

영상신호처리 및 부호화

- MATLAB을 이용한 영상신호 처리 및 부호화 -



학과 : 정보통신공학부 정보통신공학전공

교과 명 : 영상 신호 처리 및 부호화

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1. 사진 표지 만들기

본인의 사진으로 사진을 다루는 프로그램(Photo Scape)을 이용해 픽셀을 640*480 size로 사진 크기를 맞춥니다.

2. MATLAB을 이용한 영상 읽기 및 쓰기

1. Read & Display



```
>> c=imread('jeewon.jpg');  
>> imshow(c);  
>> impixel(c,200,100)
```

ans =

87 90 83

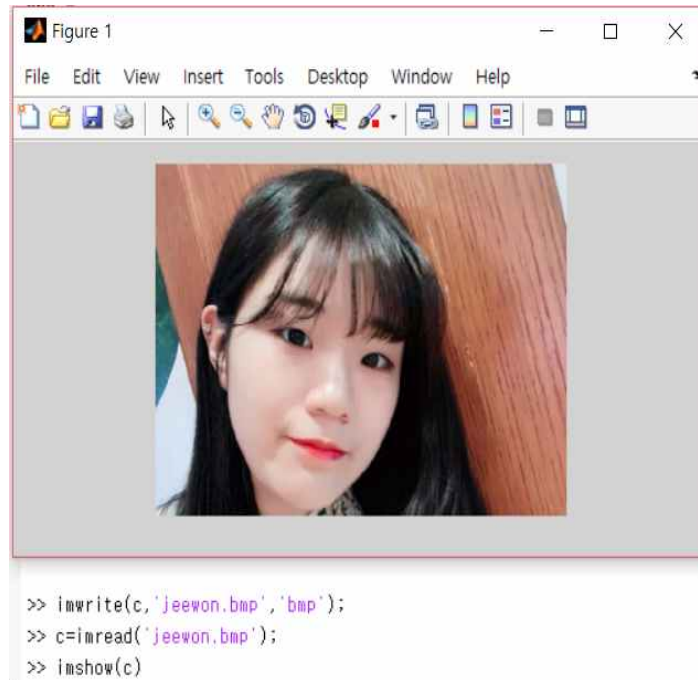
2. Image File 정보

```
>> imfinfo('jeewon.jpg')  
  
ans =  
  
    Filename: 'jeewon.jpg'  
    FileModDate: '08-11-2017 18:22:24'  
    FileSize: 82525  
    Format: 'jpg'  
    FormatVersion: ''  
    Width: 640  
    Height: 480  
    BitDepth: 24  
    ColorType: 'truecolor'  
    FormatSignature: ''  
    NumberOfSamples: 3  
    CodingMethod: 'Huffman'  
    CodingProcess: 'Sequential'  
    Comment: {}  
    Software: 'PhotoScape '  
    DigitalCamera: [1x1 struct]
```

mfinfo('jeewon.jpg')

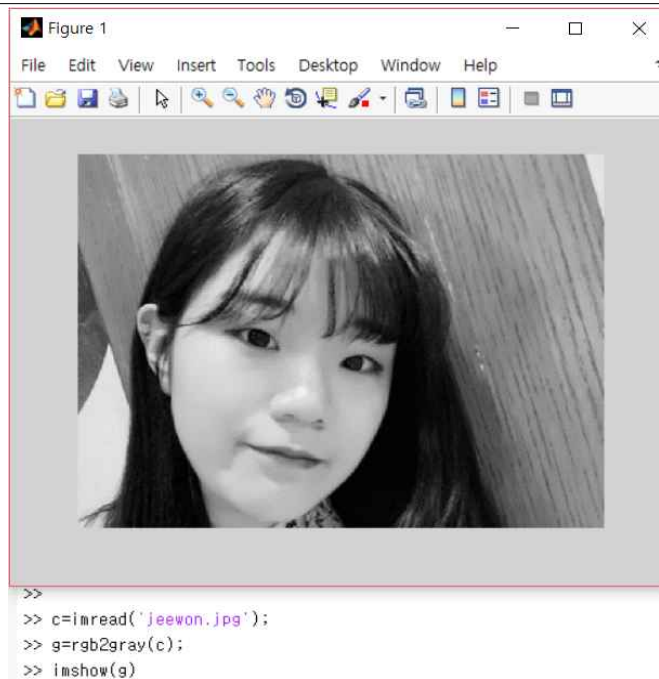
→imfinfo를 통해 영상의 크기와 형식을 확인

3. Image File Format : 변환, 저장

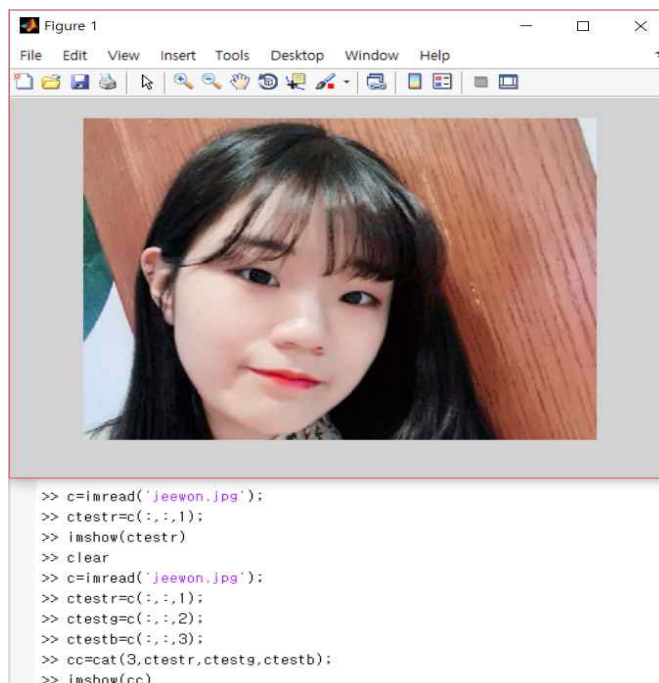


3. MATLAB을 이용한 Gray Level 출력 및 R, G, B 출력

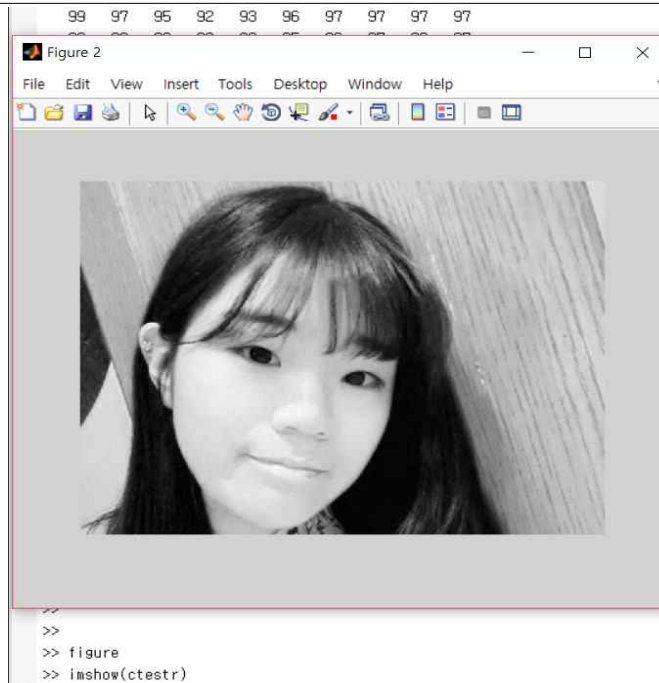
4. GRAY Image 출력



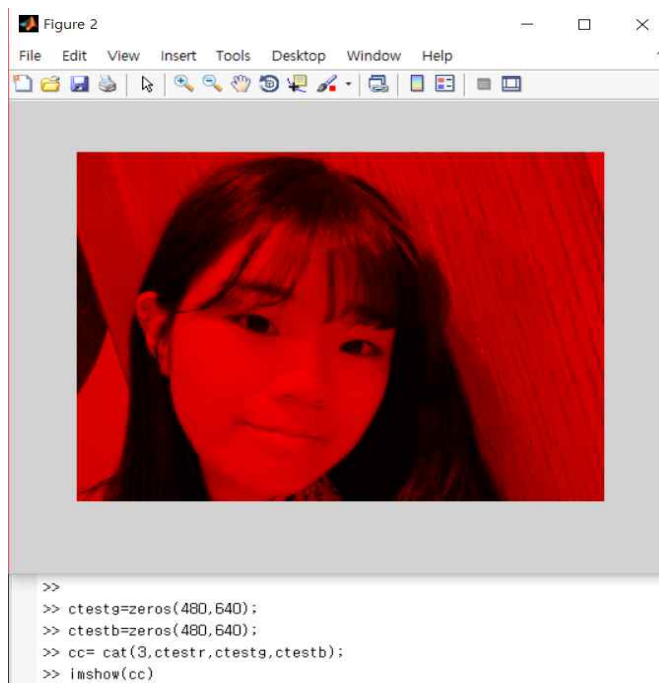
5. R, G, B 성분을 모두 합쳐서 출력



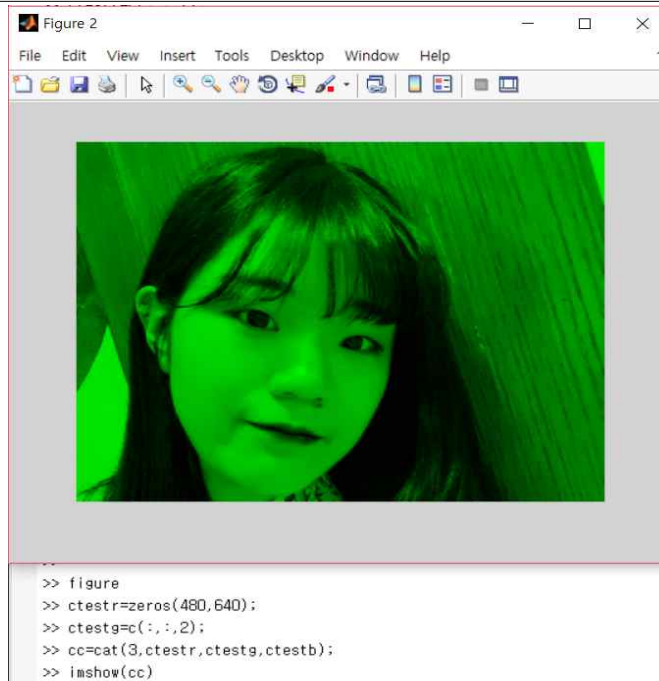
6. R 성분을 출력



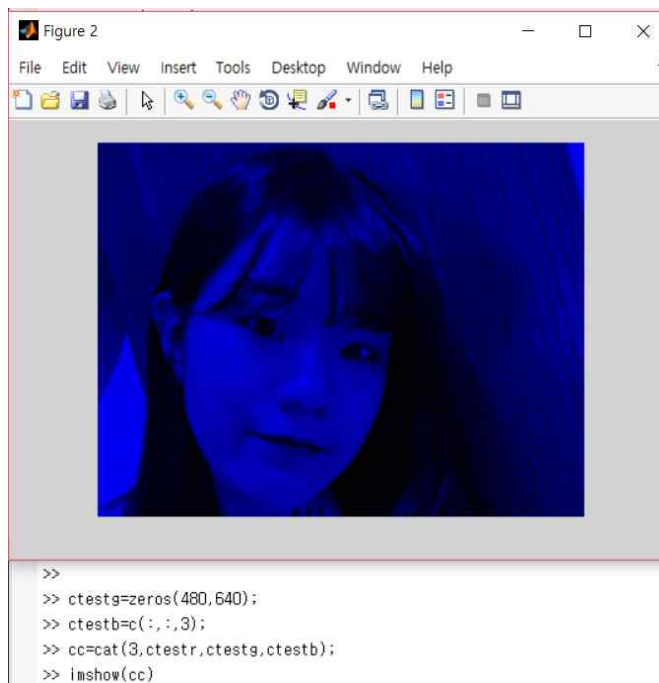
7. R, G, B 성분을 출력, G, B를 0으로 한 후 합쳐서 출력



8. R, G, B 성분을 출력 후, R, B를 0으로 한 후 합쳐서 출력

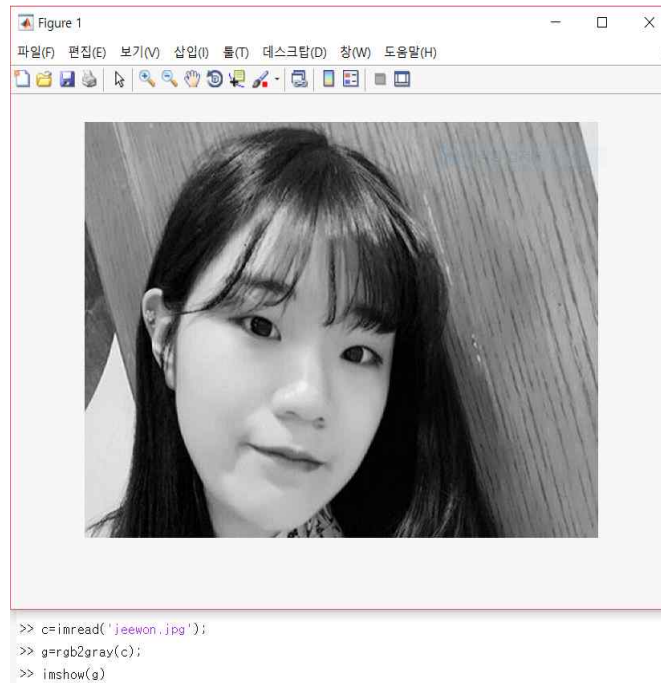


9. R, G, B 성분을 출력 후 R, G를 0으로 한 후 합쳐서 출력

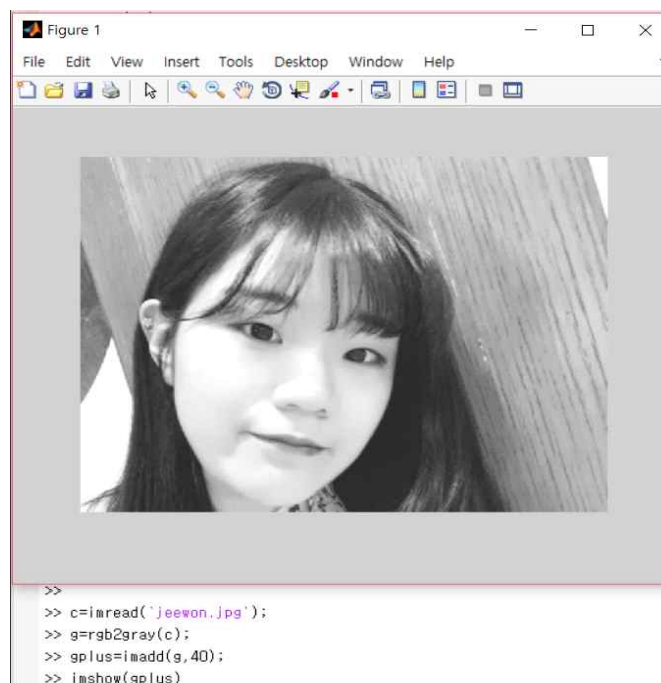


4. MATLAB을 이용한 영상 사칙연산 및 반전

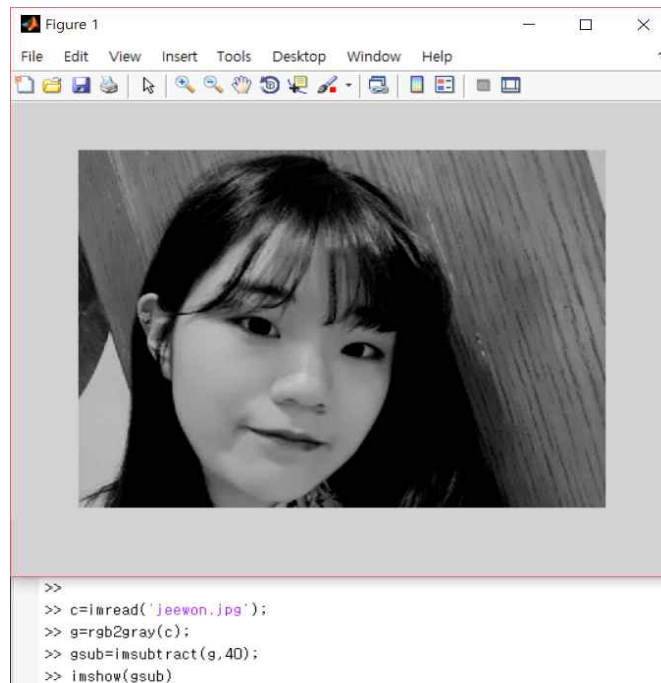
10. 원본 영상



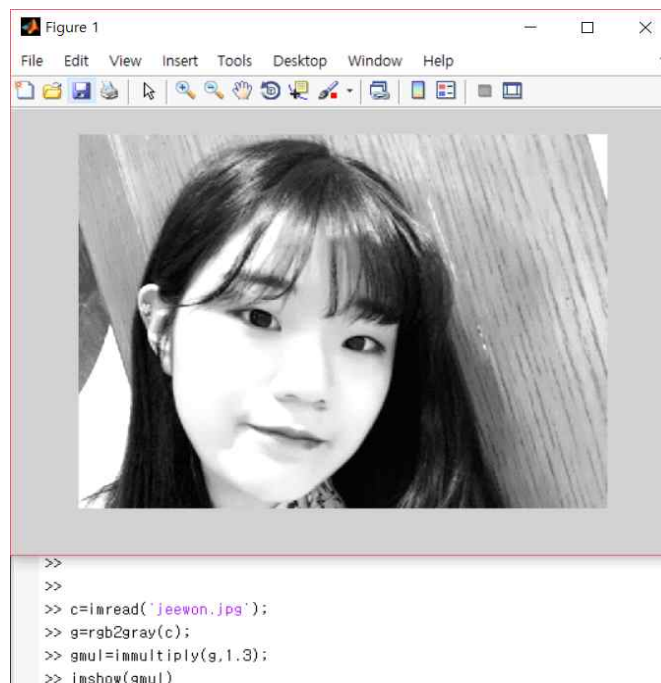
11. 원본 영상 +40



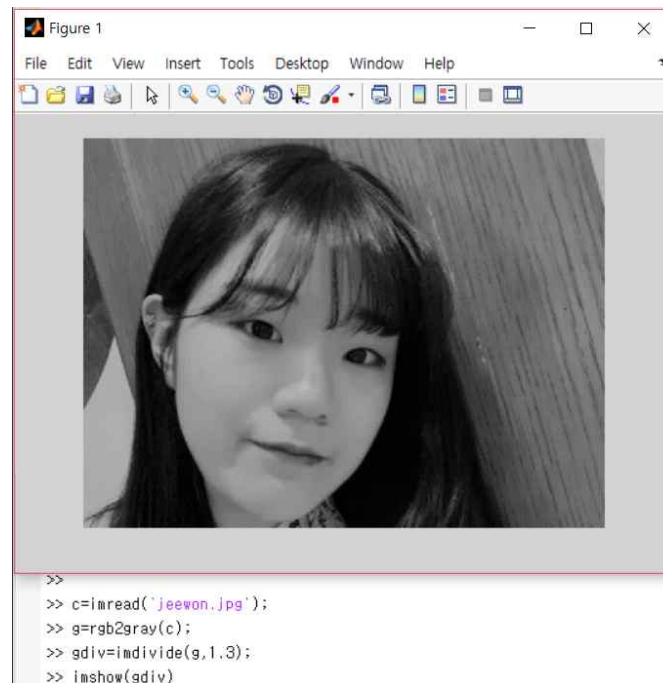
12. 원본 영상 -40



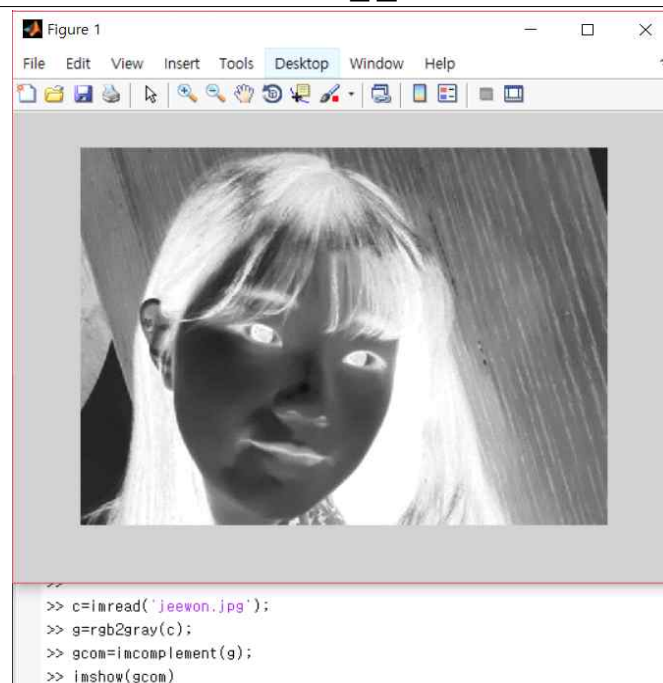
13. 원본 영상*1.3



14. 원본 영상/1.3

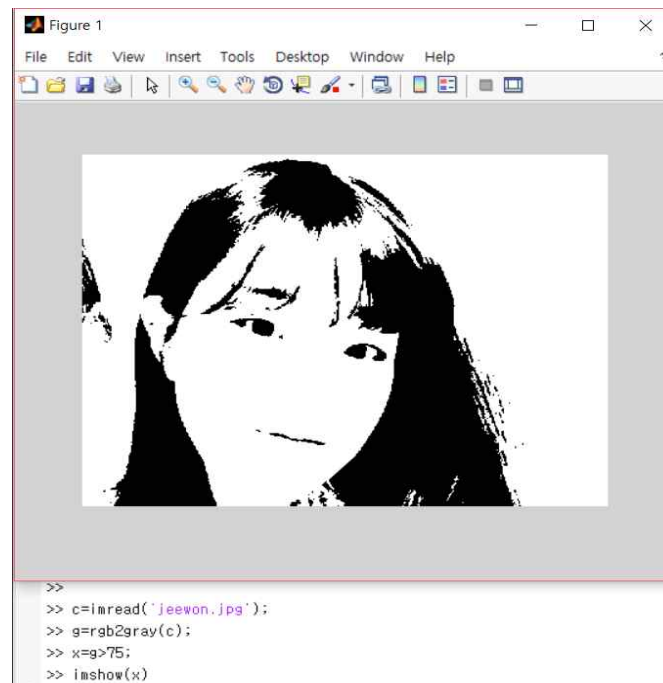


15. 반전

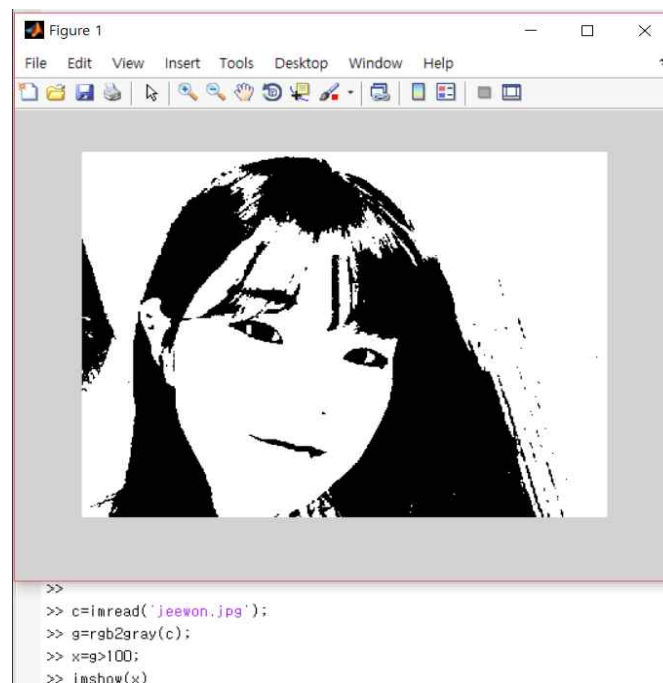


5. MATLAB을 이용한 임계점 추출

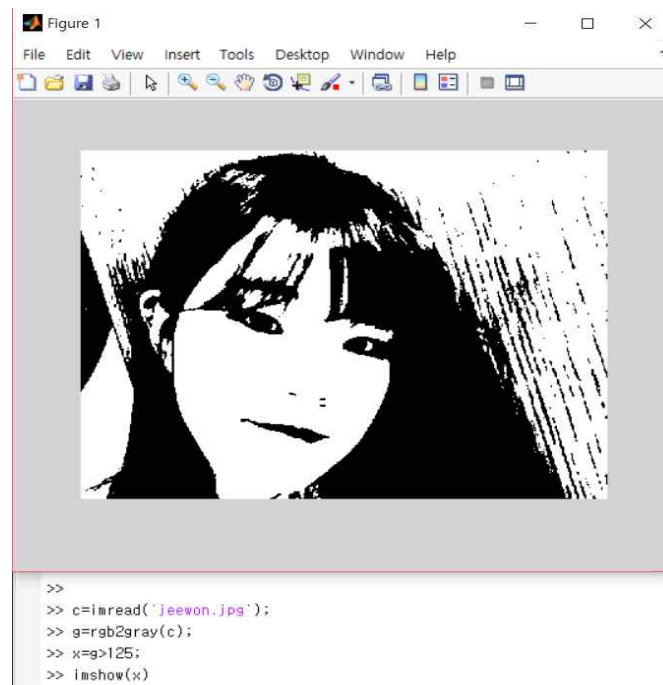
1. 임계점 75



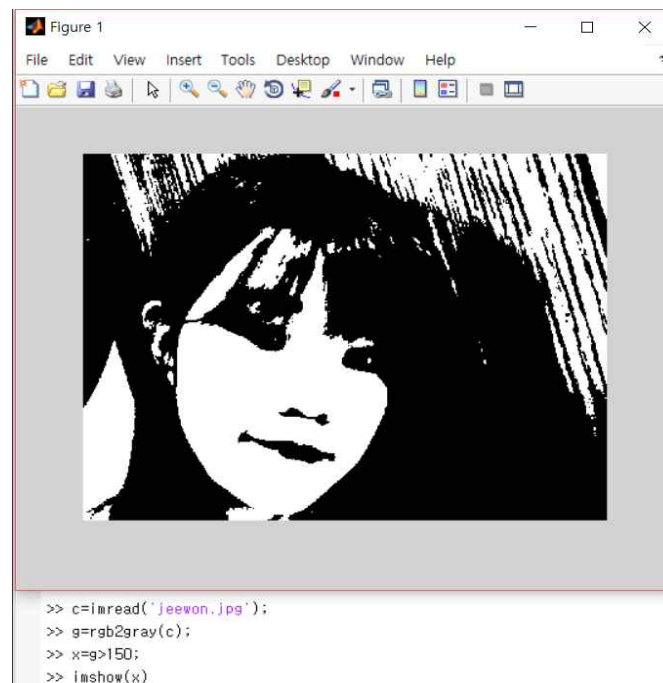
2. 임계점 100



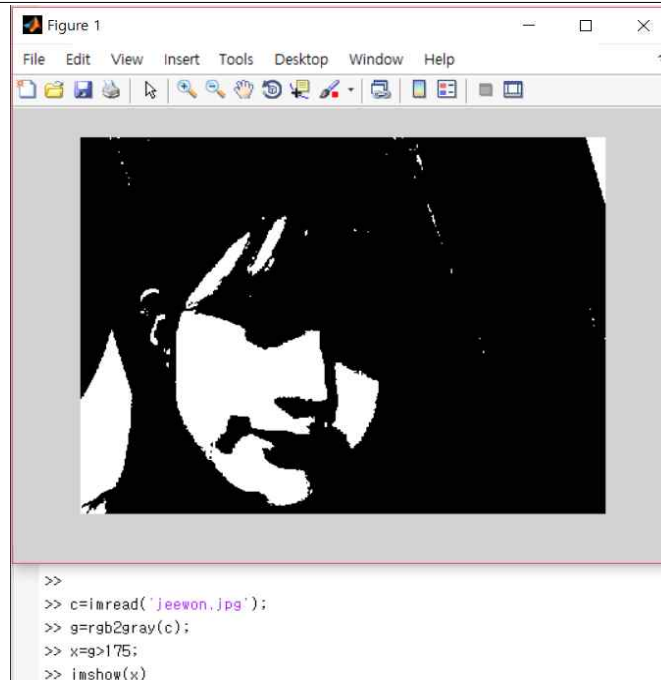
3. 임계점 125



4. 임계점 150



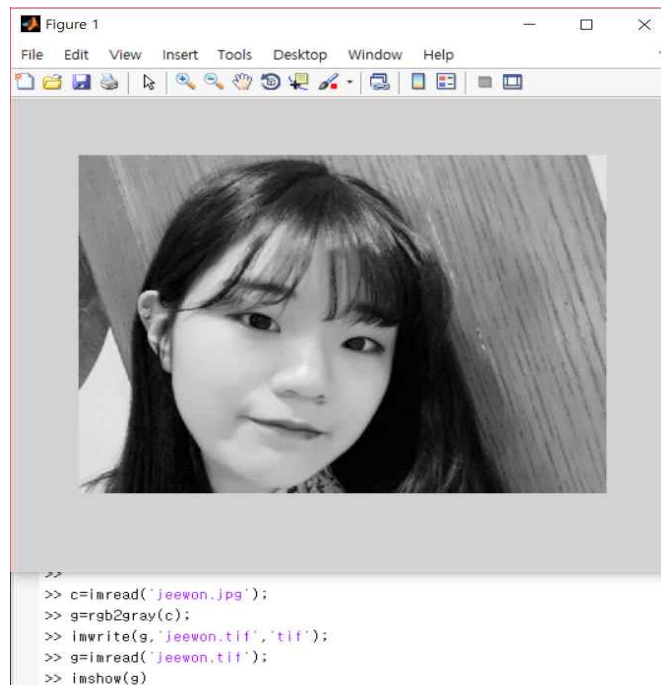
5. 임계점 175



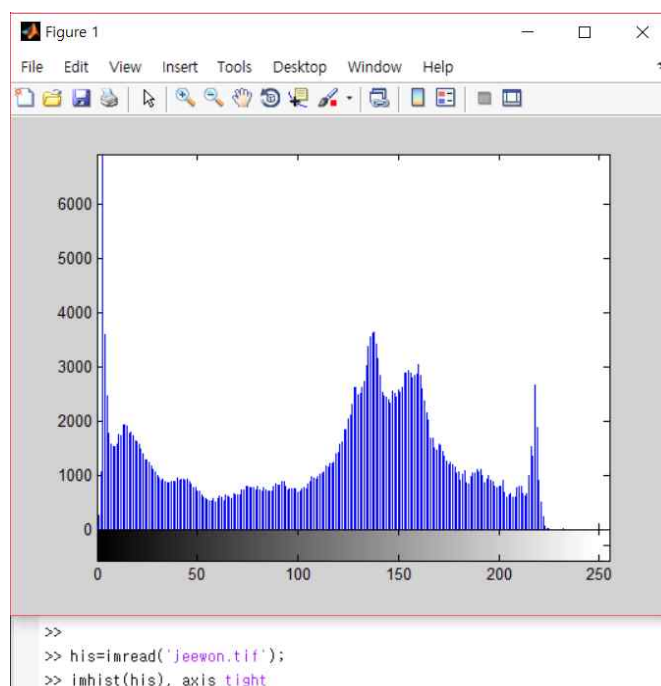
가장 잘 나타내고 있다고 생각하는 임계점은 100이 적당하다고 생각합니다.

6. MATLAB을 이용한 히스토그램 및 평활화

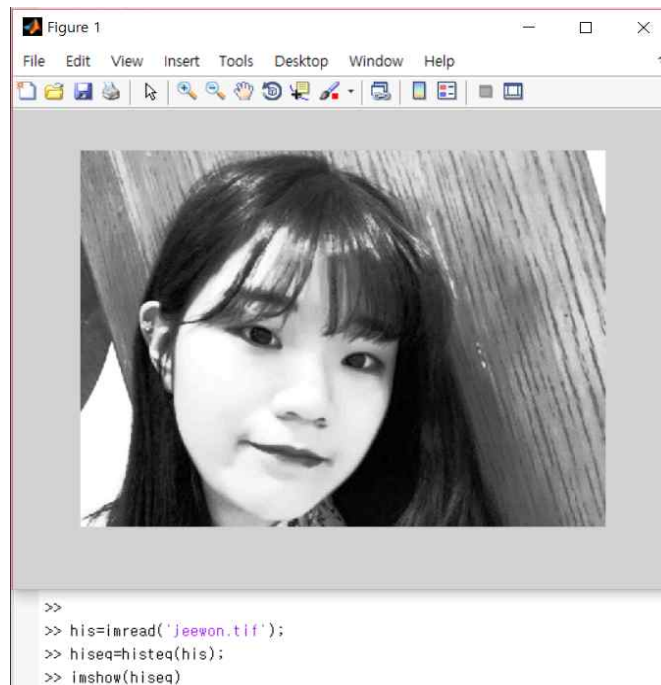
0. 우선사항



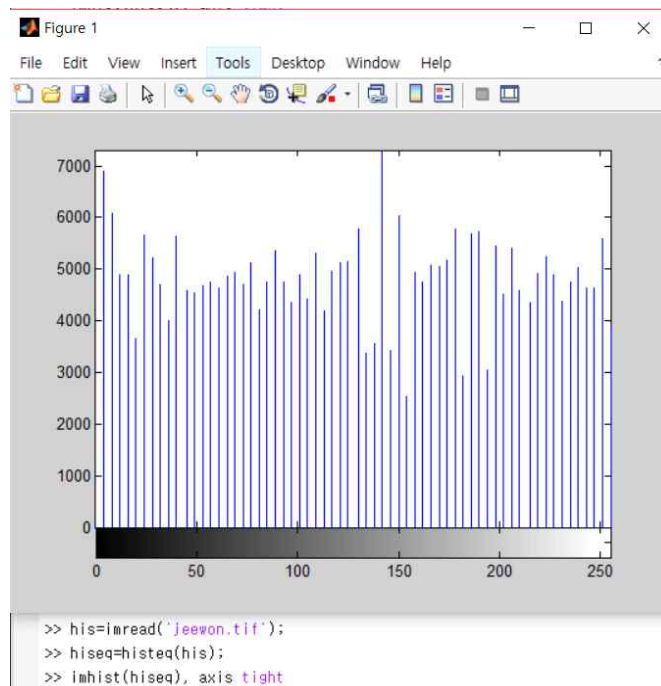
1. 히스토그램



2. 평활화

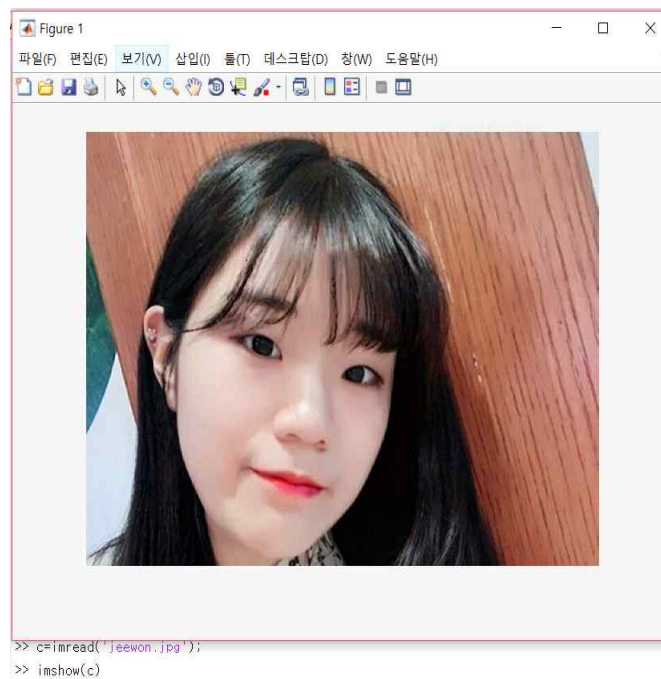


3. 평활화 후 히스토그램

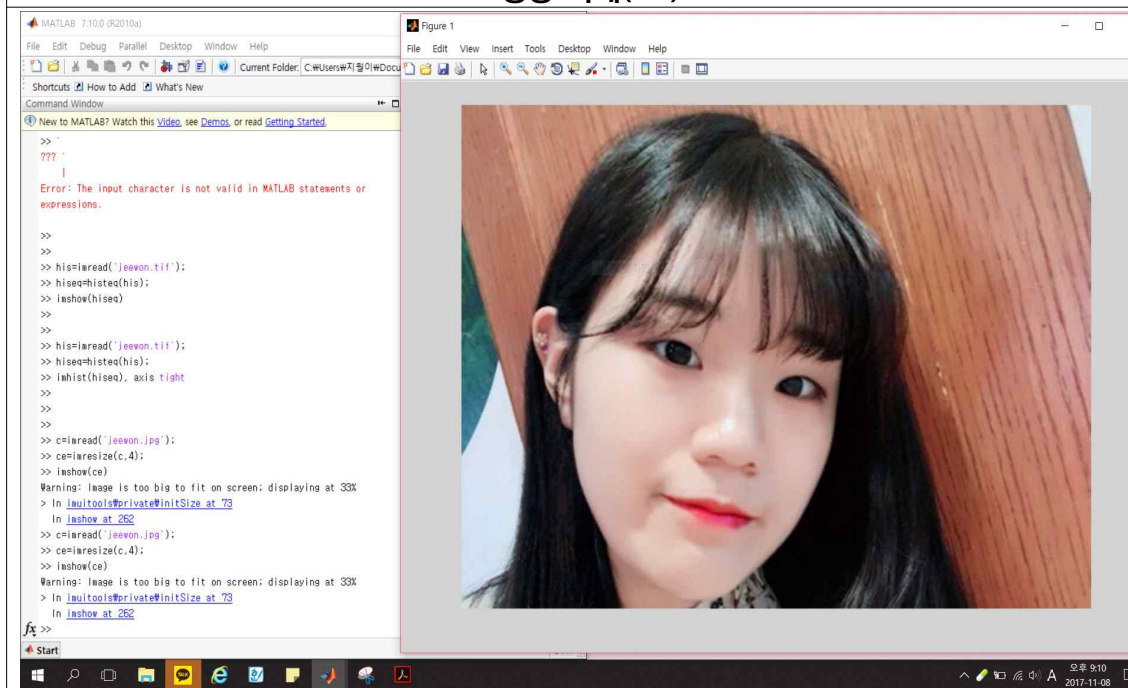


7. MATLAB을 이용한 기하학적 변환

원본 영상



1. 영상 확대(X4)



2. 영상 축소(X1/4)

MATLAB 7.10.0 (R2010a)

File Edit Debug Parallel Desktop Window Help

Current Folder: C:\Users\#지월이\Documents\MATLAB

Shortcuts How to Add What's New


Command Window

New to MATLAB? Watch this [Video](#), see [Demos](#), or read [Getting Started](#).

```
>>
>>
>> his=imread('jeewon.tif');
>> hiseq=histeq(his);
>> imshow(hiseq)
>>
>>
>> his=imread('jeewon.tif');
>> hiseq=histeq(his);
>> imhist(hiseq), axis tight
>>
>>
>>
>> c=imread('jeewon.jpg');
>> ce=imresize(c,4);
>> imshow(ce)
Warning: Image is too large to display. Only the top-left portion of the image is shown.
> In imuitools#pri
> In imshow at 262
>> c=imread('jeewon.jpg');
>> ce=imresize(c,4);
>> imshow(ce)
Warning: Image is too large to display. Only the top-left portion of the image is shown.
> In imuitools#pri
> In imshow at 262
>>
>>
>> c=imread('jeewon.jpg');
>> cr=imresize(c,0.25);
>> imshow(cr)
fx >>
```

Figure 1

File Edit View Insert Tools Desktop Window Help



Workspace

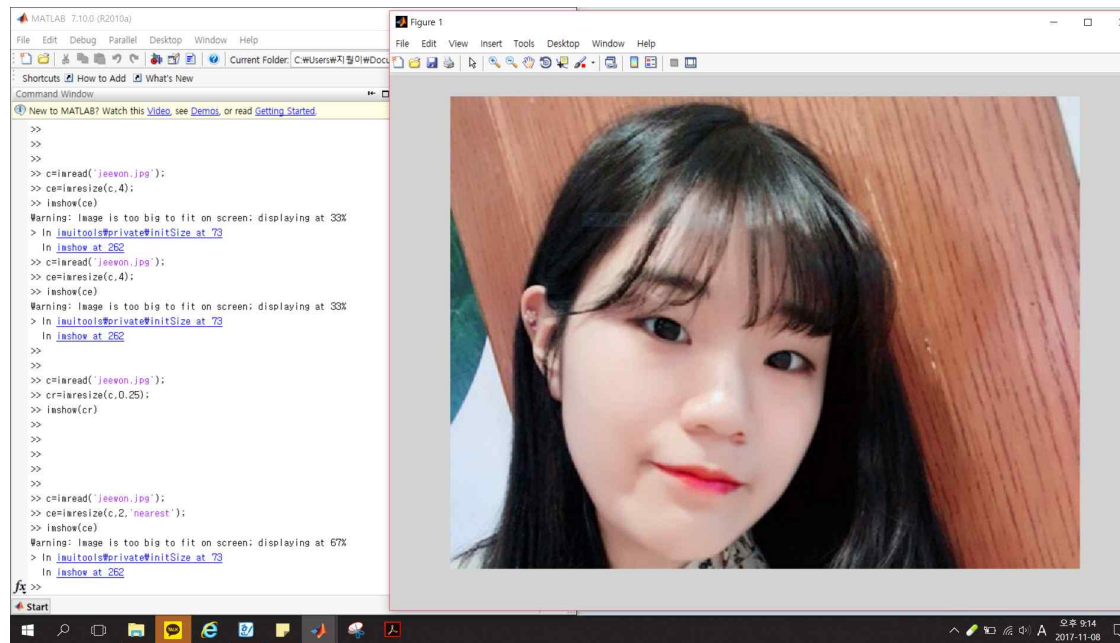
	Min	Max
x640x3 uint8>	<Too ...	<Too ...
x640x3 uint8>	<Too ...	<Too ...
0x2560x3 uint...	<Too ...	<Too ...
x160x3 uint8>	0	241
x640 uint8>	0	250
x640 uint8>	0	238
x640 uint8>	0	250
x640 uint8>	0	238
x640 uint8>	17	255
x640 uint8>	0	183
x640 uint8>	0	255
x640 uint8>	40	255
x640 uint8>	0	198
x640 uint8>	0	238
x640 uint8>	0	255

Command History

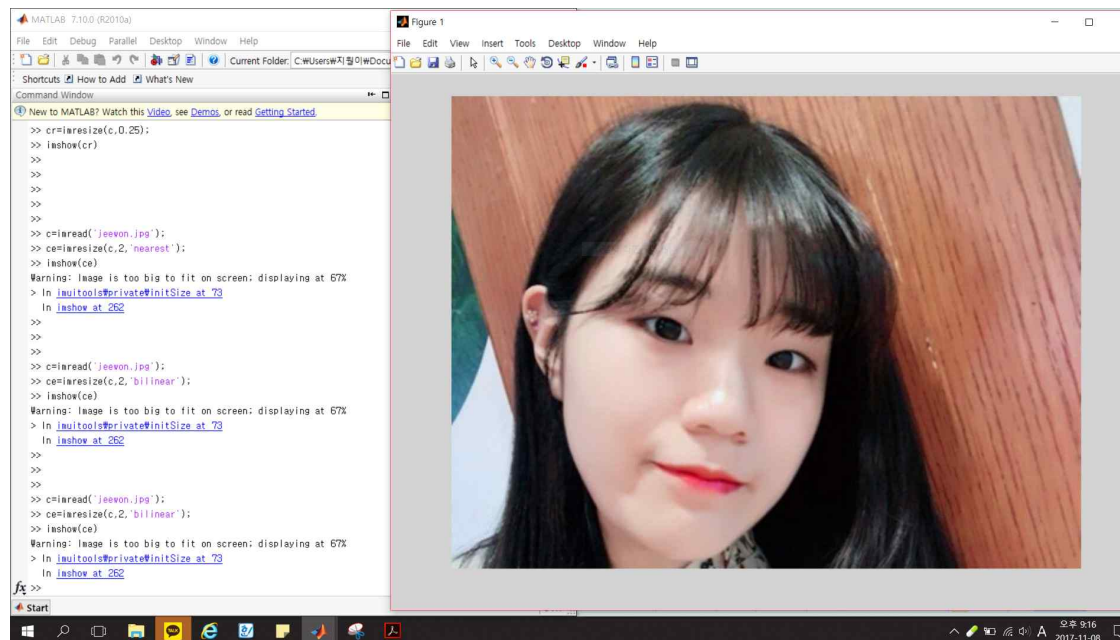
```
hiseq=histeq(hiseq);
imshow(hiseq)
his=imread('jeewon.tif');
hiseq=histeq(hiseq);
imhist(hiseq), axis
c=imread('jeewon.jpg');
ce=imresize(c,4);
imshow(ce)
c=imread('jeewon.jpg');
ce=imresize(c,4);
imshow(ce)
c=imread('jeewon.jpg');
cr=imresize(c,0.25);
imshow(cr)
```

Start OVR

3. nearest 보간

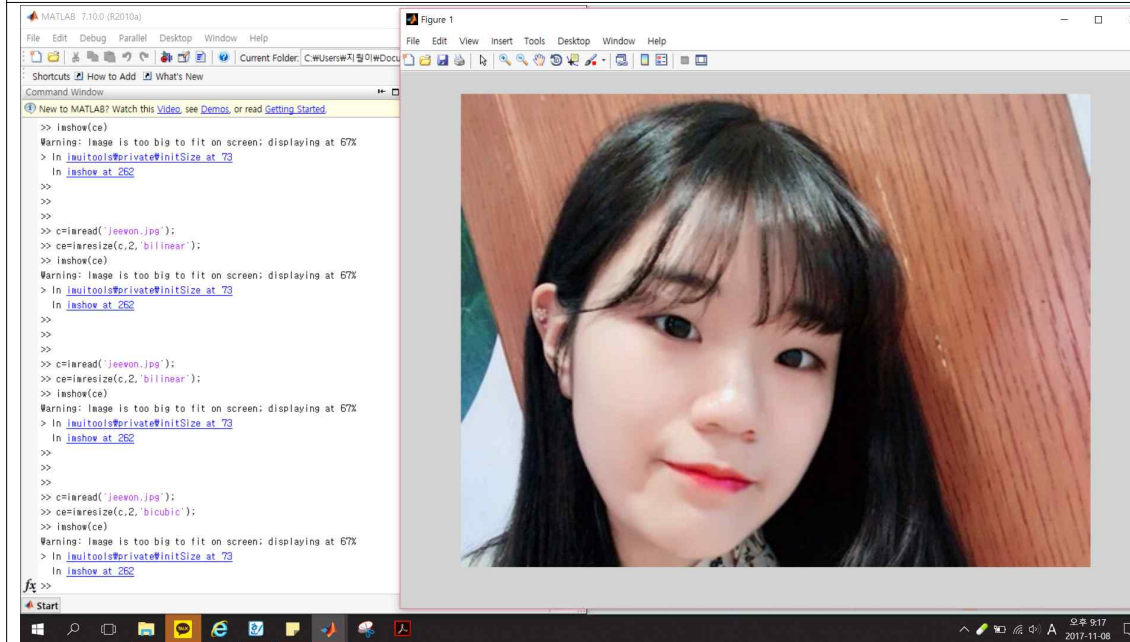


4. bilinear 보간



5. bicubic 보간

Figure 1



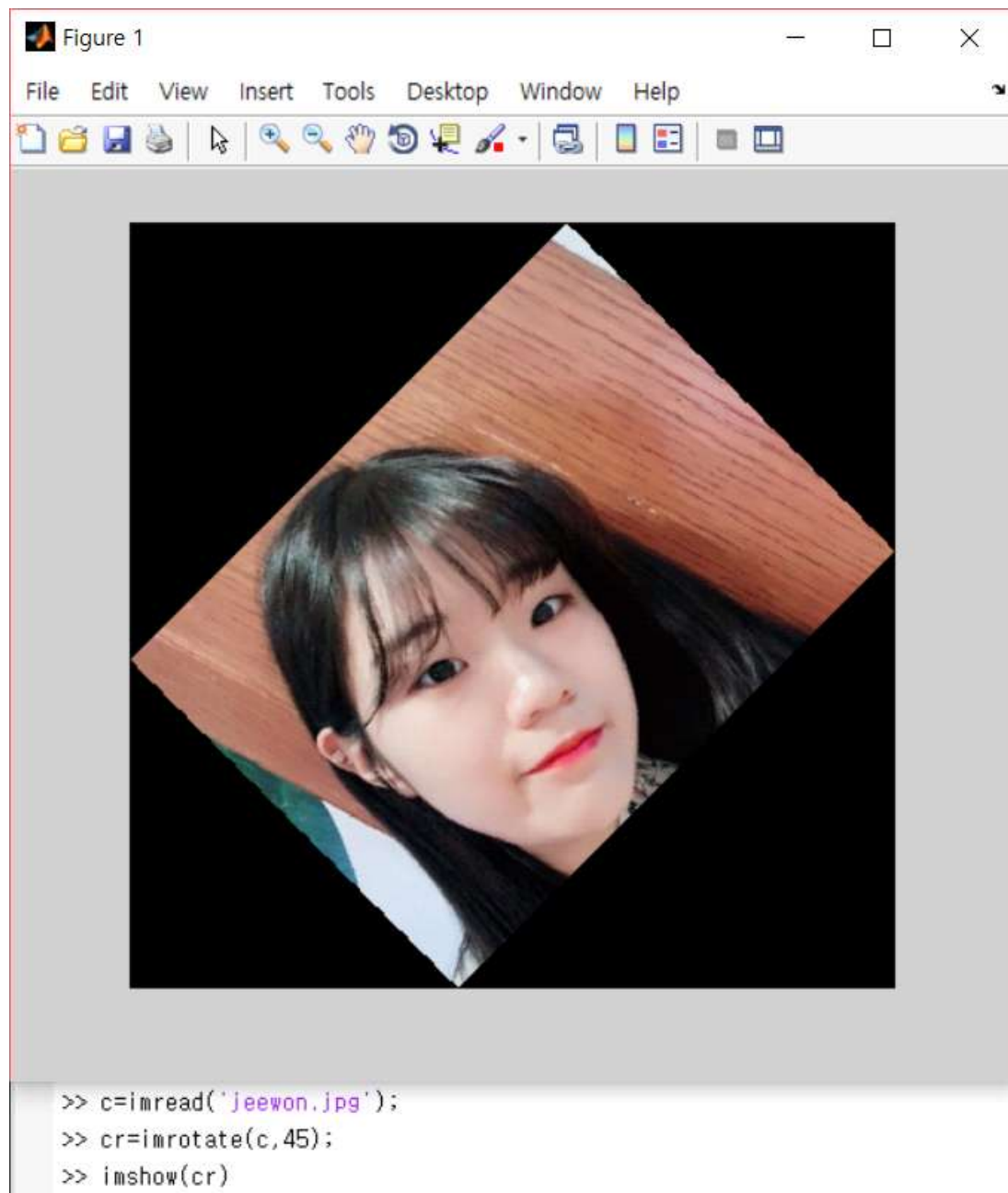
The image shows a MATLAB R2010a interface. The Command Window on the left displays the following code and output:

```
>> imshow(c)
Warning: Image is too big to fit on screen; displaying at 67%
> In julitools\private\initSize at 73
In julitools at 262
>>
>>
>> c=imread('jeewon.jpg');
>> ce=imresize(c,2,'bilinear');
>> imshow(ce)
Warning: Image is too big to fit on screen; displaying at 67%
> In julitools\private\initSize at 73
In julitools at 262
>>
>>
>> c=imread('jeewon.jpg');
>> ce=imresize(c,2,'bilinear');
>> imshow(ce)
Warning: Image is too big to fit on screen; displaying at 67%
> In julitools\private\initSize at 73
In julitools at 262
>>
>>
>> c=imread('jeewon.jpg');
>> ce=imresize(c,2,'bicubic');
>> imshow(ce)
Warning: Image is too big to fit on screen; displaying at 67%
> In julitools\private\initSize at 73
In julitools at 262
fx >>
```

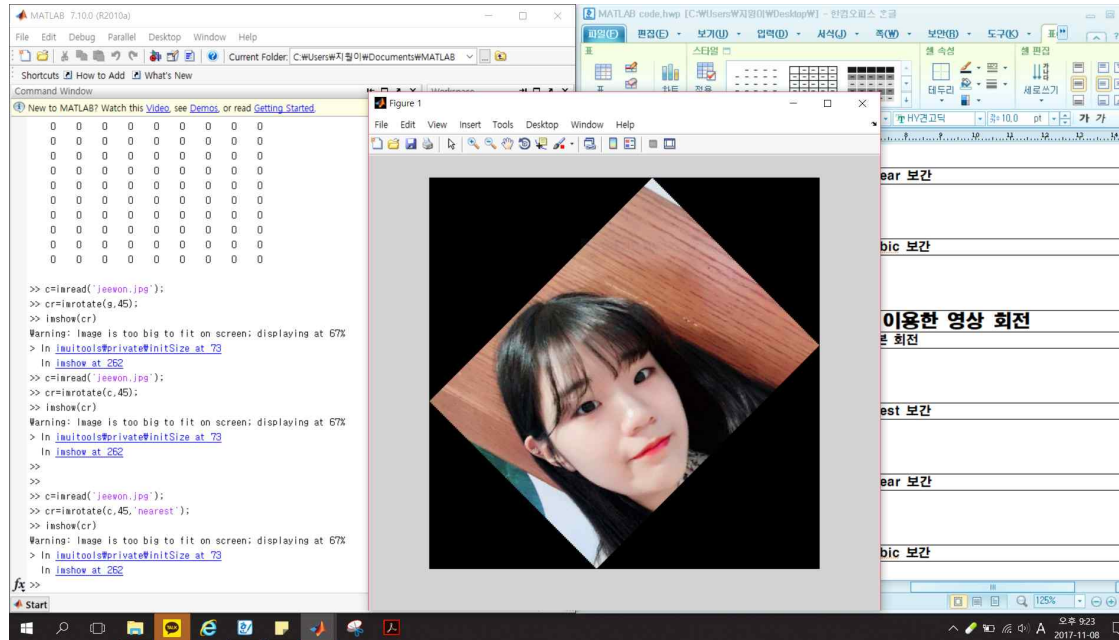
The Figure 1 window on the right displays a portrait of a woman with long dark hair and bangs, which is the result of the bicubic interpolation process. The image is shown in a window titled 'Figure 1'.

8. MATLAB을 이용한 영상 회전

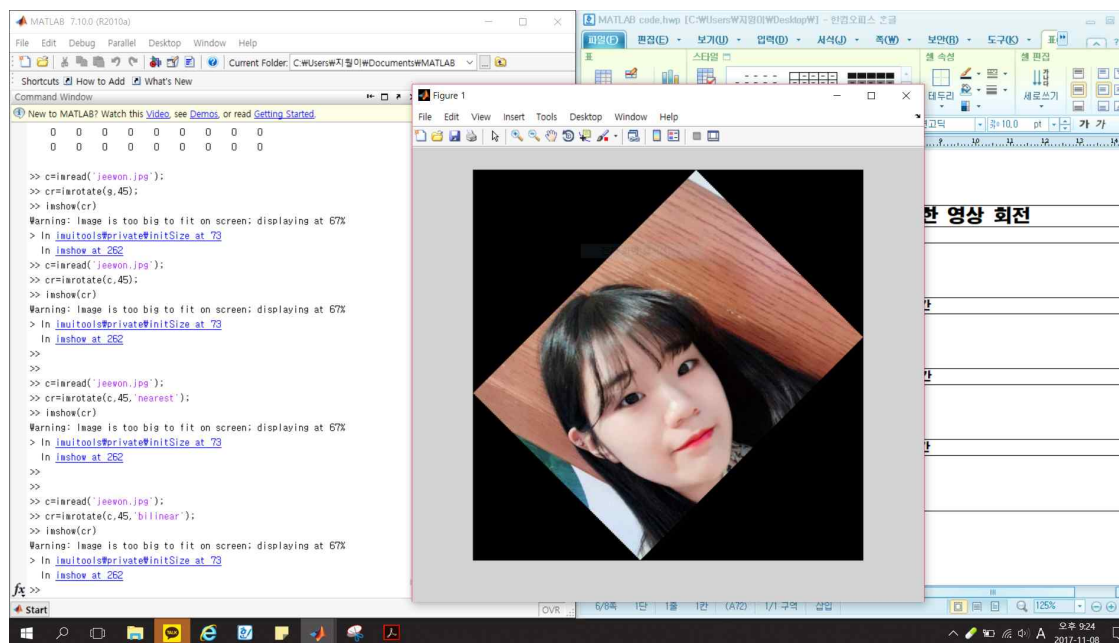
1. 원본 회전



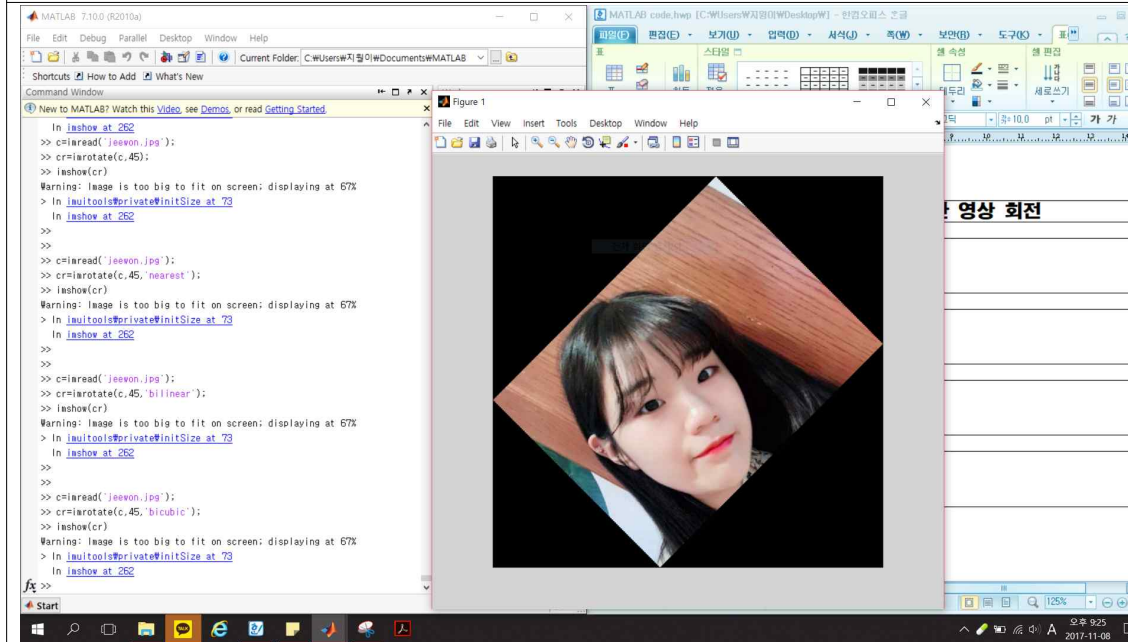
2. nearest 보간



3. bilinear 보간

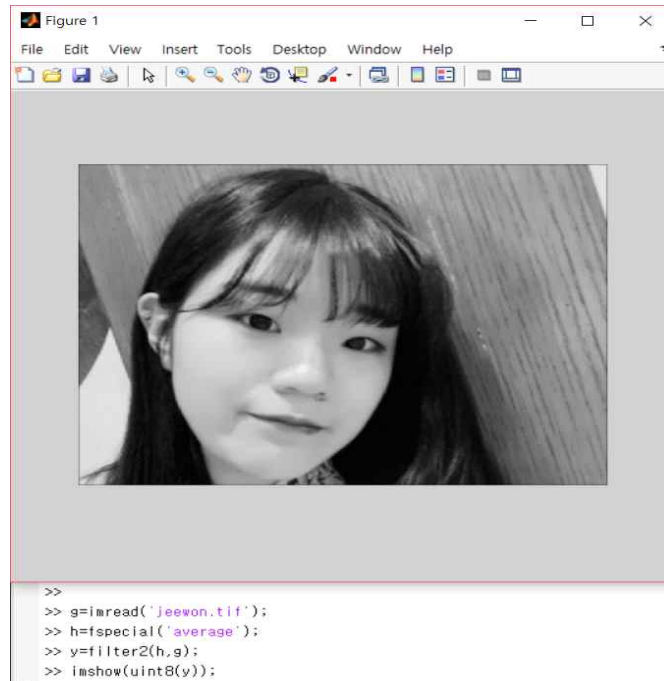


4. bicubic 보간

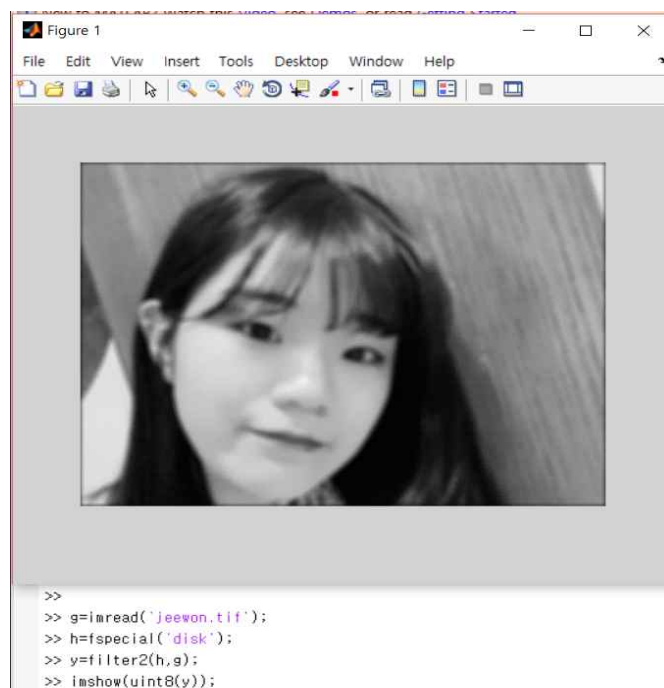


9. MATLAB을 이용한 필터

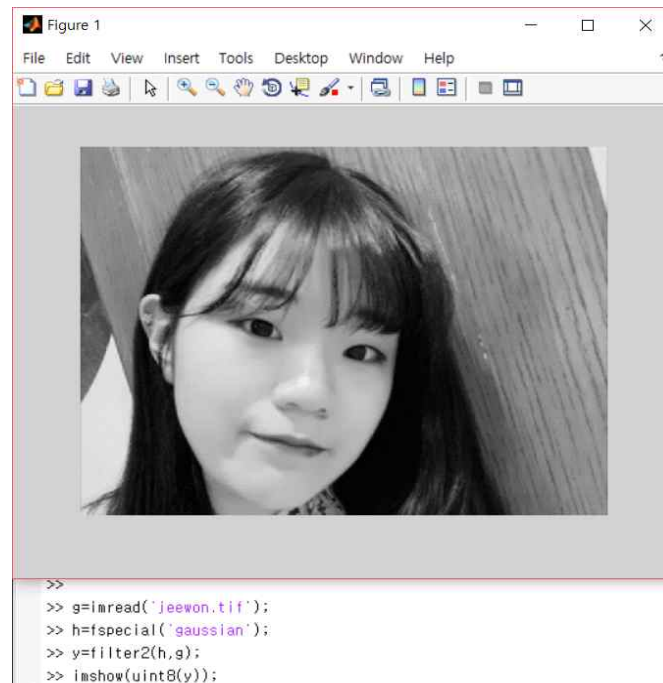
1. average 필터



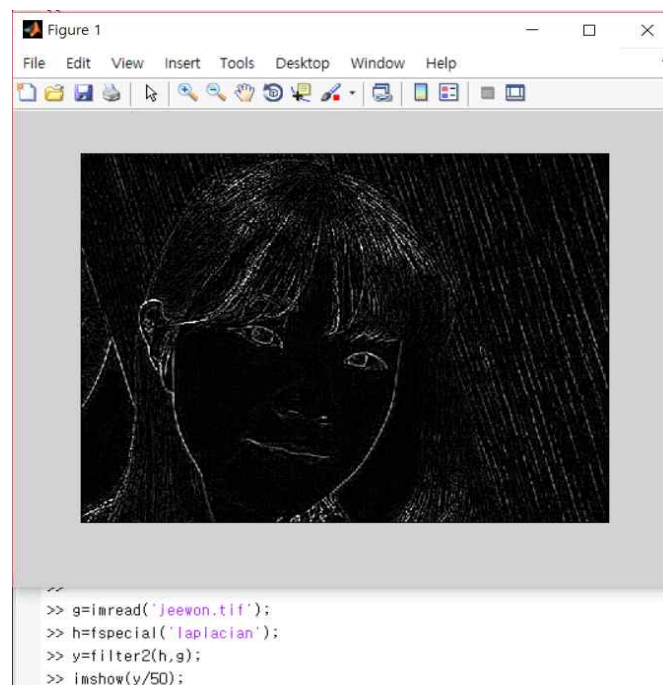
2. disk 필터



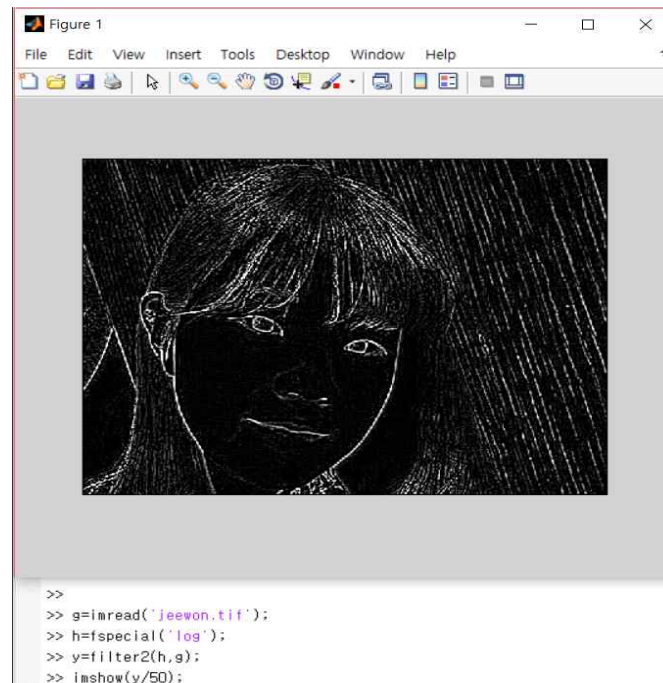
3. gaussian 필터



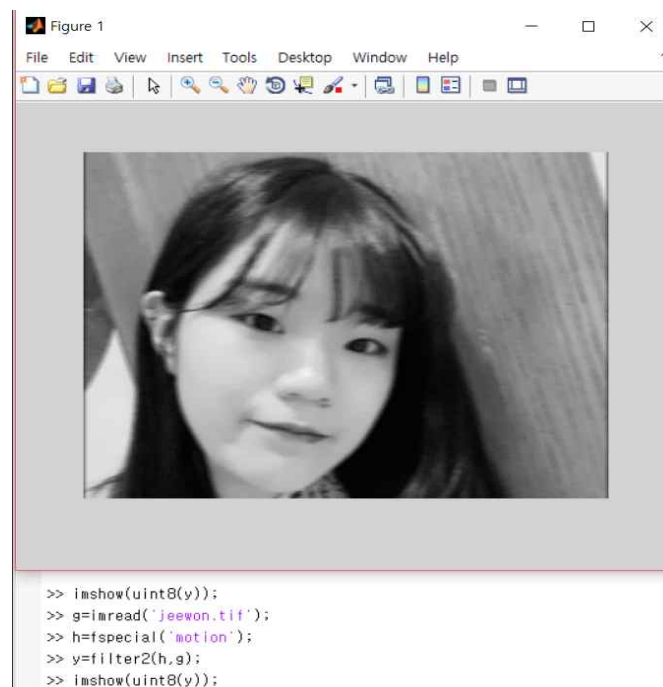
4. laplacian 필터



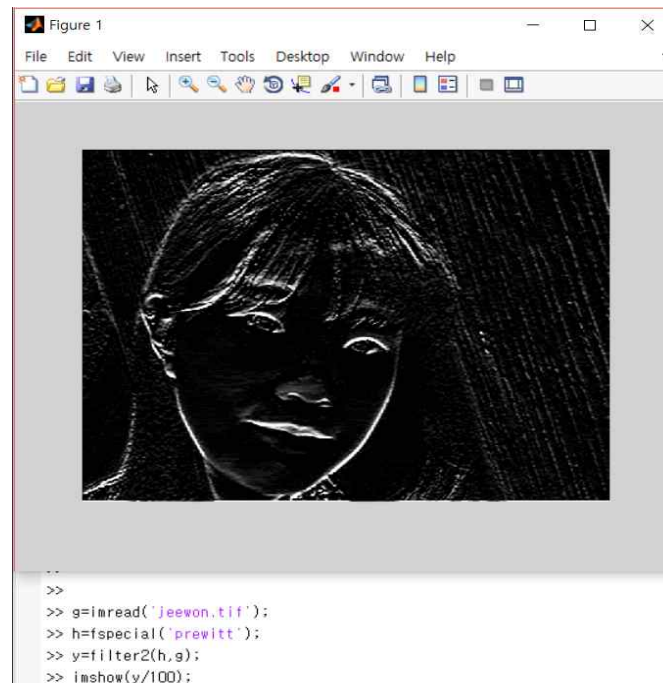
5. log 필터



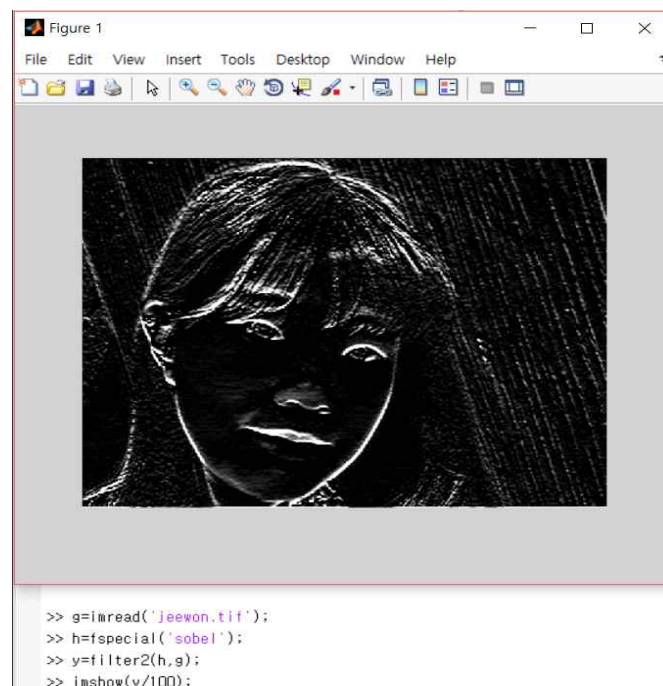
6. motion 필터



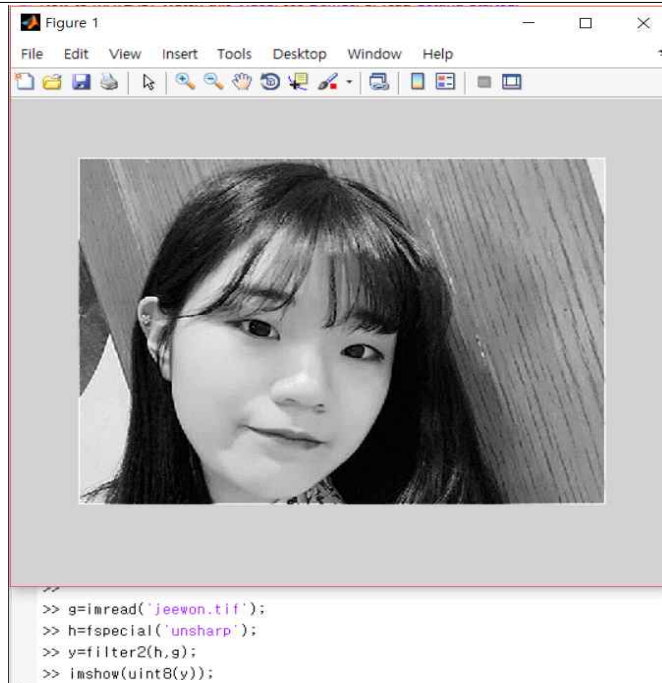
7. prewitt 필터



8. sobel 필터



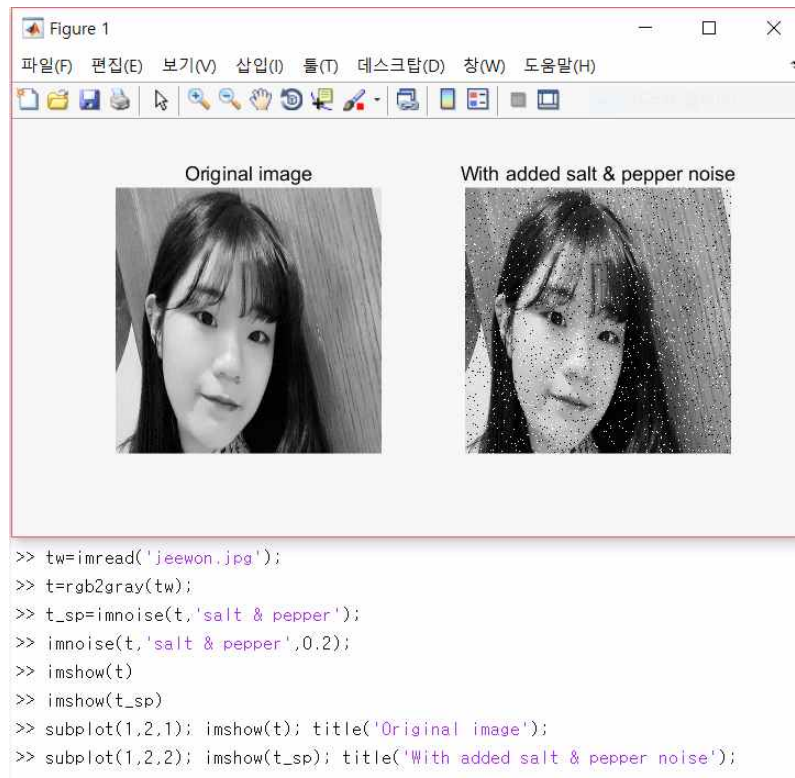
9. unsharp 필터



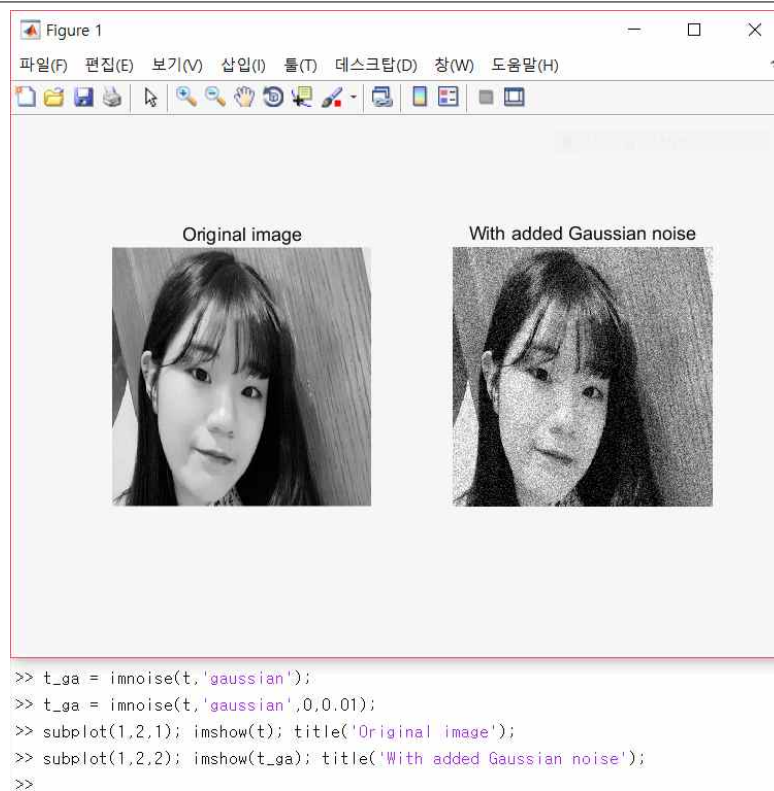
10. MATLAB을 이용한 영상 복원

-컴퓨터에 내장된 사진 편집프로그램을 통해서 픽셀값을 480x480으로 바꾸어 줍니다.

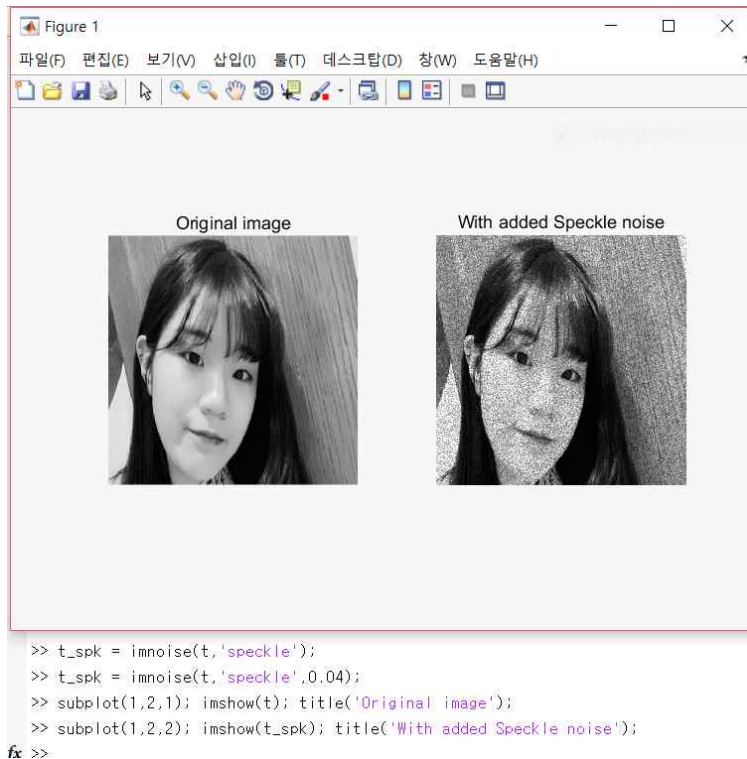
1. Salt and Pepper Noise



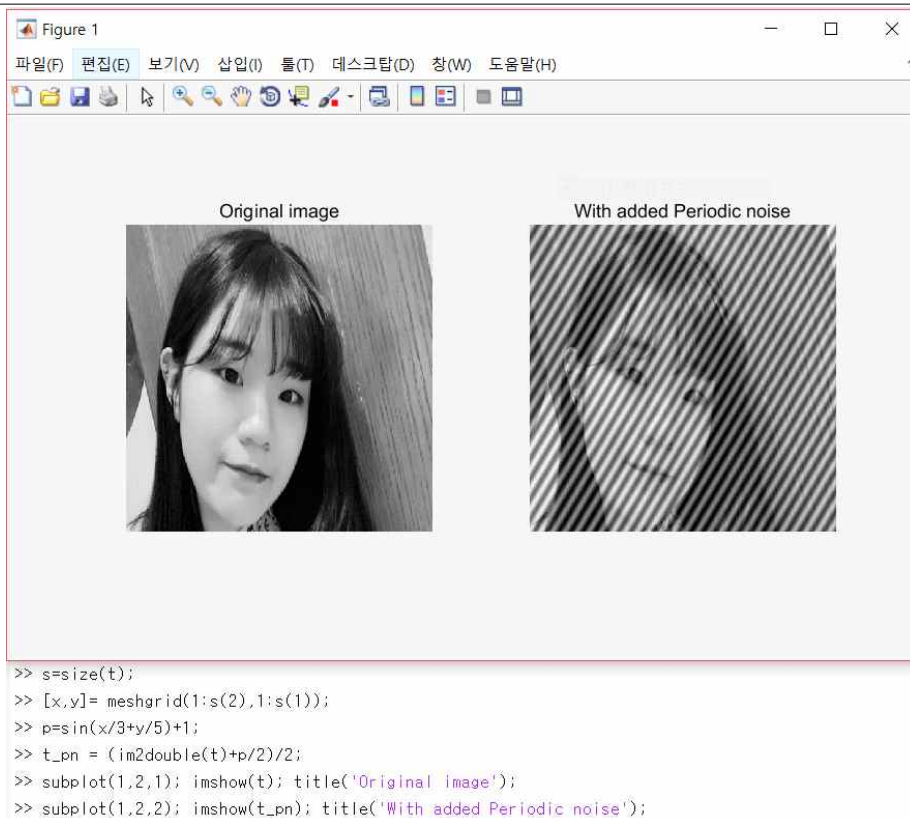
2. Gaussian Noise



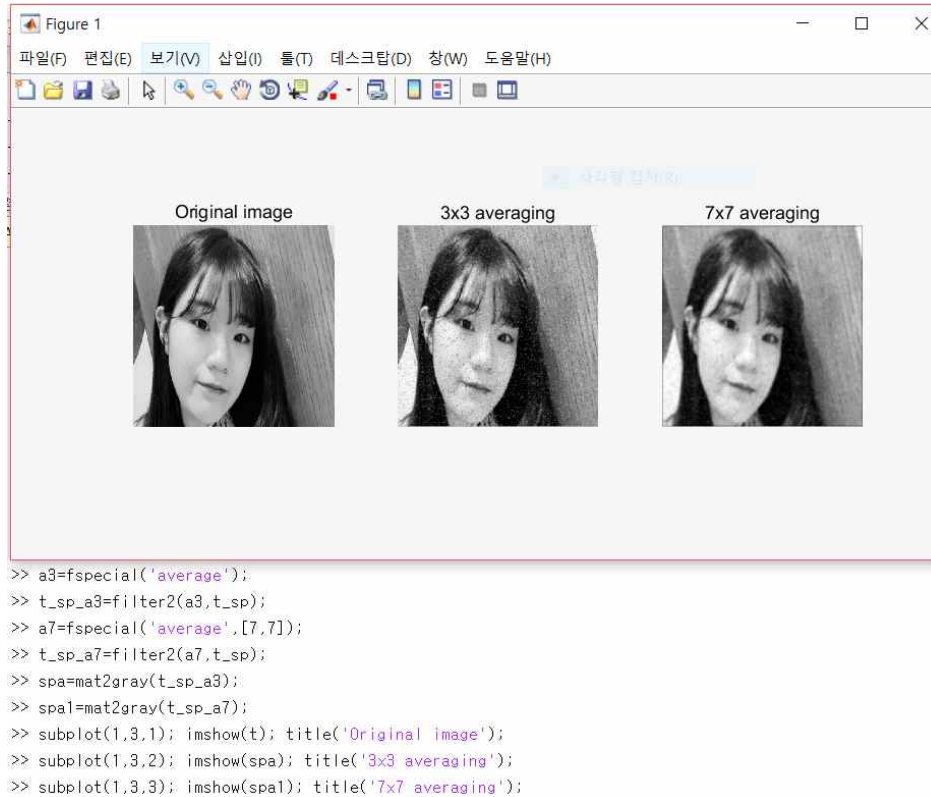
3, Speckle Noise



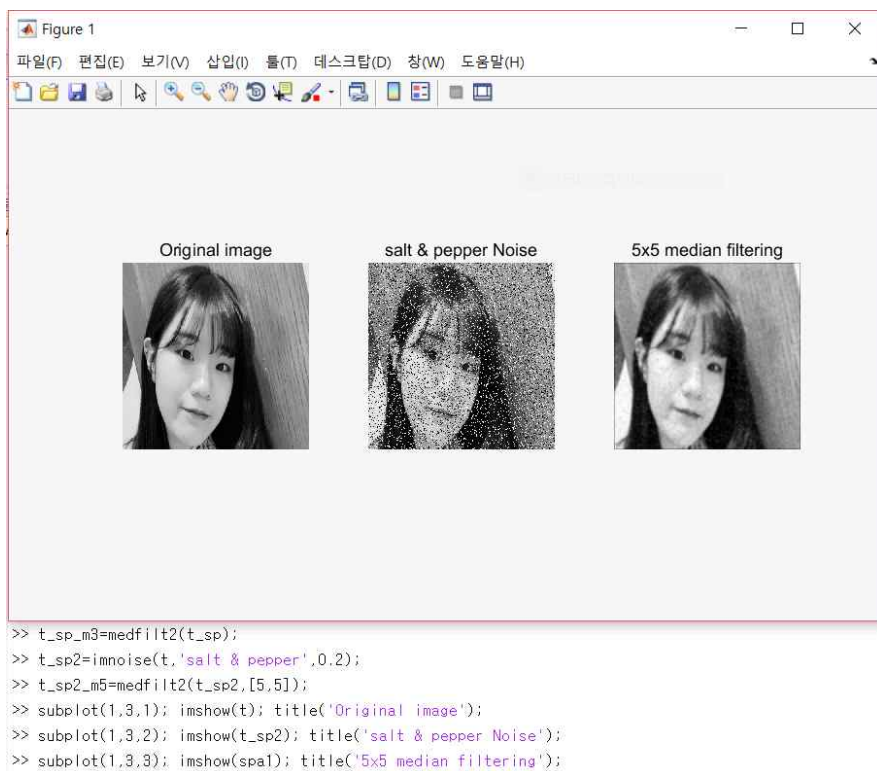
4, Periodic Noise



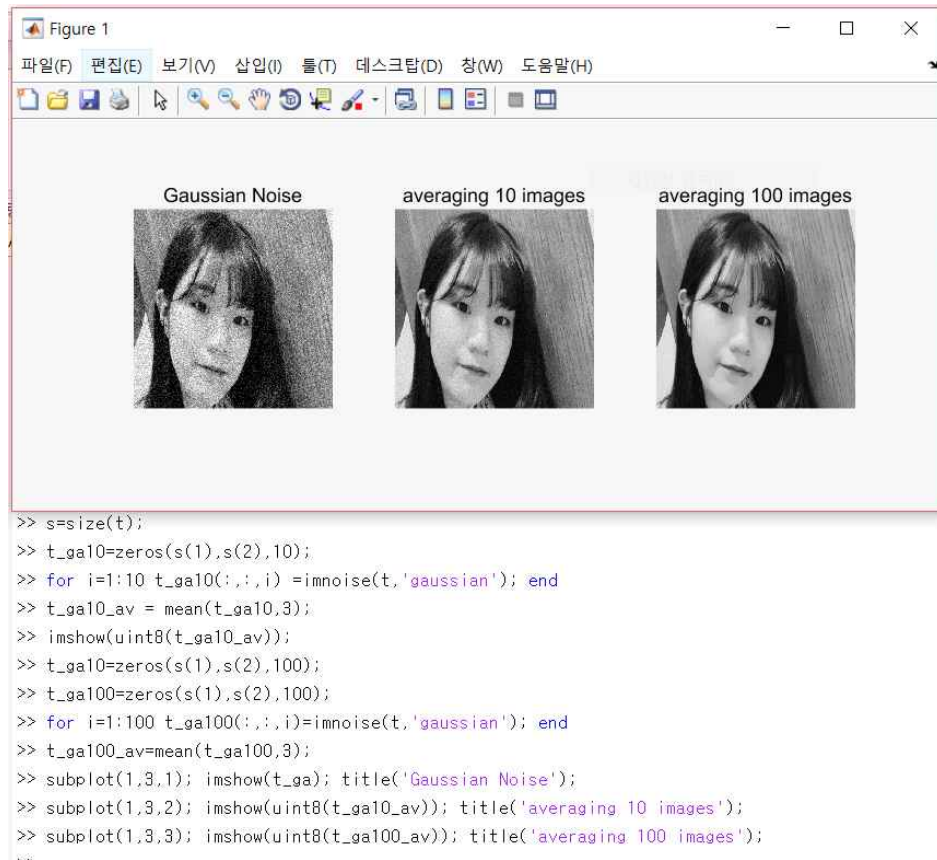
5, Low Pass Filtering



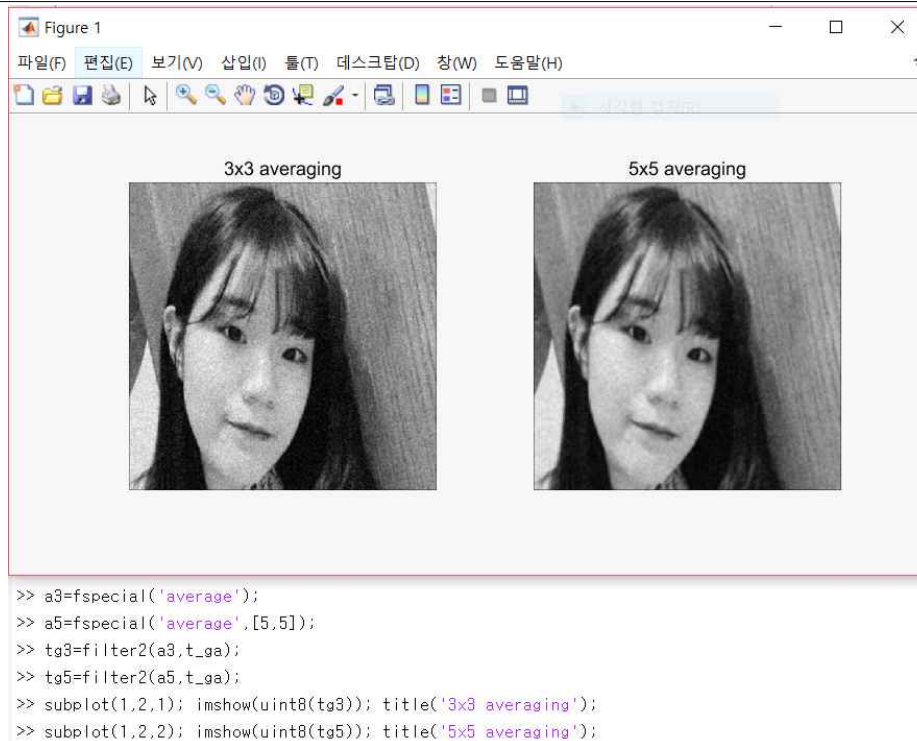
6, Median Filtering



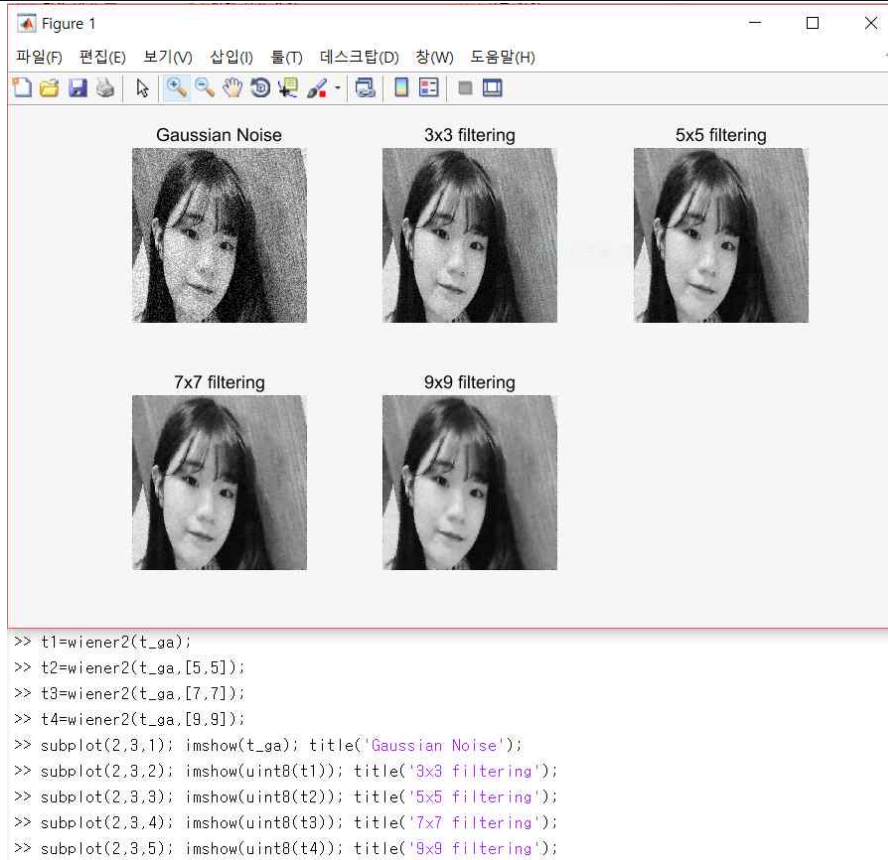
10. Image Averaging



11. Average Filtering



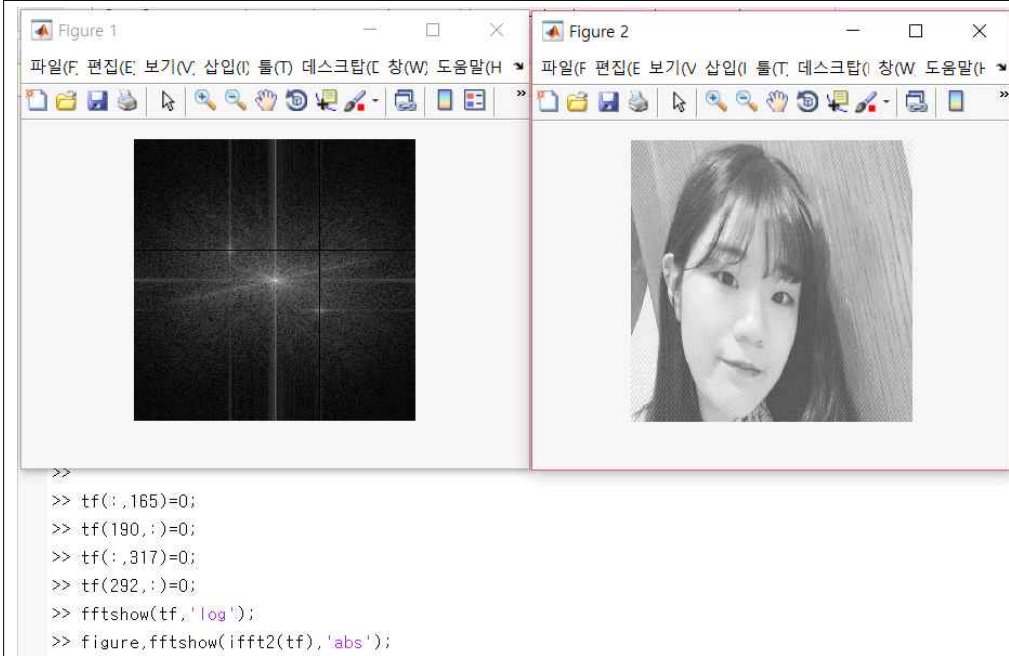
12, Adaptive Filtering



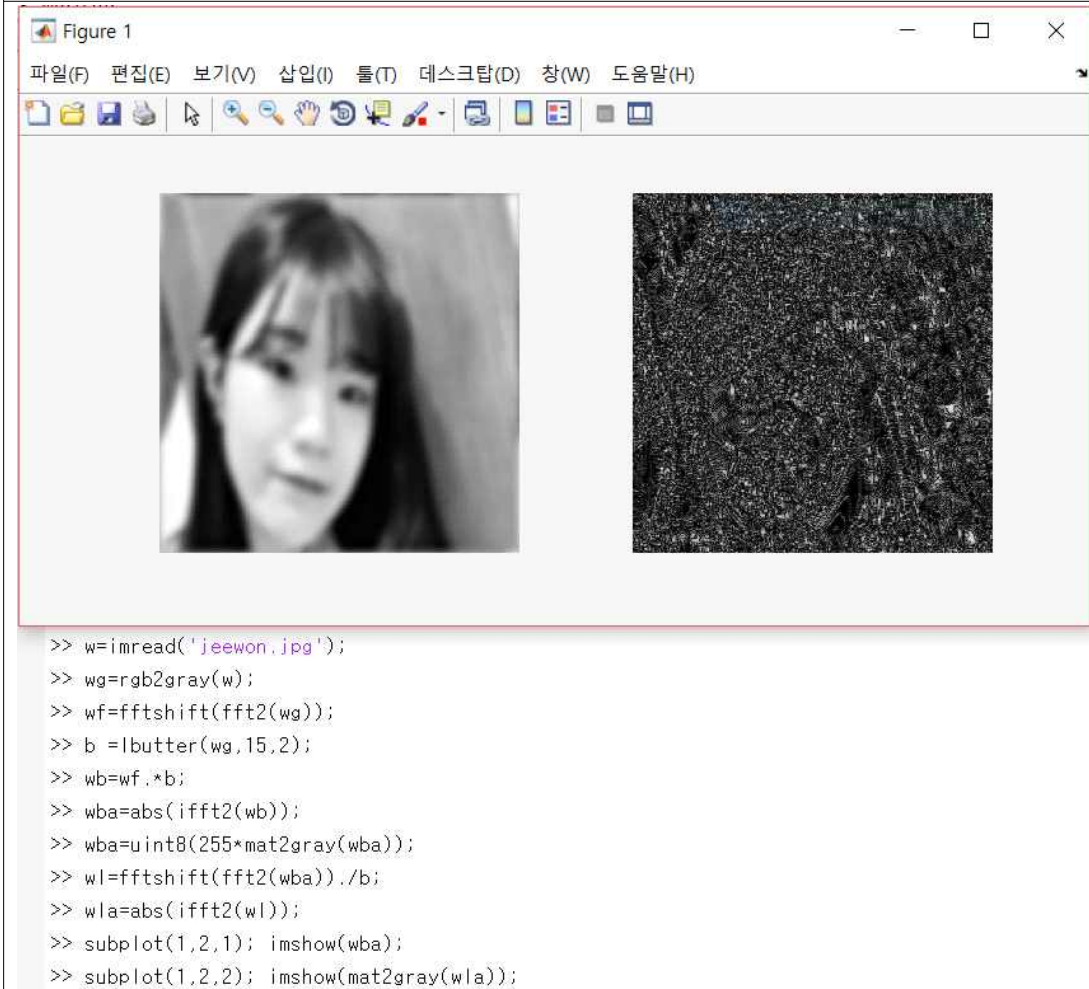
13, Band Reject Filtering



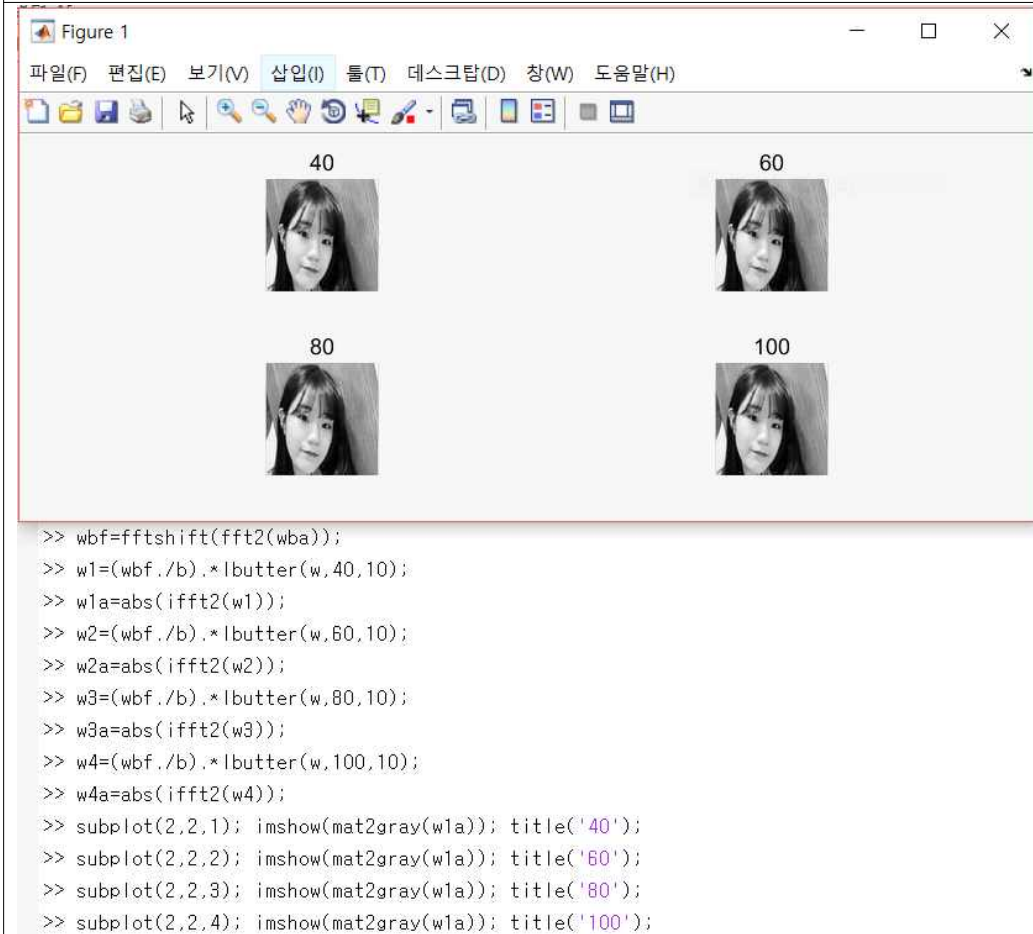
14, Notch Filtering



15, Inverse Filtering

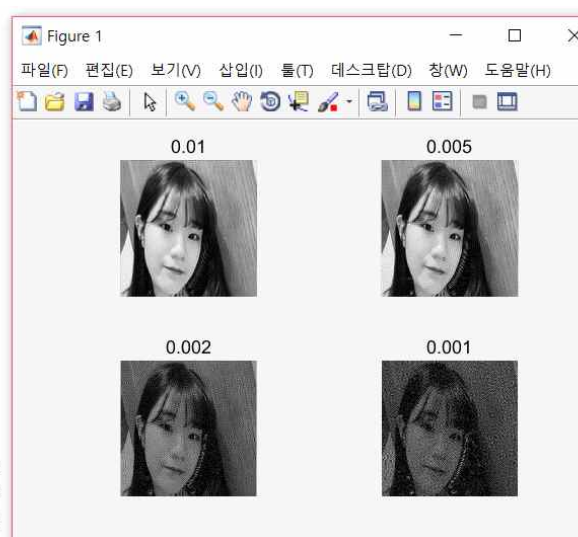


16, 버터워스 필터링



17, 역필터링 조건부

```
>> w1a=abs(ifft2(w1));
>> d=0.01;
>> b=lbutter(w,15,2); b(find(b<d)) = 1;
>> w1=fftshift(fft2(wba))./b;
>> w1a=abs(ifft2(w1));
>> d=0.005;
>> b=lbutter(w,15,2); b(find(b<d)) = 1;
>> w2=fftshift(fft2(wba))./b;
>> w2a=abs(ifft2(w2));
>> d=0.002;
>> b=lbutter(w,15,2); b(find(b<d)) = 1;
>> w3=fftshift(fft2(wba))./b;
>> w3a=abs(ifft2(w3));
>> d=0.001;
>> b=lbutter(w,15,2); b(find(b<d))=1;
>> w4a=abs(ifft2(w4));
>> subplot(2,2,1); imshow(mat2gray(w1a)); title('0.01');
>> subplot(2,2,2); imshow(mat2gray(w2a)); title('0.005');
>> subplot(2,2,3); imshow(mat2gray(w3a)); title('0.002');
>> subplot(2,2,4); imshow(mat2gray(w4a)); title('0.001');
```



18. 움직임에 의한 블러링 제거

