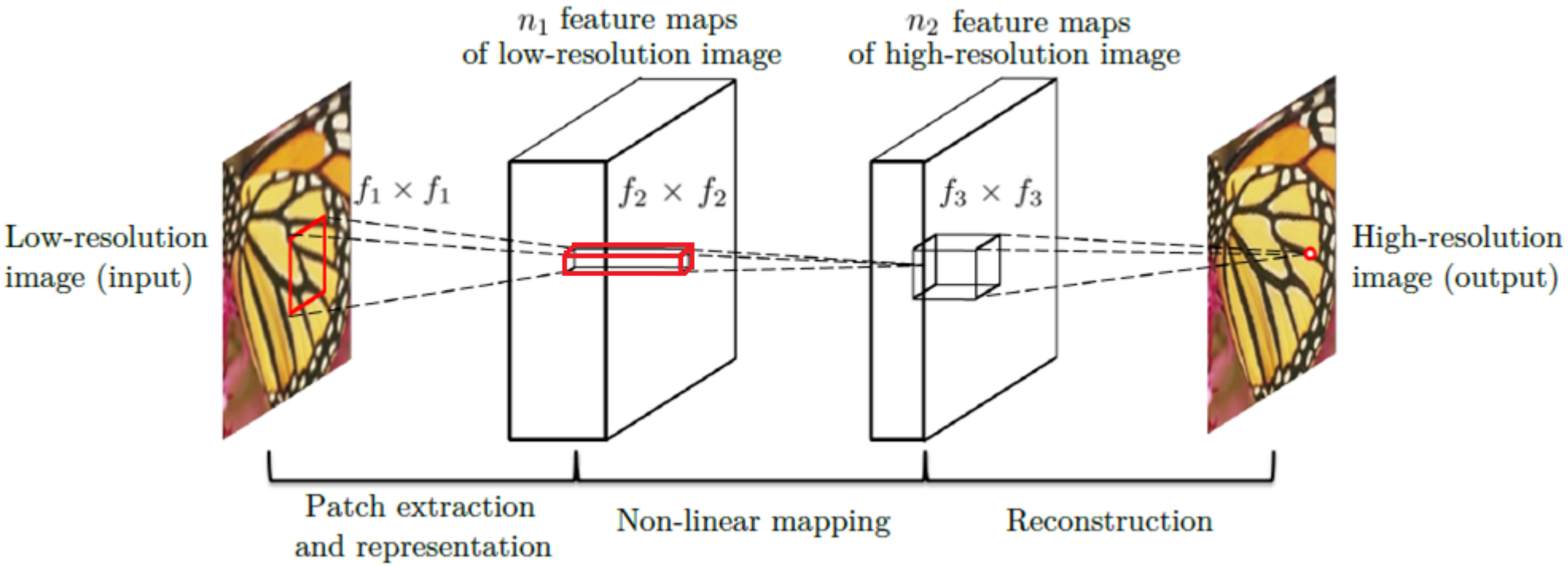
Patch extraction and representation



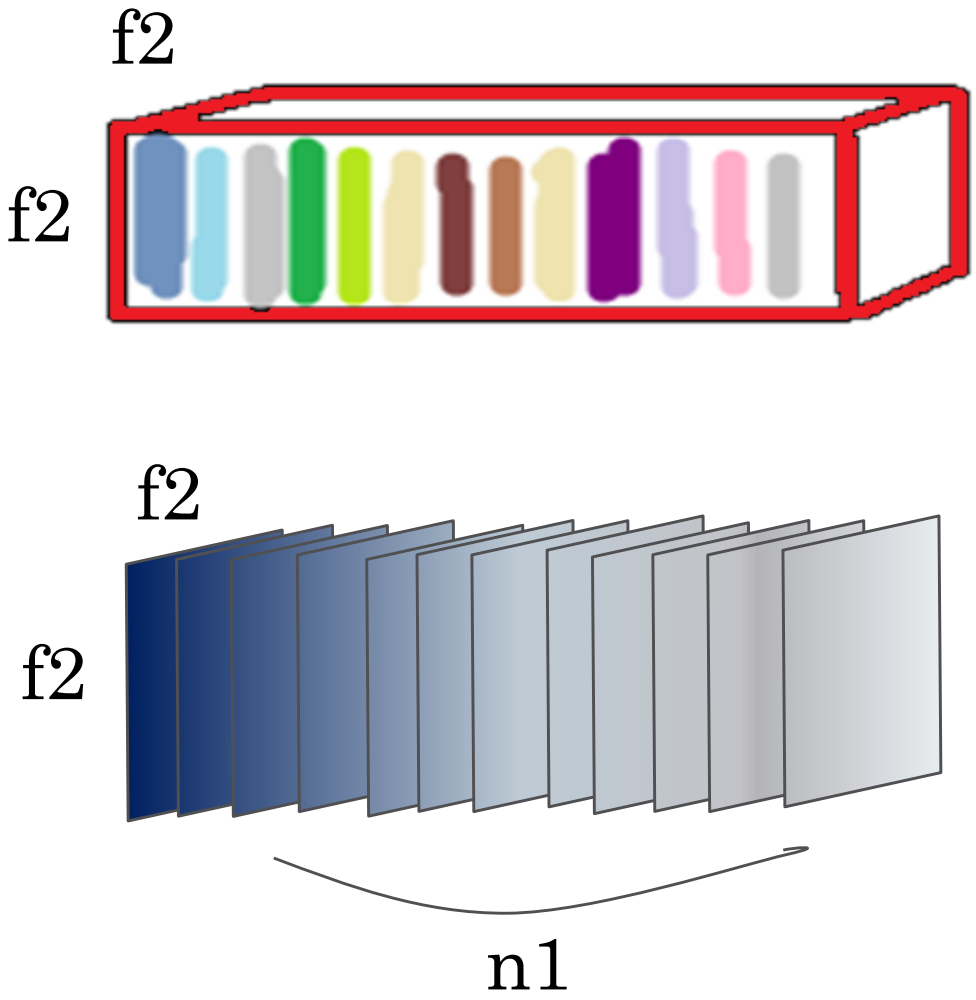


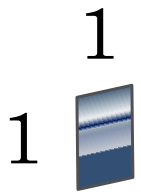


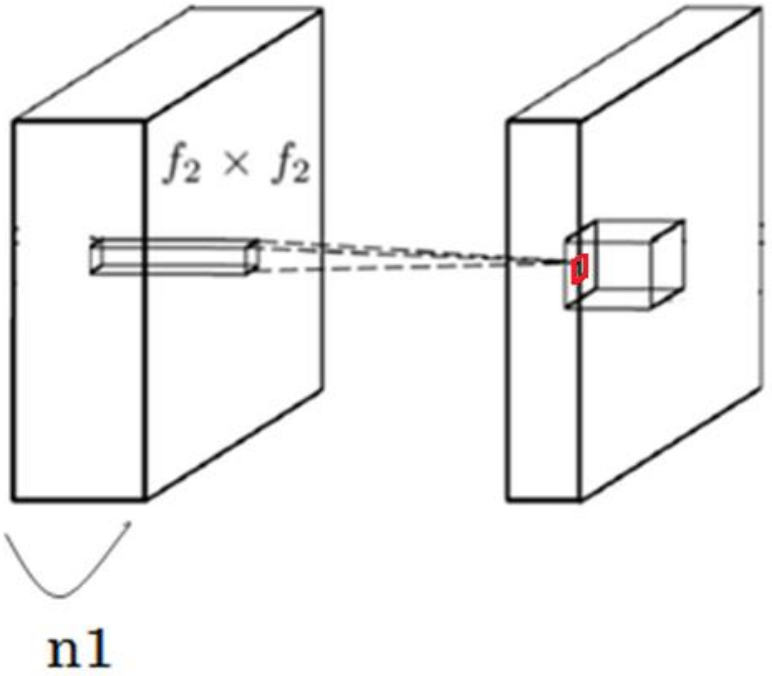
Formulation



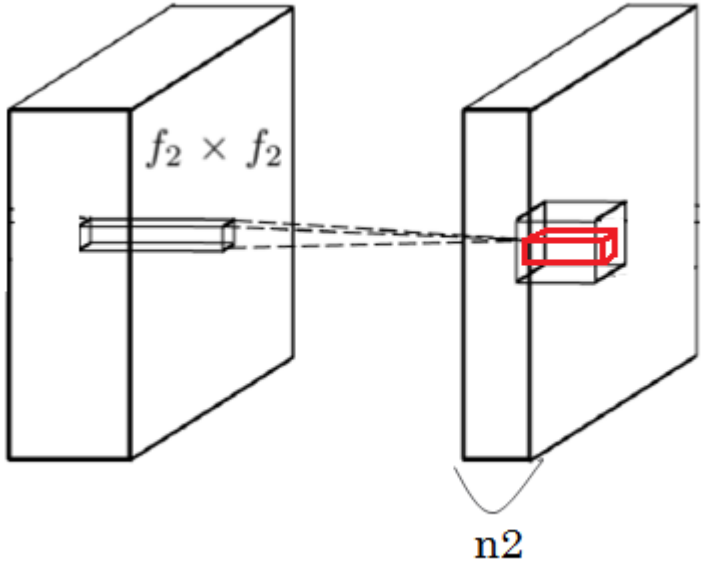
Non-linear mapping

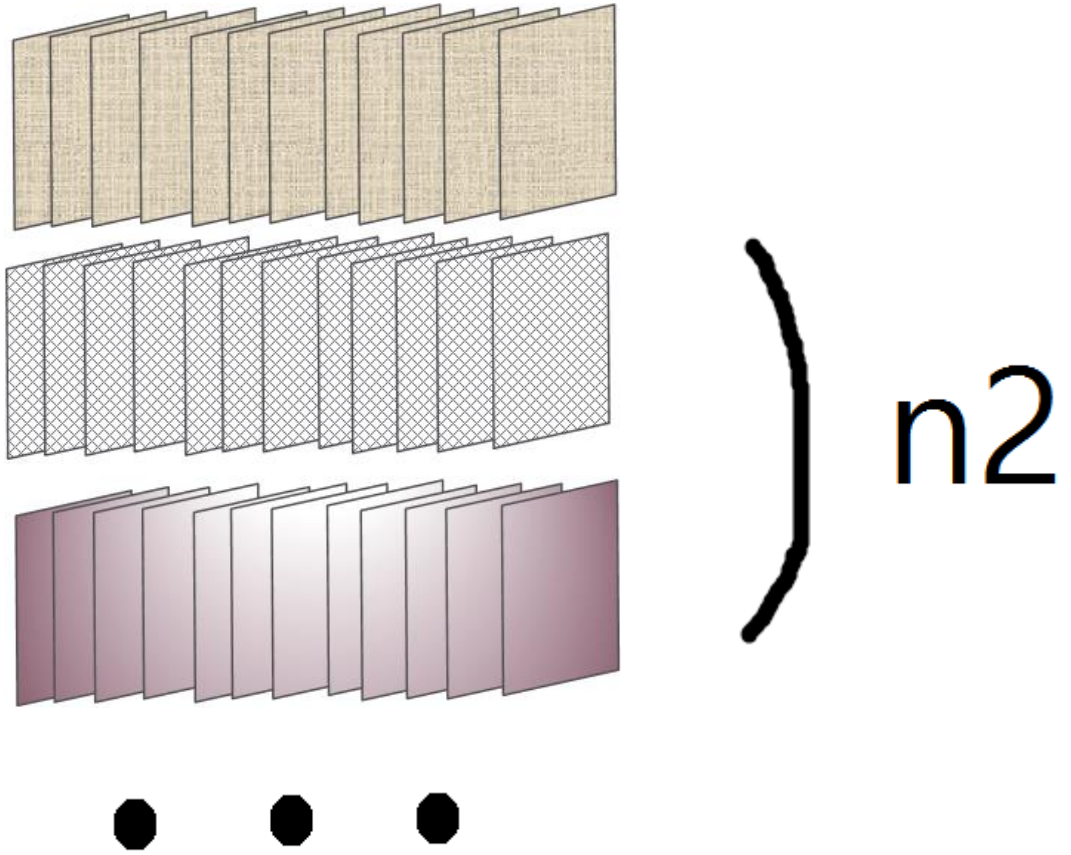


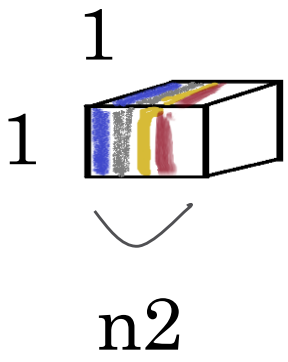




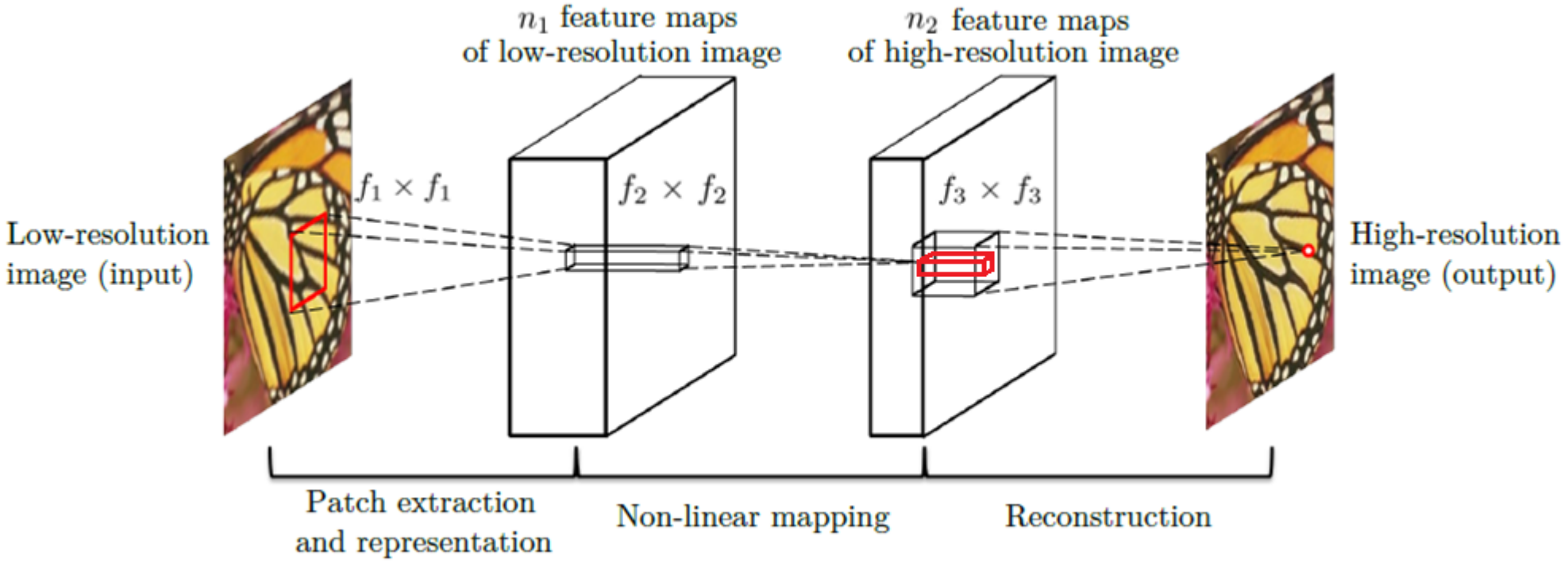
Non-linear mapping



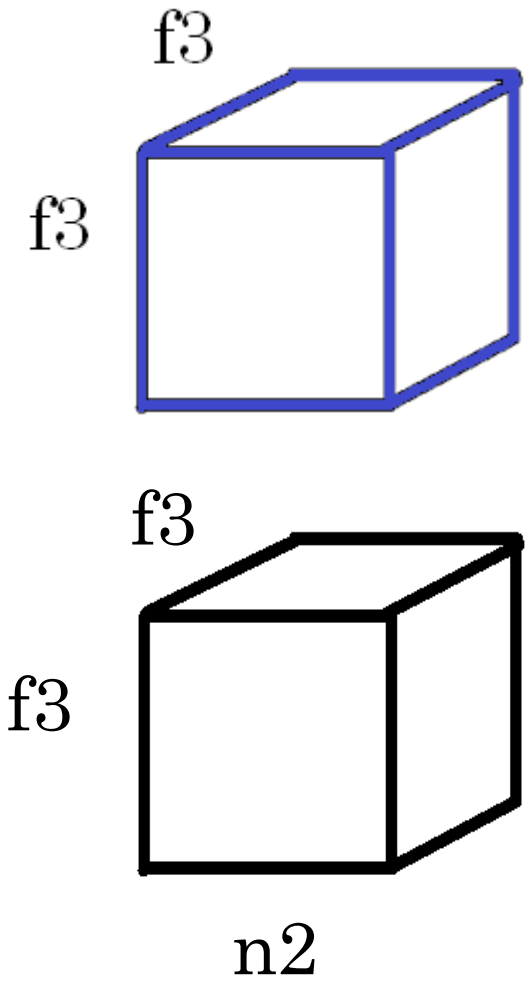


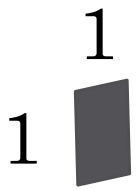


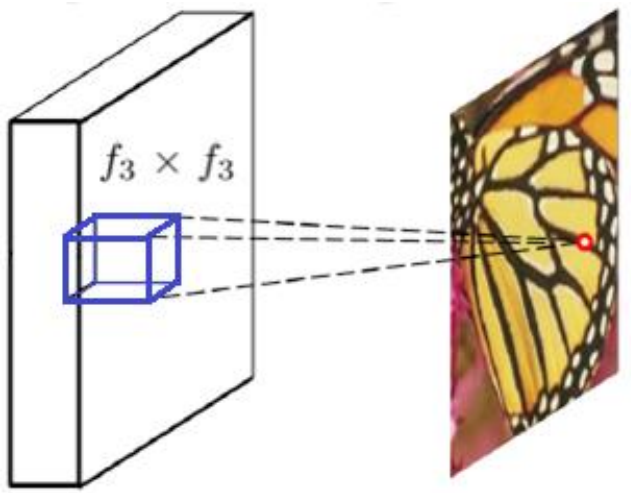
Formulation



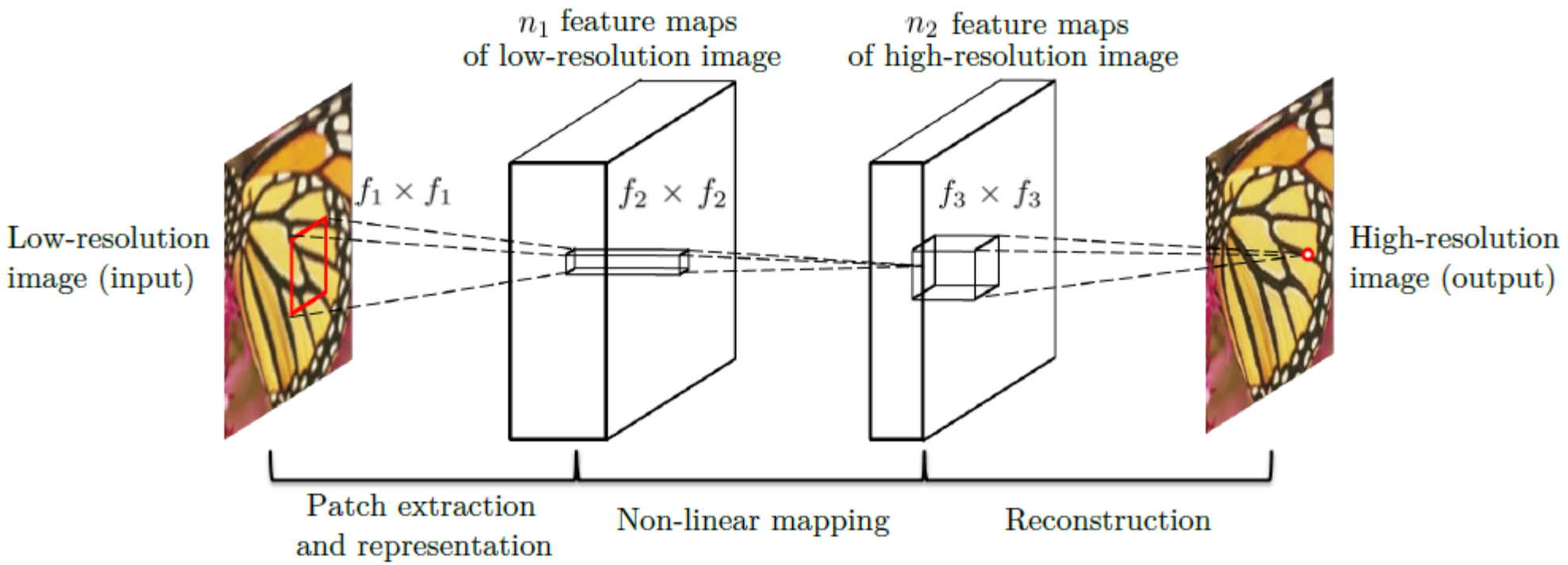
Reconstruction



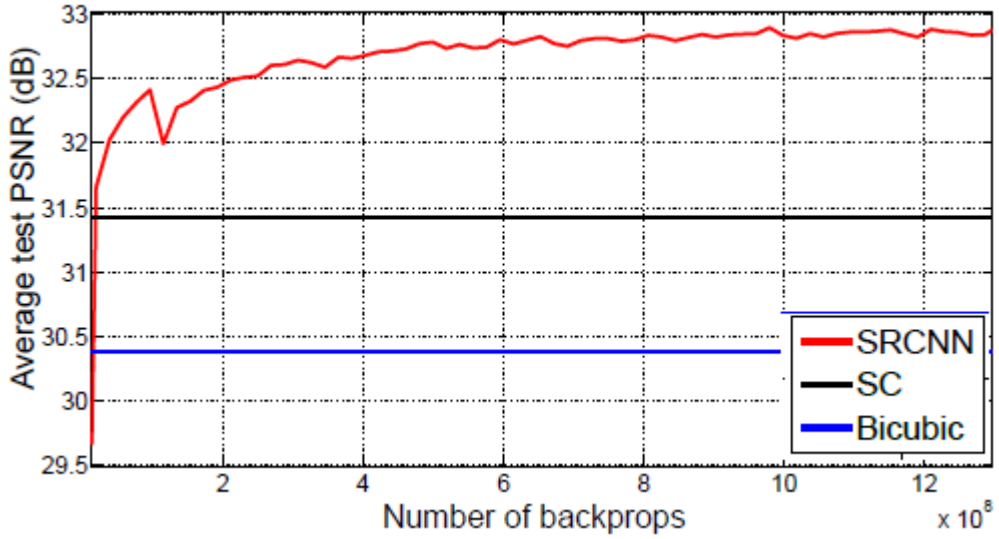




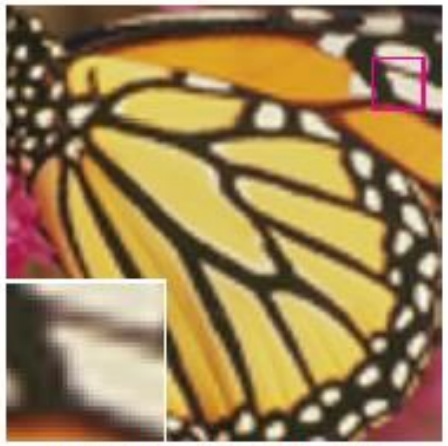
Formulation



Result

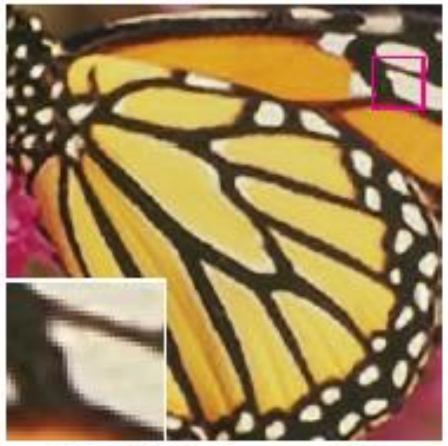


Original / PSNR



Bicubic / 24.04 dB

SC / 25.58 dB



SRCNN / 27.95 dB

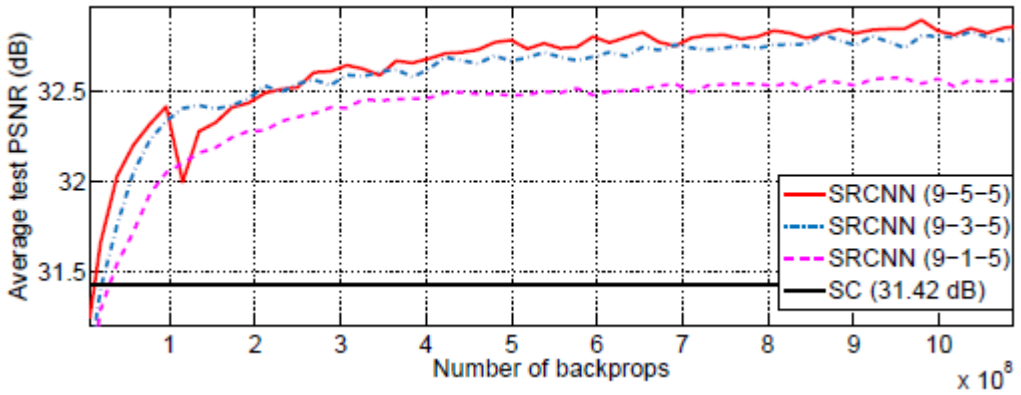
Experiments - two problems

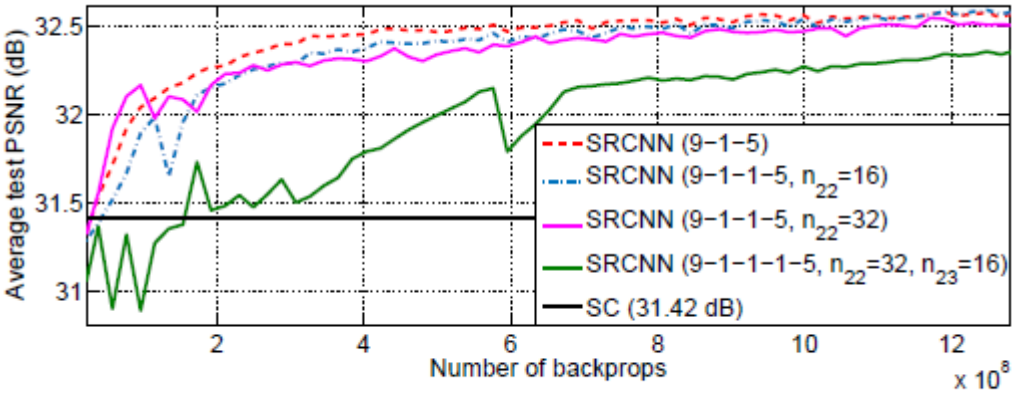
Trade-Off Performance & Speed

적당한 f1, f2, f3 , n1, n2 파라미터 값 설정

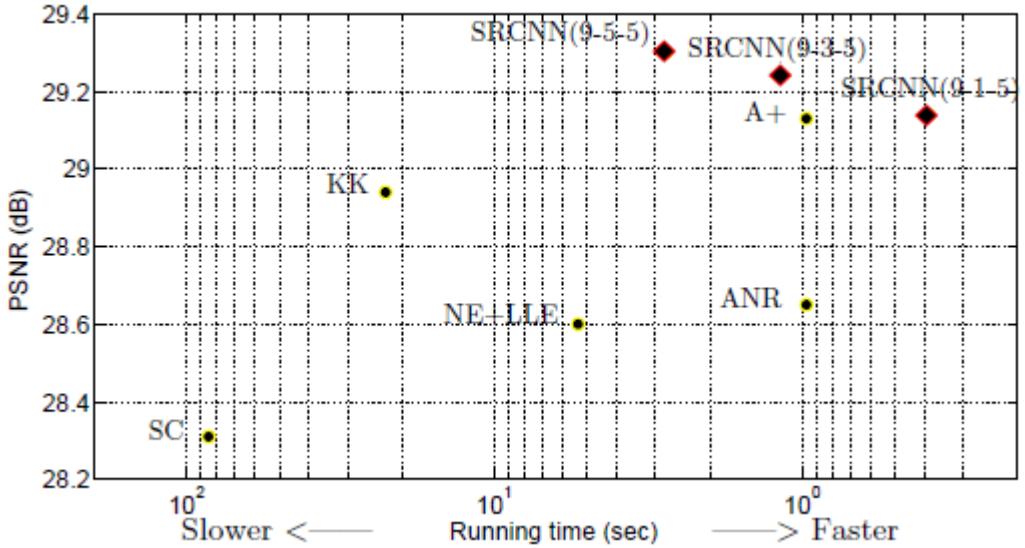
The deeper, The better ?

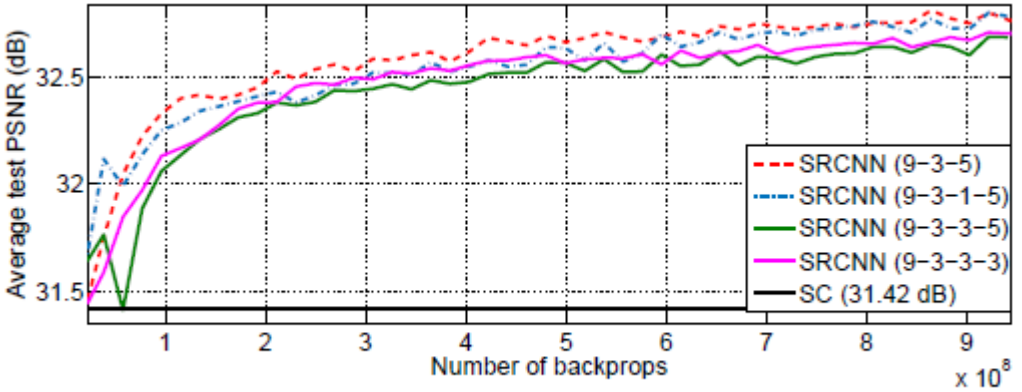
많은 레이어를 사용할 수록 결과가 좋은가?



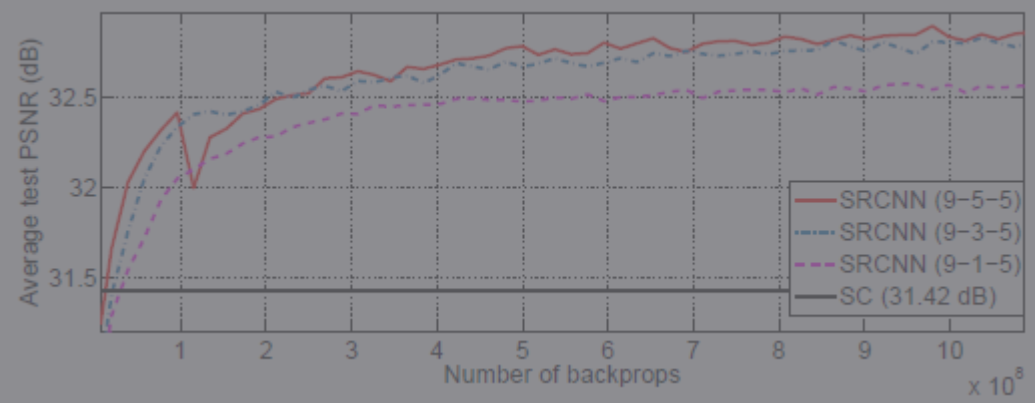


(a) 9-1-1-5 ($n_{22} = 32$) and 9-1-1-1-5 ($n_{22} = 32, n_{23} = 16$)

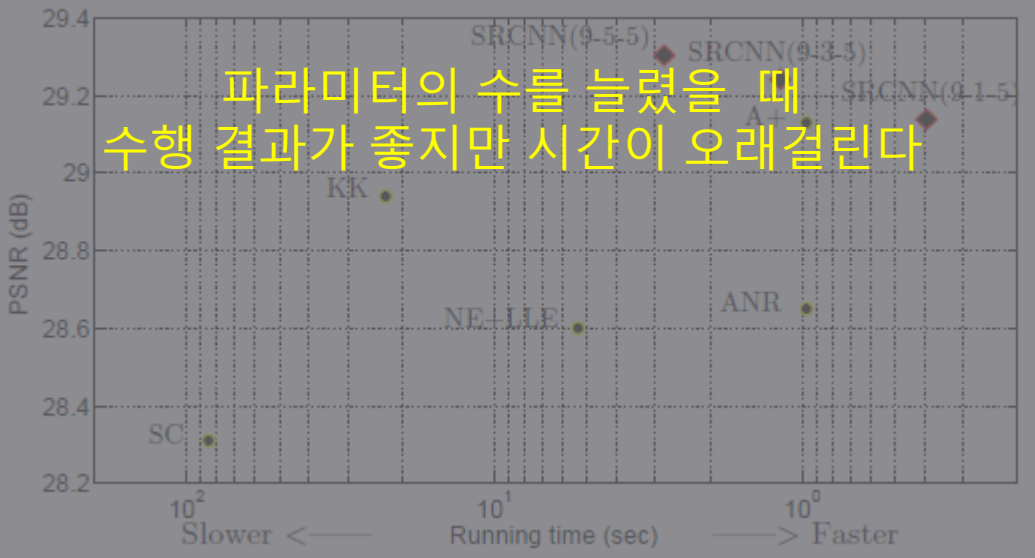




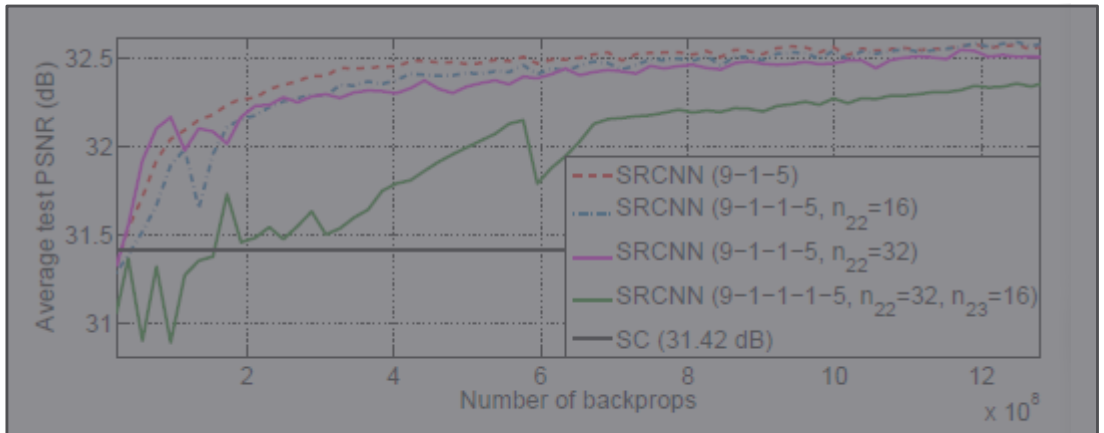
(b) 9-3-3-5 and 9-3-3-3



Trade-off



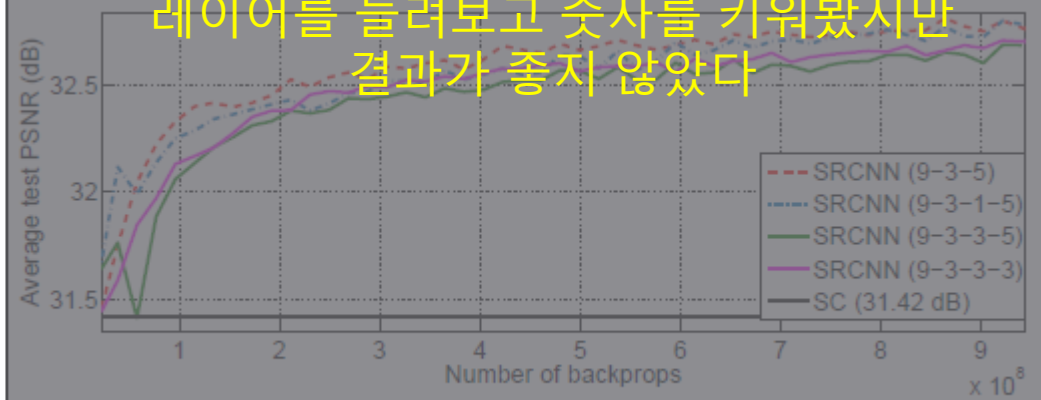
파라미터의 수를 늘렸을 때
수행 결과가 좋지만 시간이 오래걸린다



(a) 9-1-1-5 ($n_{22} = 32$) and 9-1-1-1-5 ($n_{22} = 32, n_{23} = 16$)

The deeper, the better?

레이어를 늘려보고 숫자를 키워봤지만
결과가 좋지 않았다



(b) 9-3-3-5 and 9-3-3-3

Future works

- Training Data 분석 - 수식을 어떻게 이용할 것인가
- Channel 확장
- Machine Learning 이해

  -- 대학원 수업, Sung Kim, cs231n 복습
- Tensorflow 테스트 및 구현

  -- Sung Kim, 텐서플로 첫걸음