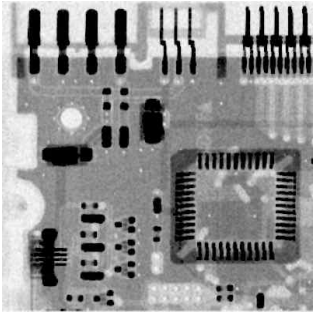
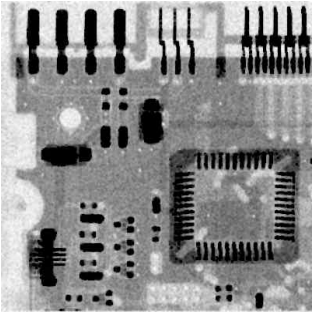
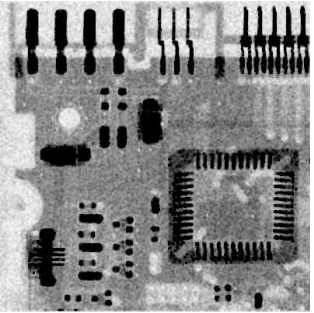
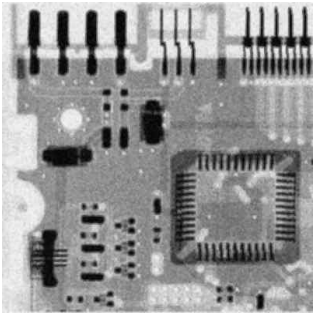
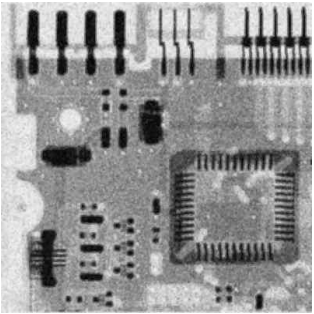
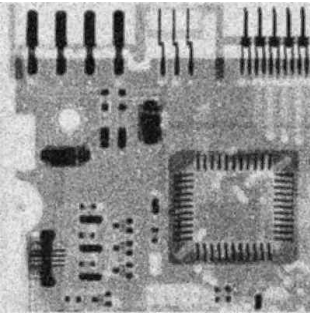
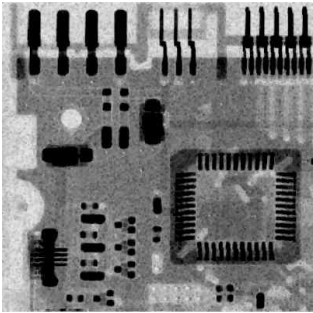
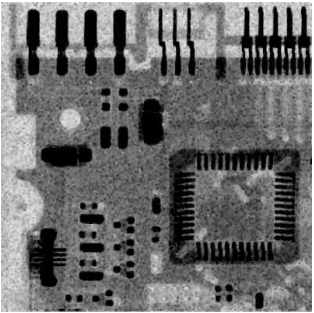
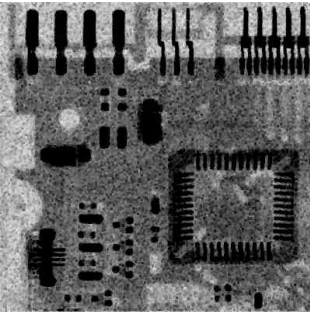
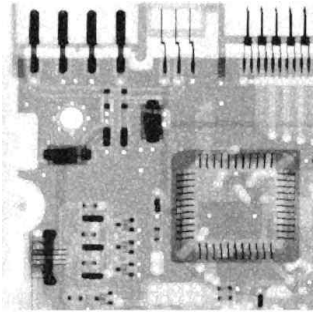
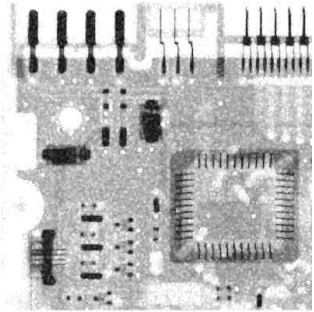
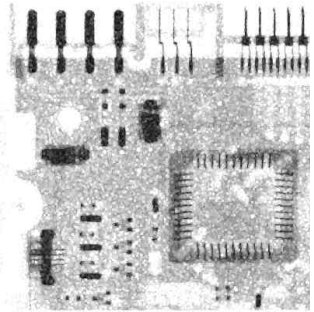
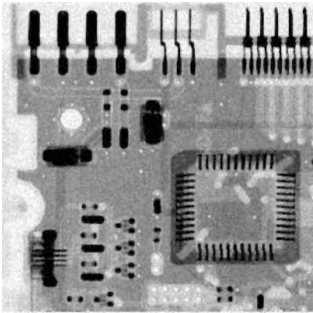
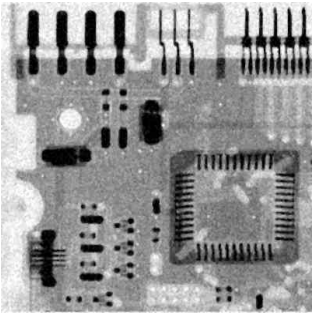
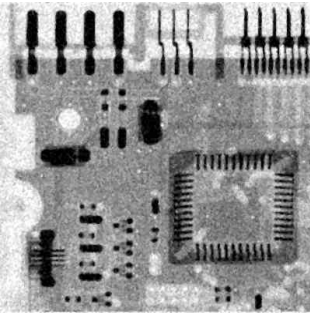


Gaussian

filtersize는 3으로 진행

	low (0.10)	middle (0.15)	high (0.20)
harmonic			
midpoint			
minimum			
maximum			
median			

PSNR

	low (0.10)	middle (0.15)	high (0.20)
harmonic	22.32	21.01	19.43
mid point	24.79	23.21	21.59
minimum	16.18	14.20	12.44
maximum	16.29	14.37	12.73
median	28.01	25.65	23.78

hormonic : 원본 영상과 비교해봤을 때 노이즈가 여기저기 남아있다. 조금 어둡게 보인다.

midpoint : 원본 영상과 비교해봤을 때 노이즈가 여기저기 남아있다

minimum : 원본 영상과 비교해봤을 때 전체적으로 검다.

maximum : 원본 영상과 비교해봤을 때 전체적으로 하얗다.

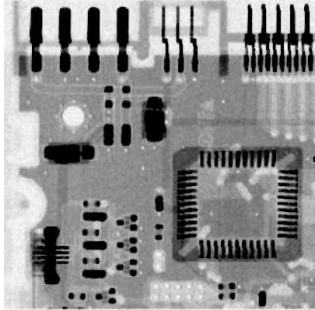
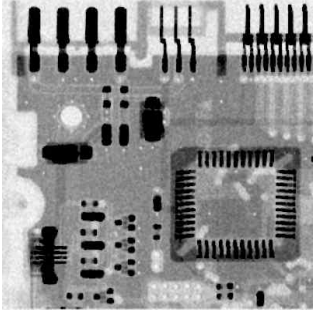
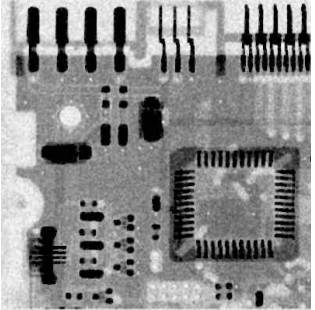
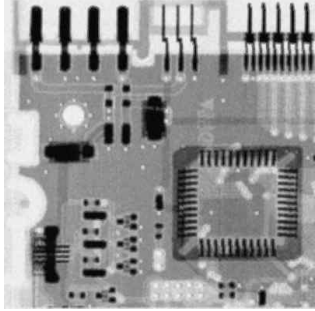
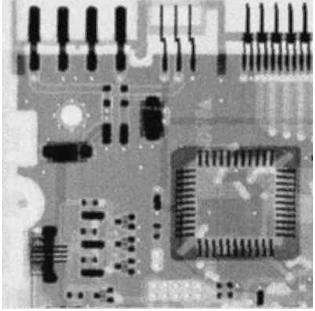
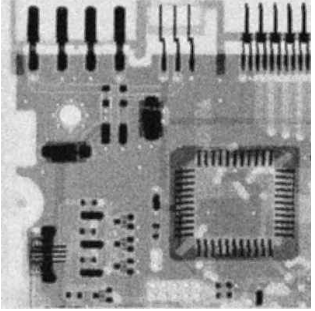
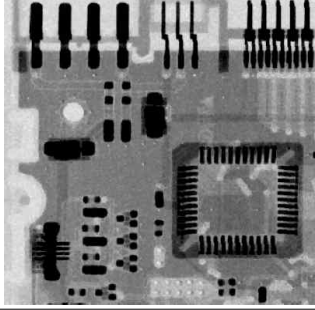
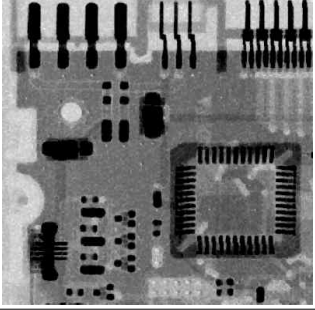
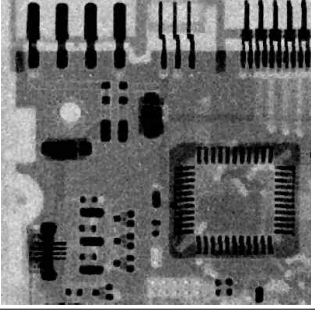
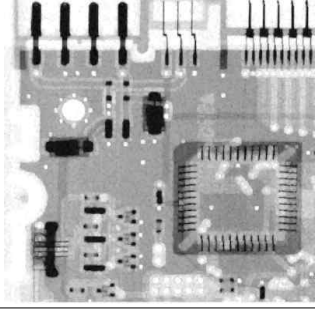
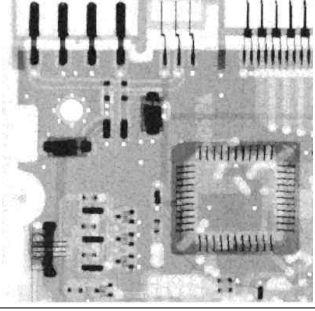
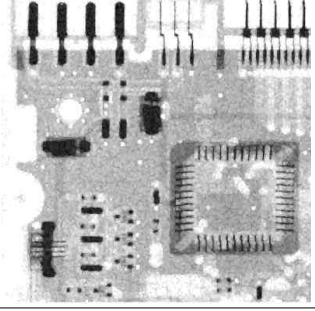
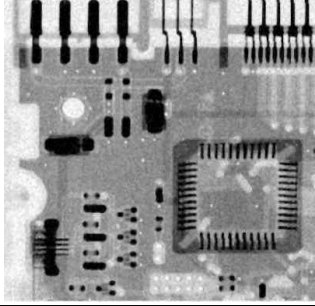
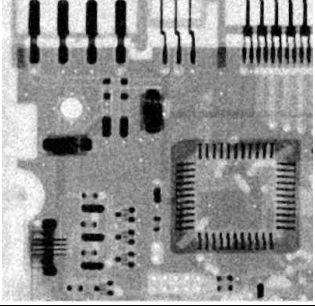
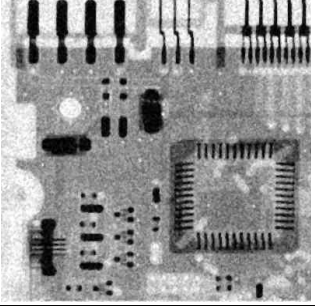
median : 원본 영상과 비교해봤을 때 노이즈가 여기저기 남아있다. 그래도 가장 노이즈 제거가 잘되었다고 판단된다.

filtersize를 3으로 설정하고 영상을 육안으로 비교하며 PSNR값을 참고한 결과 원본 영상과 가장 가까운 값을 갖는 필터링은 median이다.

노이즈가 가장 돋보이는 minimum, maximum filter가 가장 안 좋은 성능을 나타낸다.

Uniform

filtersize는 3으로 진행

	low (0.10)	middle (0.15)	high (0.20)
harmonic			
midpoint			
minimum			
maximum			
median			

PSNR

	low (0.10)	middle (0.15)	high (0.20)
harmonic	22.72	21.80	21.50
mid point	25.72	24.92	23.85
minimum	17.13	15.62	14.34
maximum	17.20	15.69	14.48
median	28.19	25.73	24.15

hormonic : 원본 영상과 비교해봤을 때 노이즈가 여기저기 남아있다. 조금 어둡게 보인다.

midpoint : 원본 영상과 비교해봤을 때 노이즈가 여기저기 남아있다

minimum : 원본 영상과 비교해봤을 때 전체적으로 검다.

maximum : 원본 영상과 비교해봤을 때 전체적으로 하얗다.

median : 원본 영상과 비교해봤을 때 노이즈가 여기저기 남아있다. 그래도 가장 노이즈 제거가 잘되었다고 판단된다.

filtersize를 3으로 설정하고 영상을 육안으로 비교하며 PSNR값을 참고한 결과 원본 영상과 가장 가까운 값을 갖는 필터링은 median이다.
noise가 높은 부분에서는 midpoint와 비슷한 효과를 냈다.

전반적으로 비슷해 보이지만 minimum filter가 가장 안 좋은 성능을 나타낸다.

Salt

filtersize는 3으로 진행

	low (0.05)	middle (0.10)	high (0.15)
harmonic			
contraharmonic q=1			
contraharmonic q=-1			
minimum			
maximum			
median			

PSNR

	low (0.05)	middle (0.10)	high (0.15)
harmonic	23.46	23.15	22.62
contraharmonic $q=1$	15.25	12.92	11.60
contraharmonic $q=-1$	25.20	22.17	19.95
minimum	19.25	19.31	19.40
maximum	10.25	8.24	7.30
median	31.19	28.17	24.96

harmonic : 원본 영상과 비교해봤을 때 노이즈가 여기저기 남아있다. 조금 어둡게 보인다.

contraharmonic

$Q=1$: 원본 영상과 비교해봤을 전반적으로 하얀 점이 더 많아져 형태가 없어져간다.

$Q=-1$: 원본 영상과 비교해봤을 하얀 점이 없어지긴 했지만 그래도 조금은 남아있다.

minimum : 원본 영상과 비교해봤을 때 살짝 검게 보이고 약간 번져있다.

maximum : salt 때문에 형태를 알 수 없다.

median : 원본 영상과 비교해봤을 때 하얀 점 살짝 남아있다. 가장 노이즈 제거가 잘되었다고 판단된다.

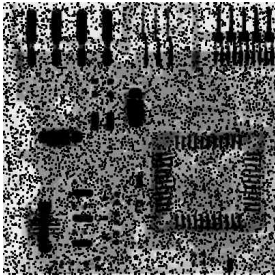
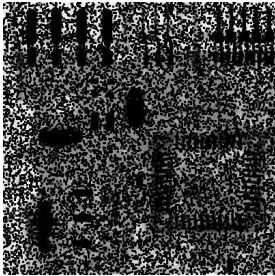
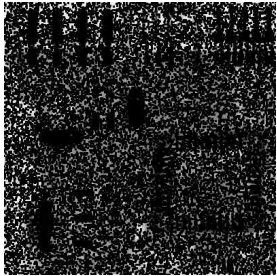
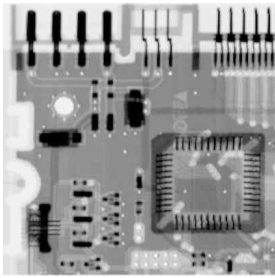
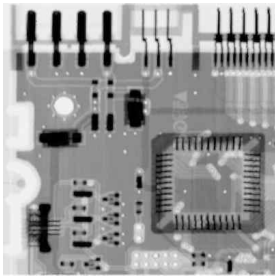
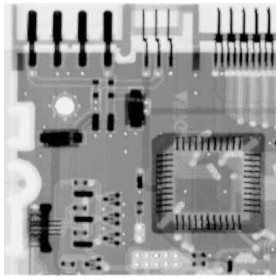
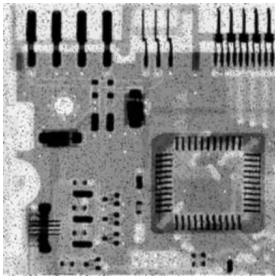
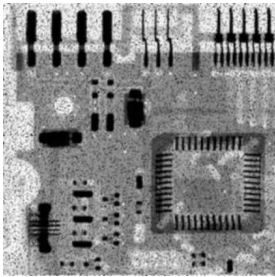
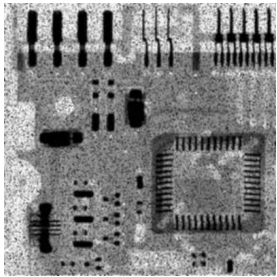
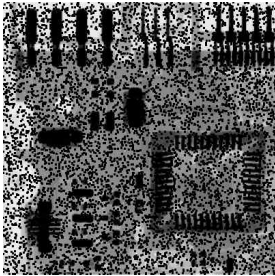
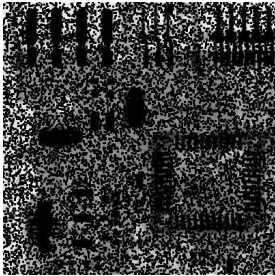
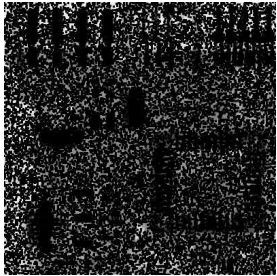
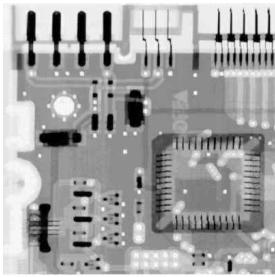
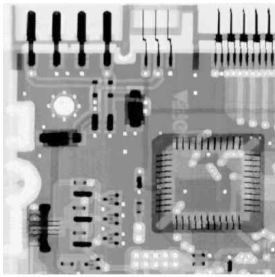
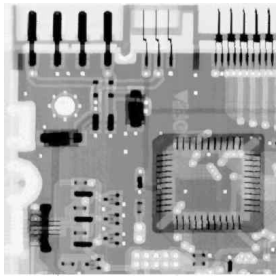
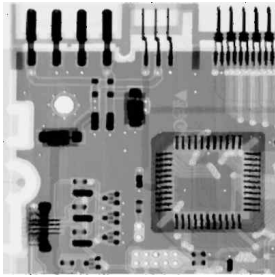
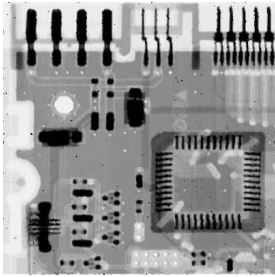
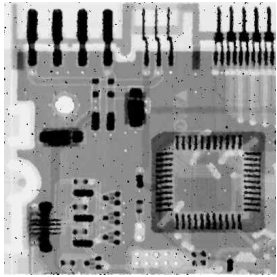
filtersize를 3으로 설정하고 영상을 육안으로 비교하며 PSNR값을 참고한 결과

원본 영상과 가장 가까운 값을 갖는 필터링은 median이다.

salt noise에서는 maximum filter가 최악의 결과를 만들어 낸다.

Pepper

filtersize는 3으로 진행

	low (0.05)	middle (0.10)	high (0.15)
harmonic			
contraharmonic q=1			
contraharmonic q=-1			
minimum			
maximum			
median			

PSNR

	low (0.05)	middle (0.10)	high (0.15)
harmonic	8.34	6.15	5.16
contraharmonic $q=1$	23.99	24.00	23.99
contraharmonic $q=-1$	23.59	20.29	17.92
minimum	8.20	6.10	5.13
maximum	19.58	19.65	19.73
median	30.96	27.41	23.65

harmonic : pepper가 영상을 가려 형태를 알아볼 수가 없다.

contraharmonic

$Q=1$: 원본 영상과 비교해봤을 때 pepper가 없어지긴 했지만 그래도 조금은 남아있다.

$Q=-1$: 원본 영상과 비교해봤을 때 pepper가 여기저기 남아있다. 나름 괜찮다.

minimum : pepper가 영상을 가려 검게 보이고 잘 알아볼 수 없다.

maximum : 원본 영상과 비교해봤을 때 하얗게 떠있는 모습이다.

median : 원본 영상과 비교해봤을 때 검은 점 살짝 남아있다. 가장 노이즈 제거가 잘되었다고 판단된다.

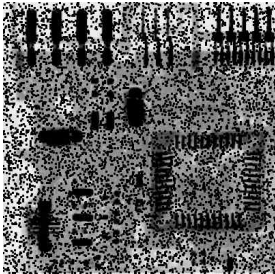
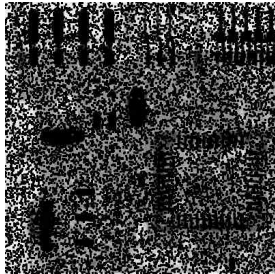
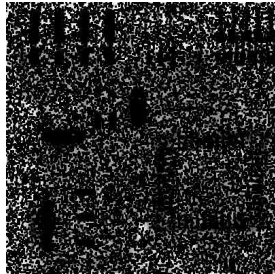
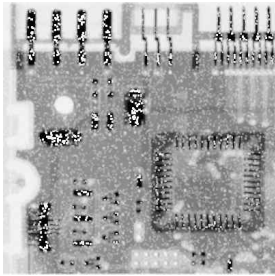
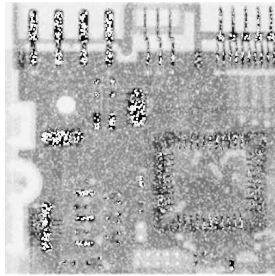
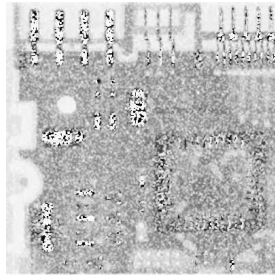
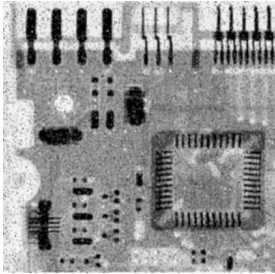
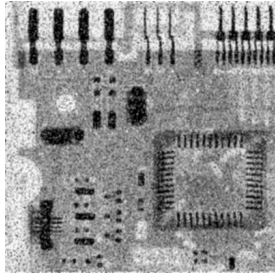
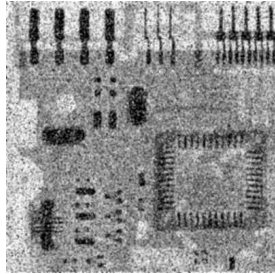
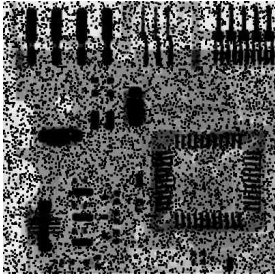
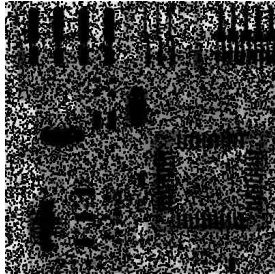
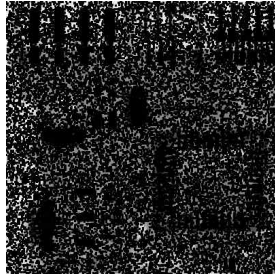
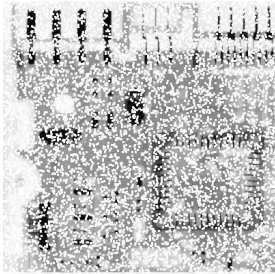
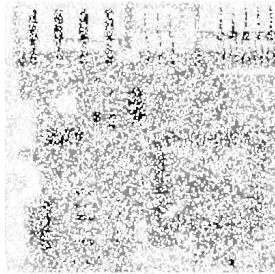
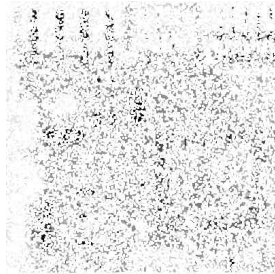
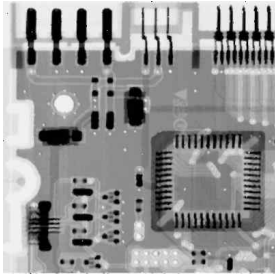
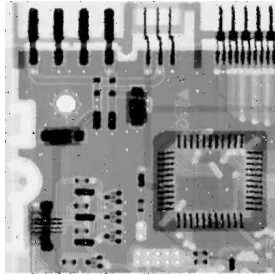
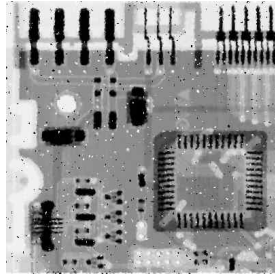
filtersize를 3으로 설정하고 영상을 육안으로 비교하며 PSNR값을 참고한 결과 원본 영상과 가장 가까운 값을 갖는 필터링은 median이다.

하지만 contraharmonic이 pepper noise가 높은 부분에서는 더 효과적이다.

pepper noise에서 harmonic, minimum filter는 최악의 결과를 만들어낸다.

Salt & Pepper

filtersize는 3으로 진행

	low (0.05)	middle (0.10)	high (0.15)
harmonic			
contraharmonic q=1			
contraharmonic q=-1			
minimum			
maximum			
median			

PSNR

	low (0.05)	middle (0.10)	high (0.15)
harmonic	8.34	6.15	5.15
contraharmonic $q=1$	15.10	12.66	11.22
contraharmonic $q=-1$	22.55	19.58	17.51
minimum	8.21	6.10	5.14
maximum	10.20	8.22	7.30
median	29.92	26.16	22.05

harmonic : pepper와 salt가 영상을 가려 형태를 알아볼 수가 없다.

contraharmonic

$Q=1$: 원본 영상과 비교해봤을 때 pepper가 없어지긴 했지만 salt가 영상을 가린다.

$Q=-1$: 원본 영상과 비교해봤을 때 salt가 줄었지만 여기저기 pepper가 남아있다.

minimum : pepper가 영상을 가려 검게 보이고 잘 알아볼 수 없다.

maximum : salt가 영상을 가려 하얗게 보이고 잘 알아볼 수 없다.

median : 원본 영상과 비교해봤을 때 검은 점과 하얀점이 살짝 남아있다. 가장 노이즈 제거가 잘되었다고 판단된다.

filtersize를 3으로 설정하고 영상을 육안으로 비교하며 PSNR값을 참고한 결과

원본 영상과 가장 가까운 값을 갖는 필터링은 median이다.

salt&pepper noise 에서는 max와 min filter는 최악의 결과를 만들어낸다.