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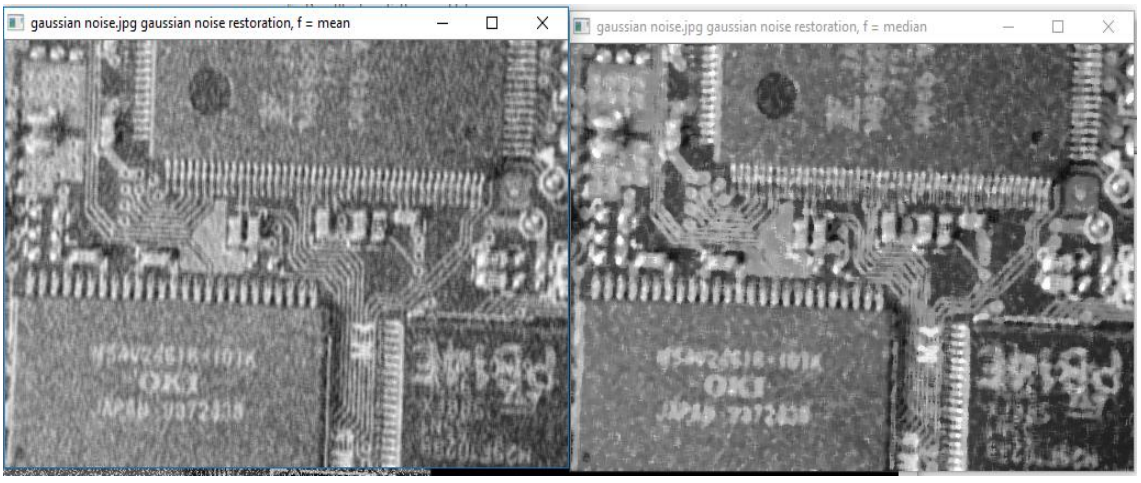
TUGAS

Simpan kode program fungsi outlier method beserta screenshot semua citra hasil restorasi. File disimpan dengan format LKP9_NIM_Kelas dalam file .pdf.

Domain spasial

1. Download citra salt and pepper noise, gaussian noise, dan speckle noise.jpg pada LM
2. Lakukanlah restorasi citra pada domain spasial menggunakan mean filter, dan median filter. (Boleh menggunakan fungsi OpenCV).
    - Restorasi citra boleh dilakukan beberapa kali secara berulang menggunakan filter dan ukuran yang sama hingga hasilnya bagus.
    - Tuliskan jumlah filtering dan ukuran filter yang digunakan.
    - Screenshot yang dilampirkan setiap tahap filtering dilakukan.
    - Lampirkan kode program bagian main saja.
        a. Gaussian noise
        Jumlah filtering =1
        Size = 3x3

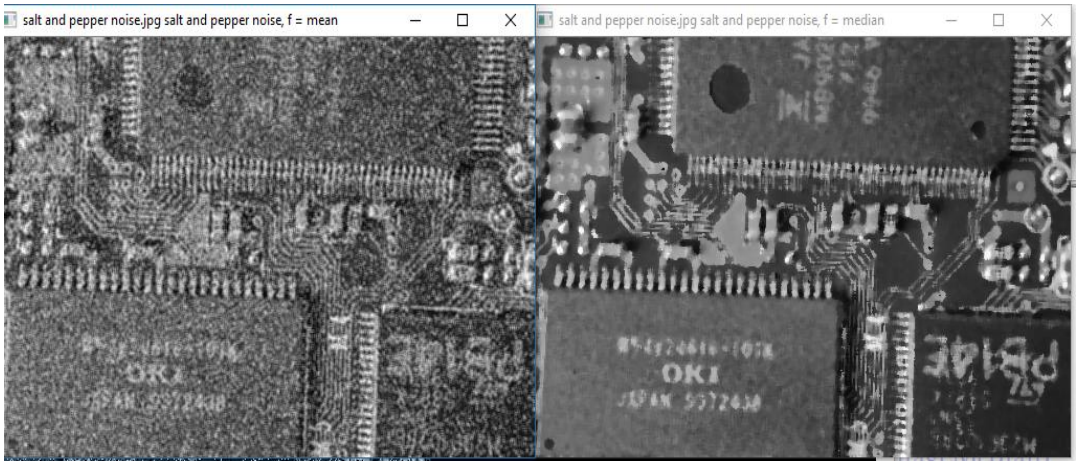


Hasil yang Didapatkan

```
int main(){
//------read image file----------------
 string filename = "gaussian noise.jpg";
 Mat original = imread(filename,0);
```

```
Mat gnImage;
Add_gaussian_noise(original, gnImage, 0, 30);
imshow(filename+" original", original);
imshow(filename+" gaussian noise", gnImage);

Mat gnImageMean;
Mat gnImageMedian;
blur(original, gnImageMean, Size( 3, 5 ), Point(-1,-1));
medianBlur(original, gnImageMedian, 5);
imshow(filename+" gaussian noise restoration, f = mean",gnImageMean);
imshow(filename+" gaussian noise restoration, f = median",gnImageMedian);

waitKey(0);
        return 0;
}
```

b. Salt and pepper noise
   Jumlah filtering= 1
   Size = 3x3

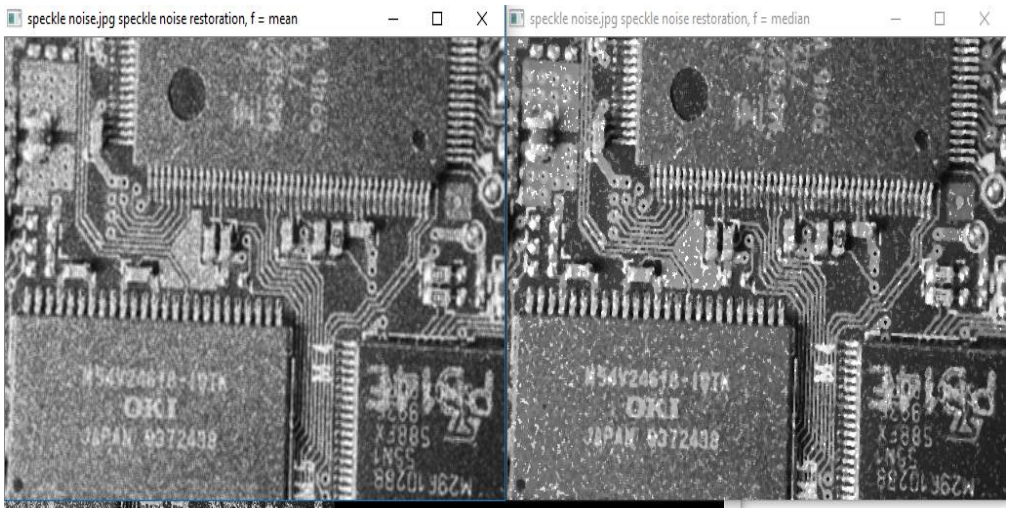


Hasil yang Didapatkan

```
int main(){
        //------read image file----------------
 string filename = "salt and pepper noise.jpg";
Mat original = imread(filename,0);
        //-------add salt and pepper noise------

 Mat snpImage;
 Add_salt_pepper_noise(original, snpImage, 1000);
```

```
 imshow(filename+" original", original);
 imshow(filename+" salt and pepper noise", snpImage);

Mat snpImageMean;
Mat snpImageMedian;
blur(snpImage, snpImageMean, Size( 3, 3 ), Point(-1,-1));
medianBlur(snpImage, snpImageMedian, 5);
imshow(filename+" salt and pepper noise, f = mean",snpImageMean);
imshow(filename+" salt and pepper noise, f = median",snpImageMedian);

          waitKey(0);
             return 0;
}
```

c. Speckle noise
   Jumlah filtering = 1
   Size = 3x3



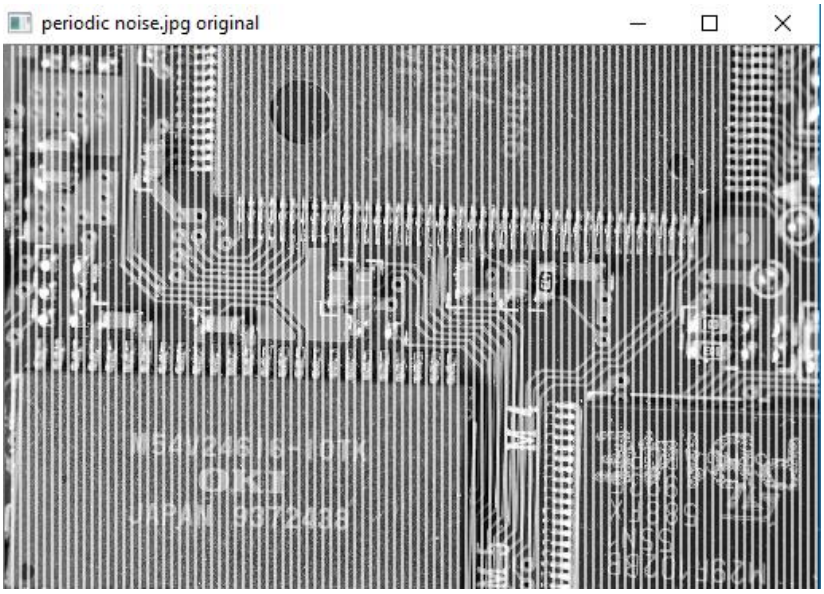
Hasil yang Didapatkan

```
int main(){
          //------read image file----------------
string filename = "speckle noise.jpg";
Mat original = imread(filename,0);
Mat spImage;
Add_speckle_noise(original, spImage, 0, 0.3);
imshow(filename+" original", original);
imshow(filename+" speckle noise", spImage);
```

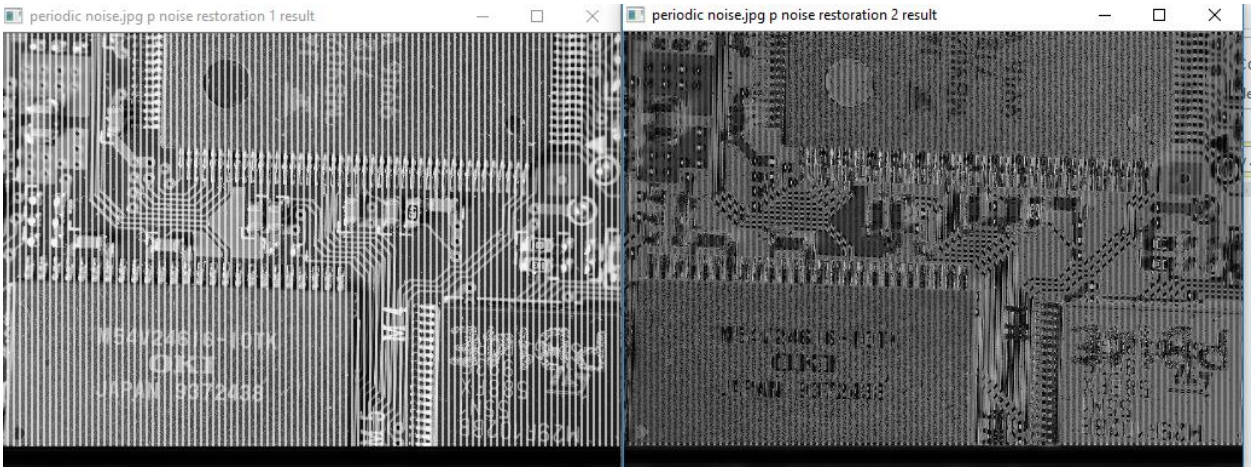
```
Mat spImageMean;
Mat spImageMedian;
blur(original, spImageMean, Size( 3, 3 ), Point(-1,-1));
medianBlur(original, spImageMedian, 3);

imshow(filename+" speckle noise restoration, f = mean",spImageMean);
imshow(filename+" speckle noise restoration,
f=median",spImageMedian);
                waitKey(0);
            return 0;
}
```

Domain frekuensi

1. Download citra periodic noise.jpg pada LMS
2. Lakukan restorasi citra pada periodic noise.jpg di domain frekeunsi menggunakan gaussian filter (Boleh menggunakan fungsi OpenCV)
3. Lampirkan kode program bagian main saja



Gambar Original



Gambar Hasil

```
int main(){
		//------read image file----------------
string filename = "periodic noise.jpg";
Mat original = imread(filename,0);
imshow(filename+" original", original);
		//-------Transform to frequency domain--------------
Mat complex = computeDFT(original);
		//-------Apply filter to periodic noise image-------
int kernel_size = 512;
filter_noise(complex, filename+" p noise restoration 1", 256,52, kernel_size);
filter_noise(complex, filename+" p noise restoration 2", 256,155, kernel_size);
			waitKey(0);
		return 0;
	}
```