

Embedment of coordinate information using digital watermarking

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Contents

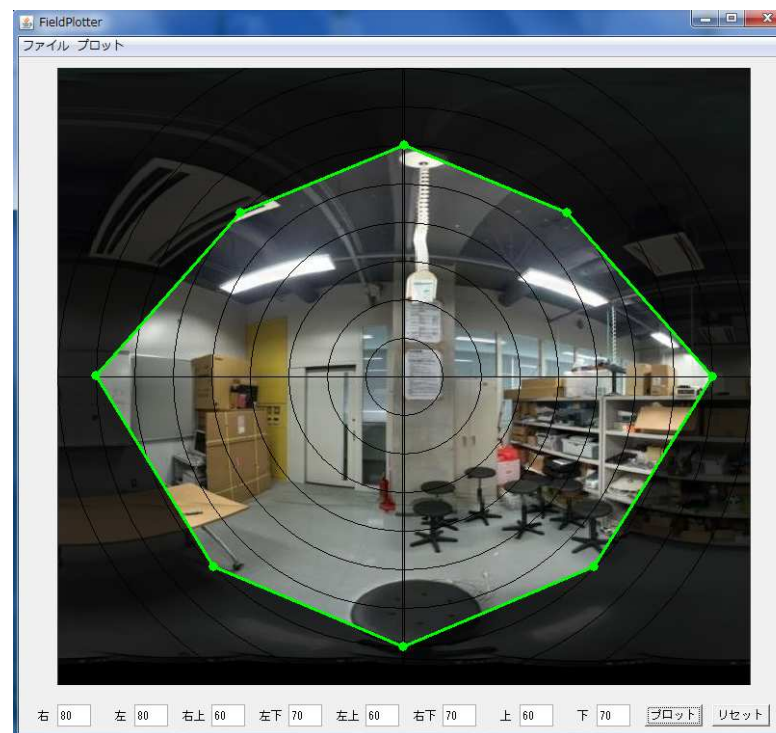
- About my study
- Digital watermarking
- Developed application

Developed measurement machine

My study : Development of easy field of vision measurement system

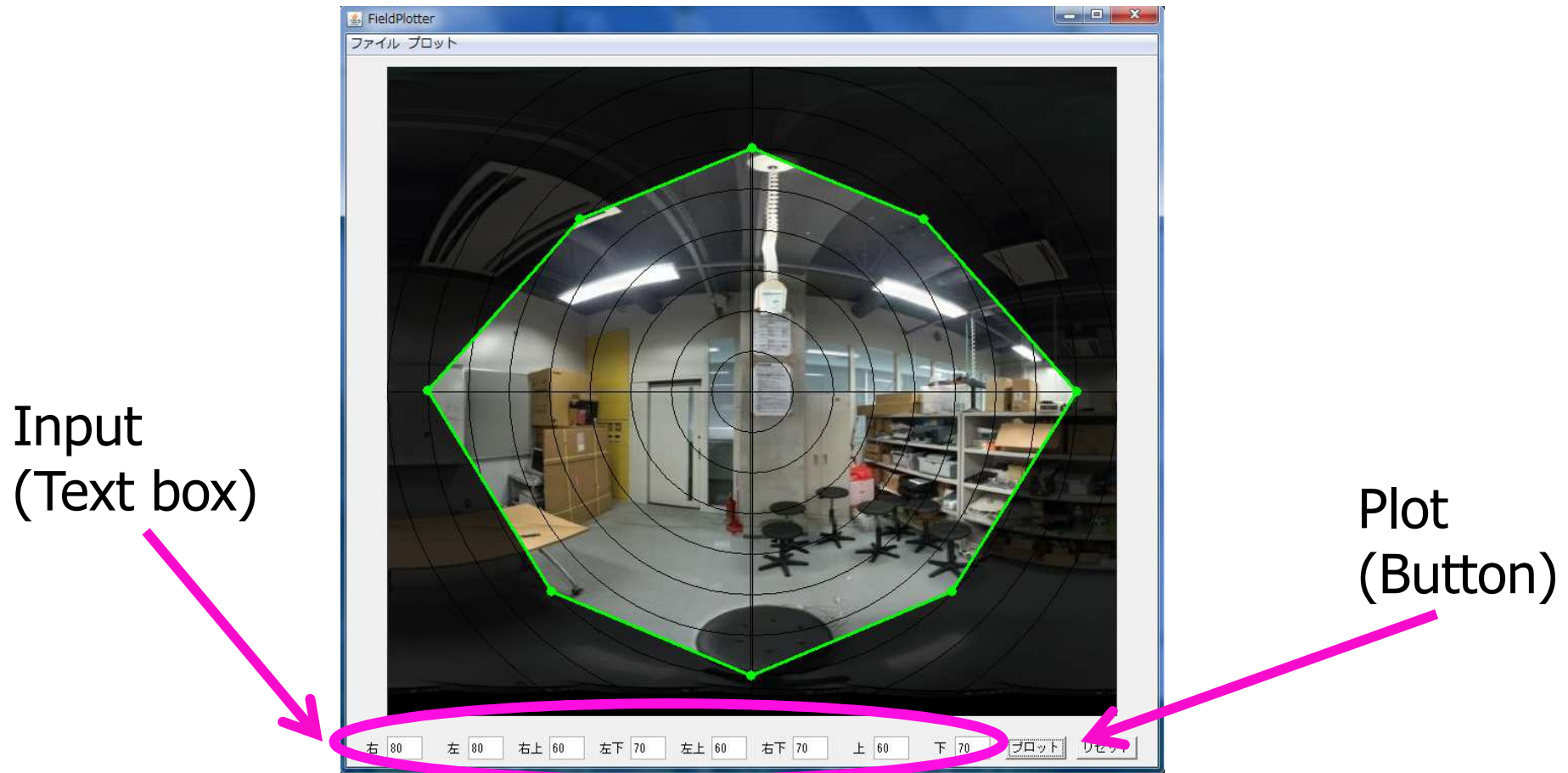


Developed measurement machine



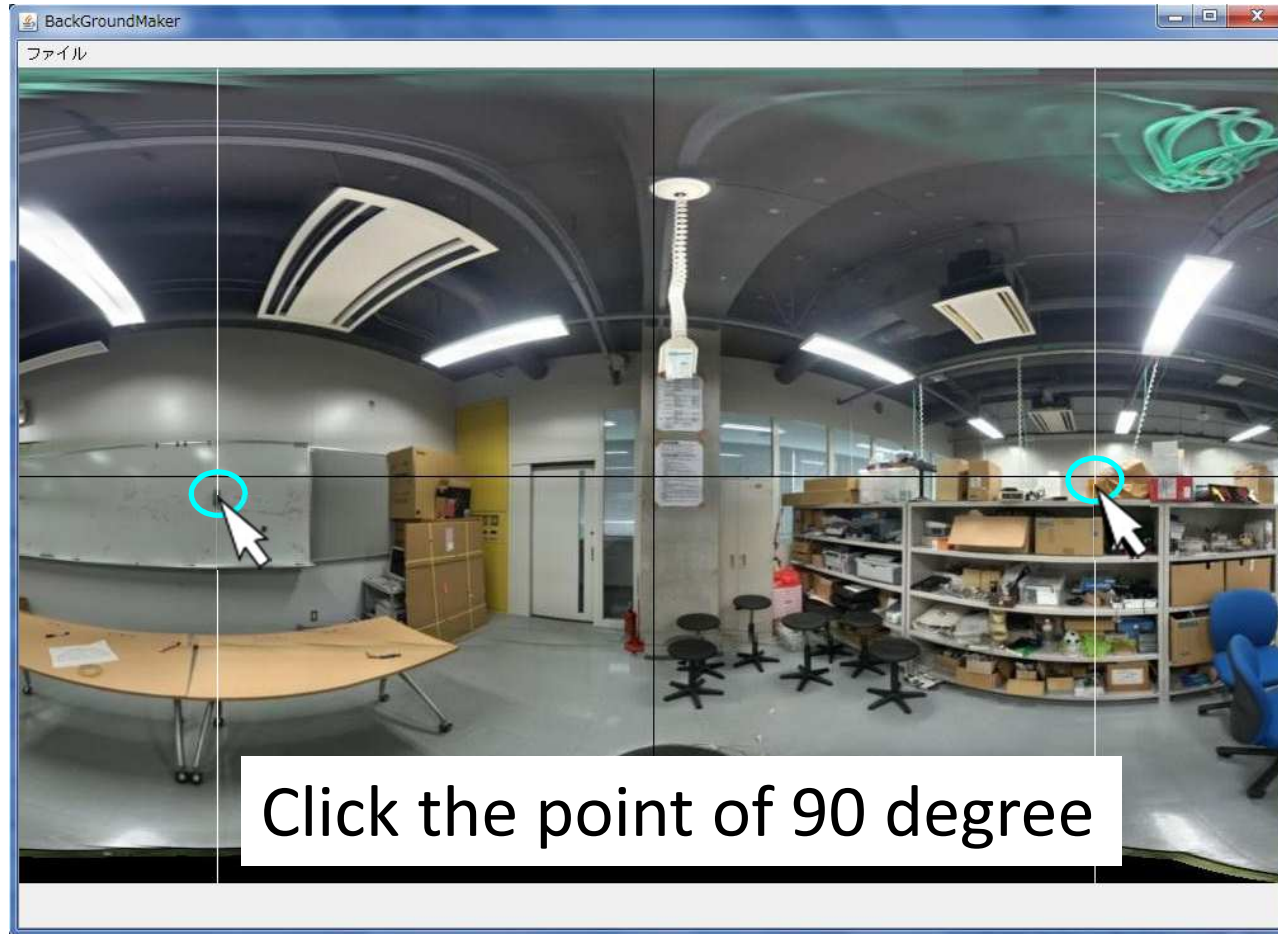
Measurement result

Result showing application



We show the teacher the image of a field of vision using this application.

Making background application

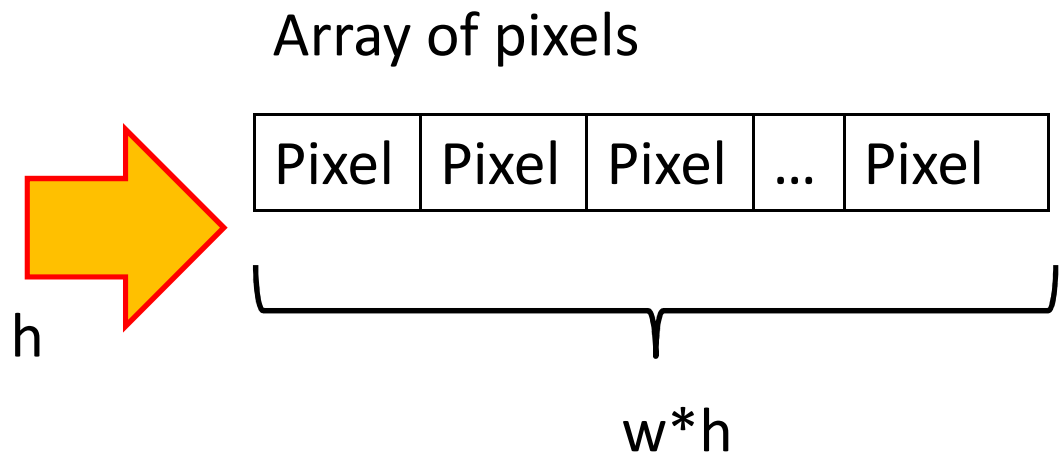


Algorithm of search 90 degree point

1. Load the pixels from an original picture.

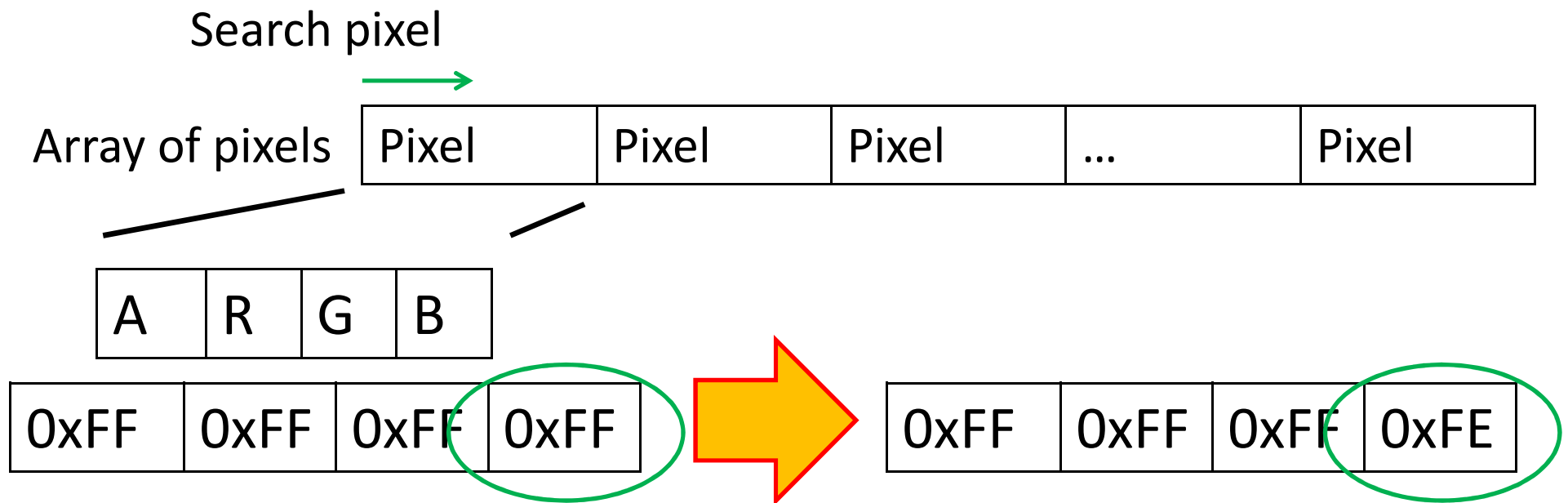


W



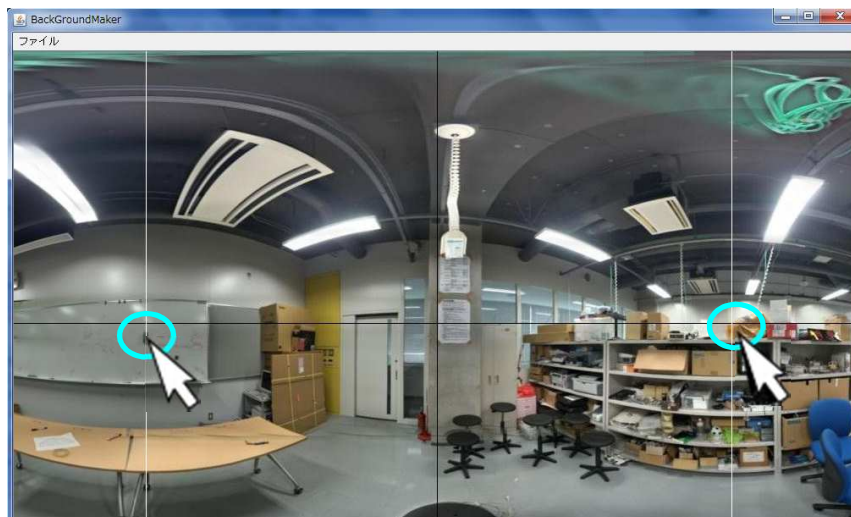
Algorithm of search 90 degree point

2. Search blue pixel which value is 0xFF.
3. If blue pixel value is 0xFF, change to 0xFE



Algorithm of search 90 degree point

4. Click the position of 90 degrees, coordinates will be recorded and it will be underlined with a line.
5. Save the picture.



Click the point of 90 degree

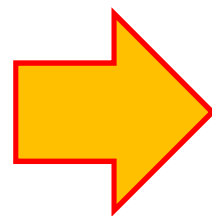
Algorithm of search 90 degree point

Behavior of result showing application

1. Load the pixels from picture.
2. Search the white pixel (0xFF).
3. If fined the white pixel, define the background picture width and show the background.



Search the white line



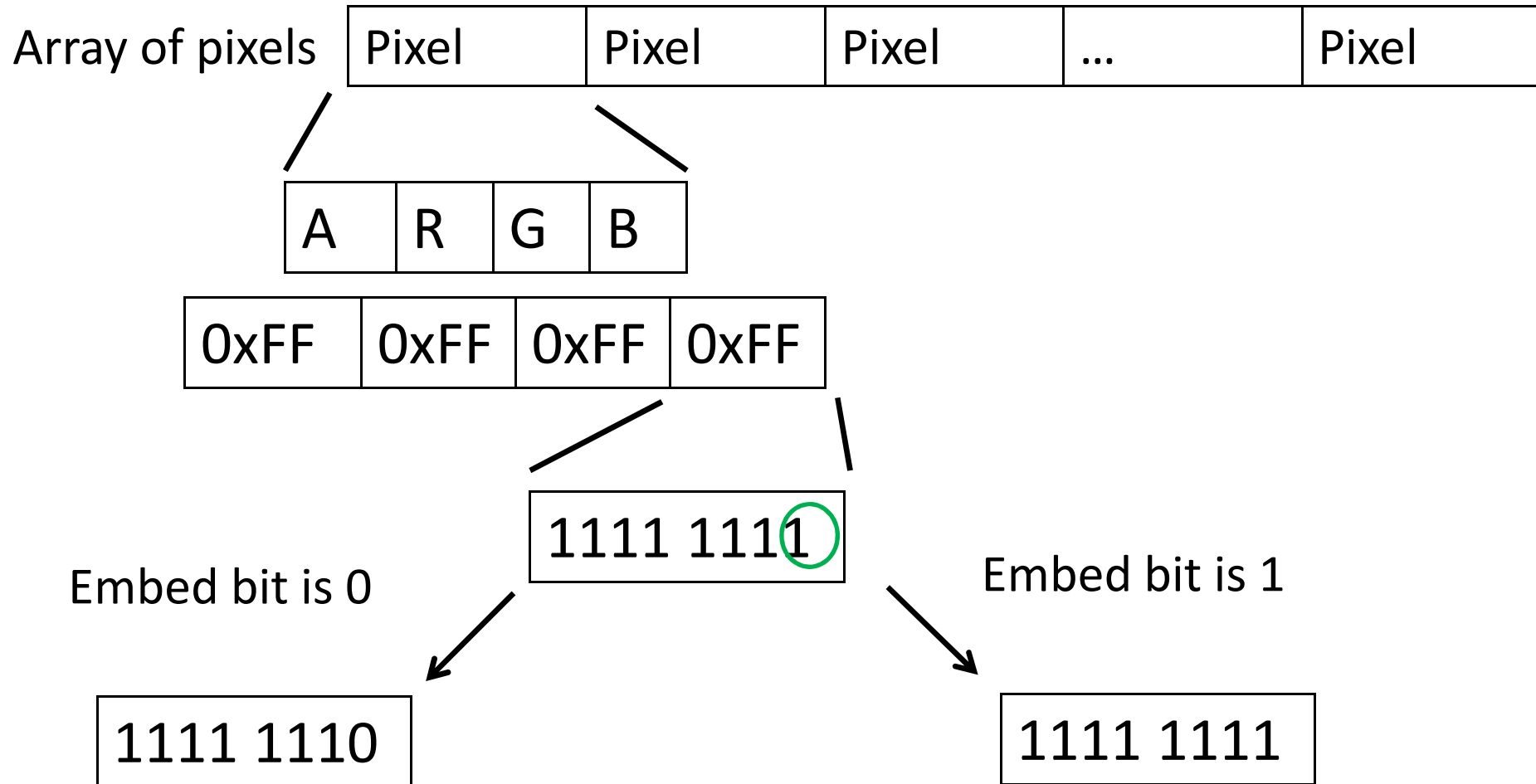
What is digital watermarking ?

- Digital watermarking is the technology which embeds a copyright holder's information, in order to protect digital contents from an illegal use.
- Invisible
- Inaudible

Method of digital watermarking

- Pixel replacement type
- Using frequency characteristic type
 - Discrete Cosine Transform(DCT)
 - Wavelet Transformation

Embed information at pixels

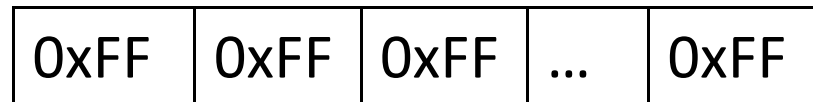


Embed information at pixels

When Embed 150 of a decimal number

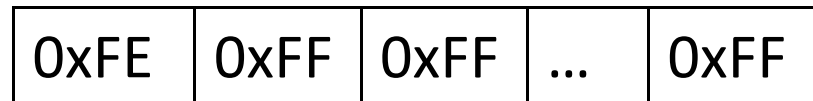
$$(150)_{10} = (10010110)_2$$

Before pixels' array



↓ Embed from lower bit to higher bit

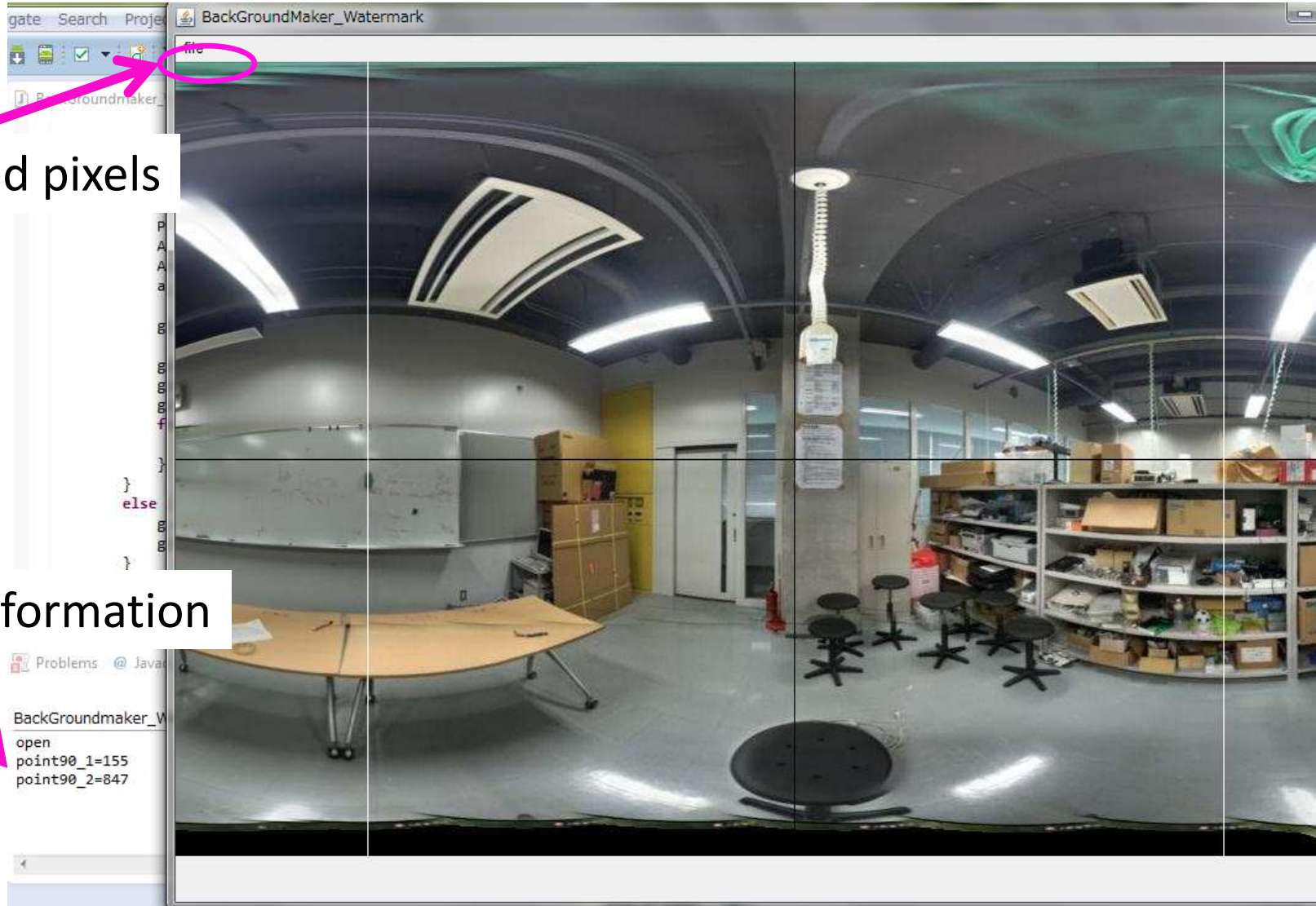
After pixels' array



Embedded bits

→ 0 1 1 0 ...

Execution result



Embedded pixels

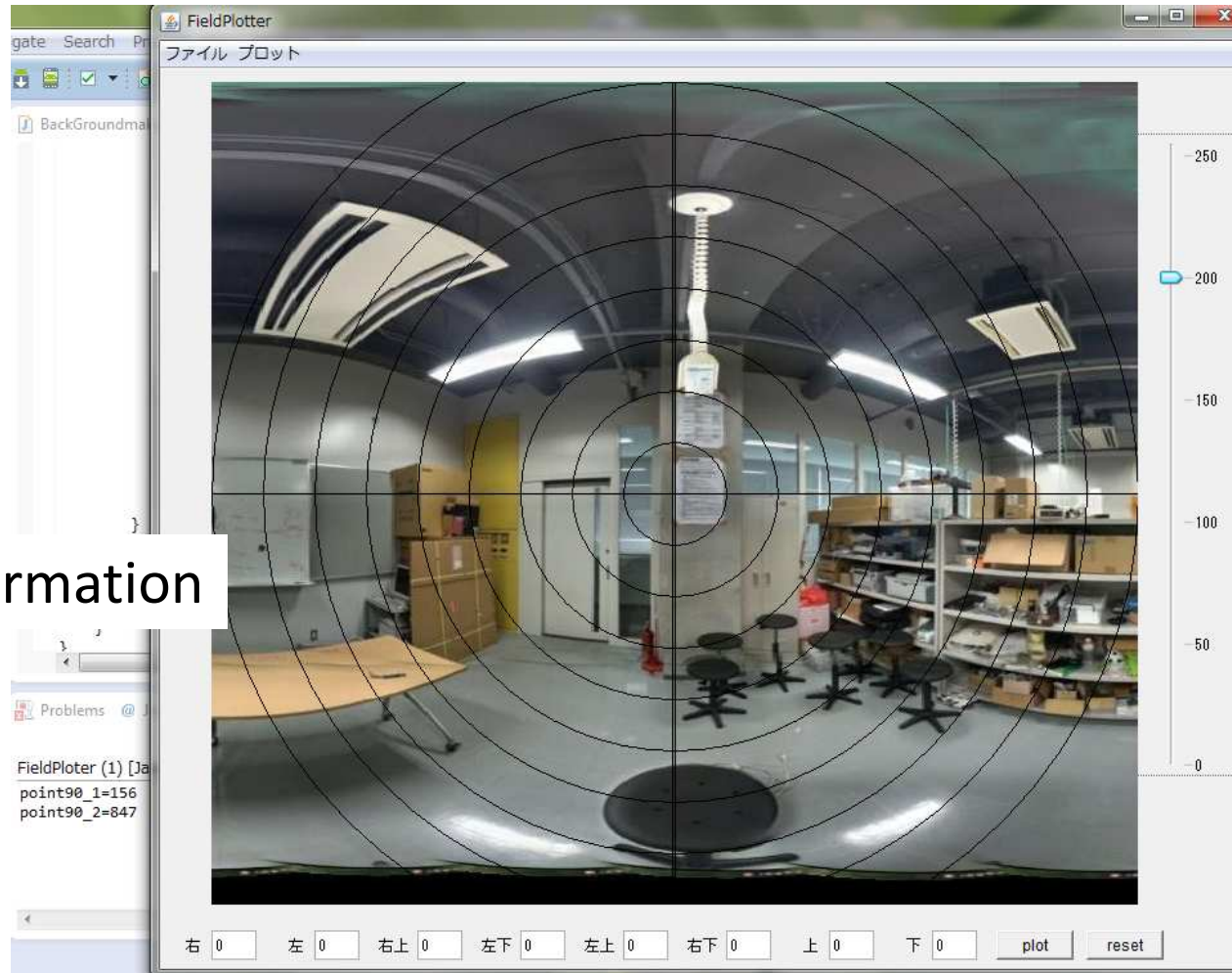
Embed information

Generated background picture



Load information from picture

Loaded information



Reference

- Tsukasa Ono, “Digital watermarking and contents protection”, Ohmsha, 2001.