DIP-Project: Fourier Transform

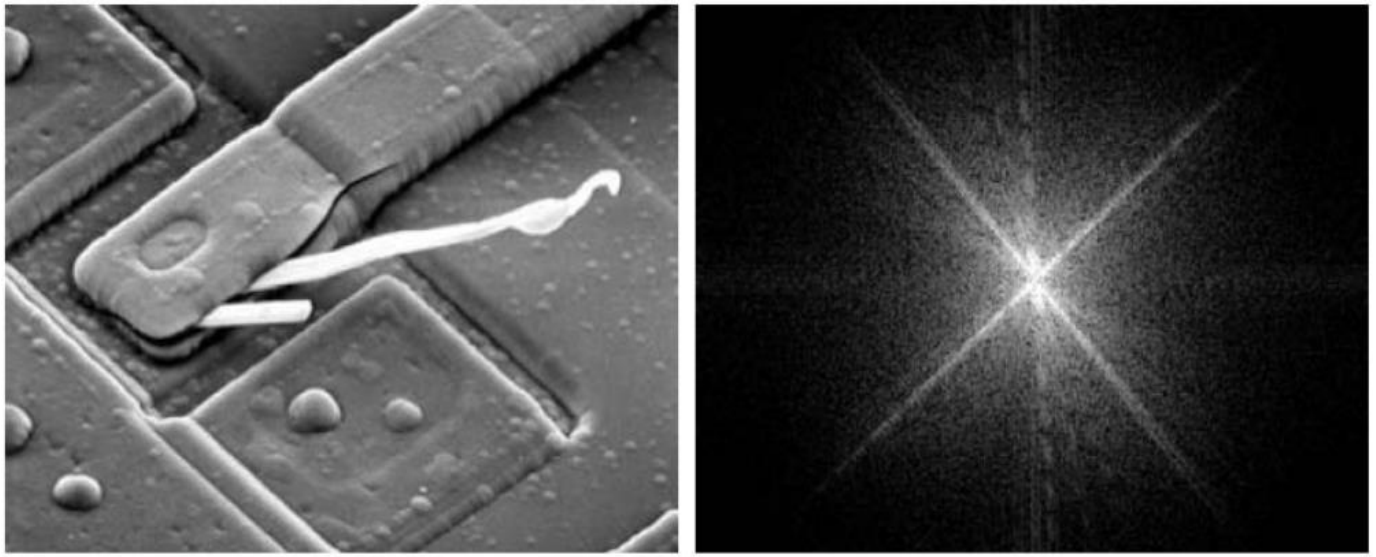
(for extra credit of 5%)

2021/06/04

Requirements

- **Deadline**: June 24 (Th.) 23:59
  - Code assignment (60%)
    - Implement DFT or FFT by using *numpy.fft* or *cv2.dft*.
    - The Fourier spectrums of the 4 given images should be as closed to results in textbook as possible.
  - Report (40%)
    - Write “Introduction (Goal)”, “Method(FT & Post-process)”, “Experimental Results”, and “Discussion”.
- Submit the code (.py) and report (.pdf) on E3
  - You just need to zip two files(.py and .pdf) and name it by DIP_studentID_name.zip, e.g., DIP_0886035_陳心怡.zip

Figure 4.28 (P. 261)

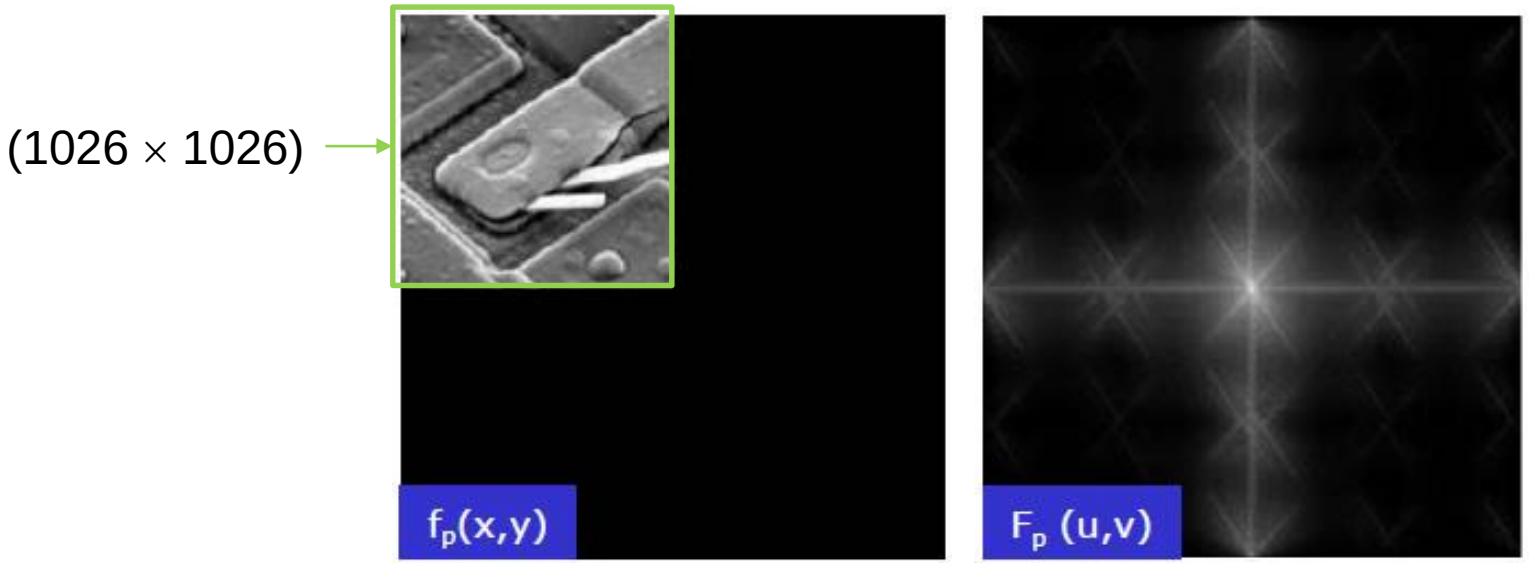


(a) Original image

(906 × 678)

(b) Fourier spectrum of (a)

Figure 4.35 (P. 268)

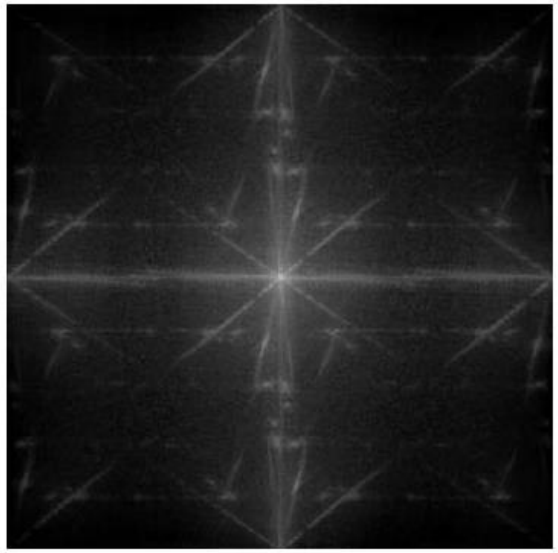


(a) Original image (b) Fourier spectrum of (a)

Figure 4.37 (P. 272)

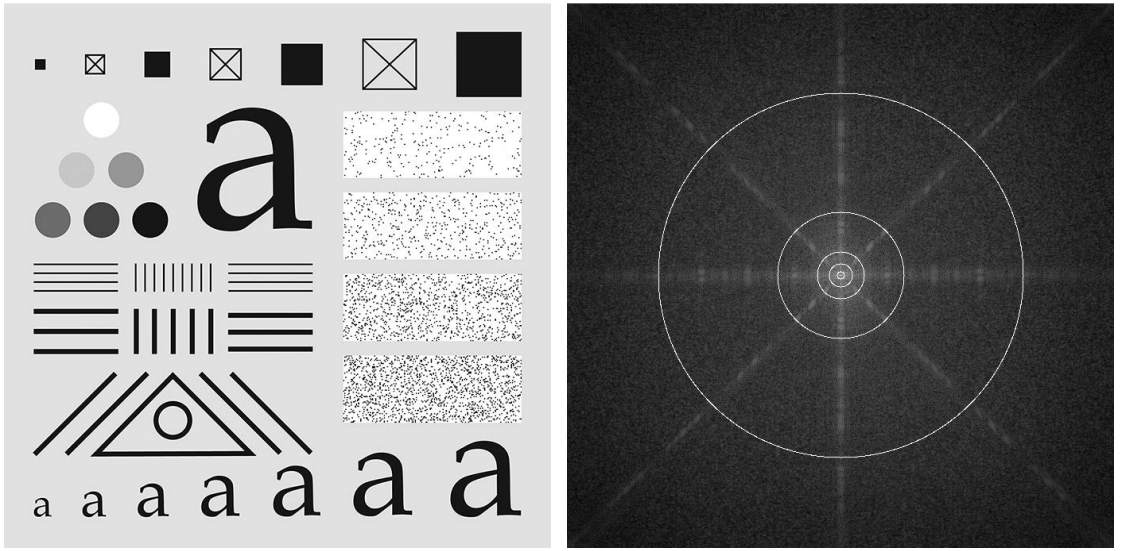
(a) Original image

(600 × 600)



(b) Fourier spectrum of (a)

Figure 4.40 (P. 275)



(a) Original image (688 × 688)

(b) Fourier spectrum* of (a)

* Circles are not parts of the spectrum

Hints

- For getting the most similar DFT/ FFT results, you should try some intensity transformations on magnitude.
  - Log Transformation
    - $s = c \cdot \log(1 + r)$, p.124
  - Power-Law (Gamma) Transformation
    - $s = c \cdot r^{\gamma}$, p.125
- If you have no idea how to code, please refer to the sample code.