Image Processing Workflow

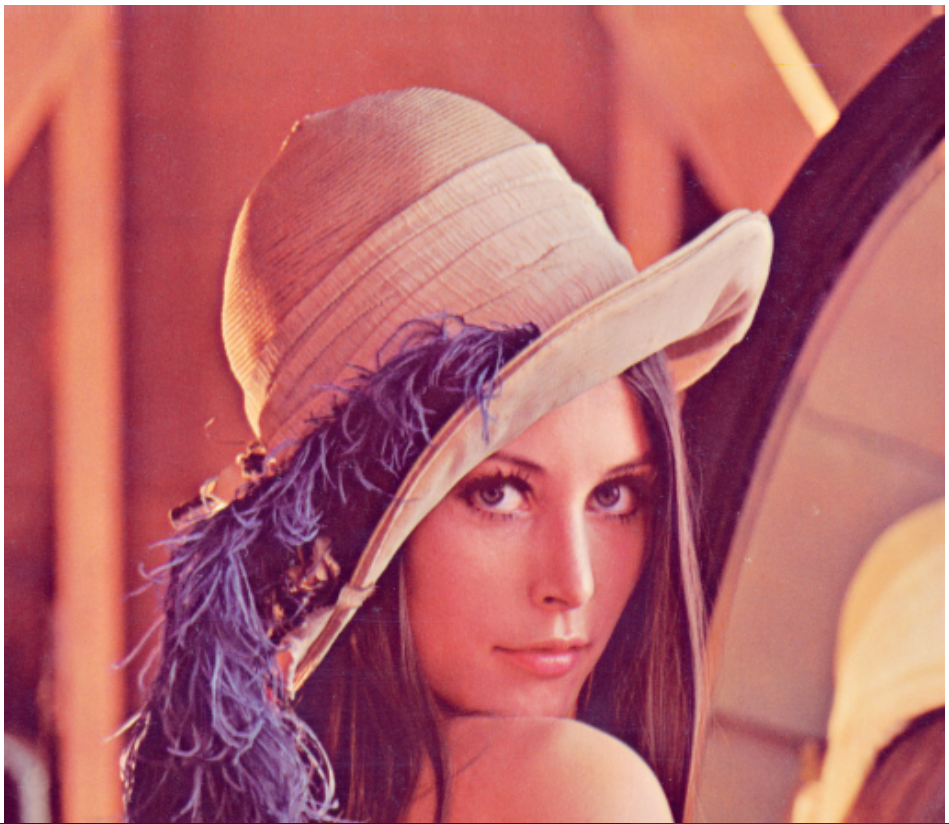
Your Name

August 5, 2025

1. Image Loading and Grayscale Conversion

Step Explanation

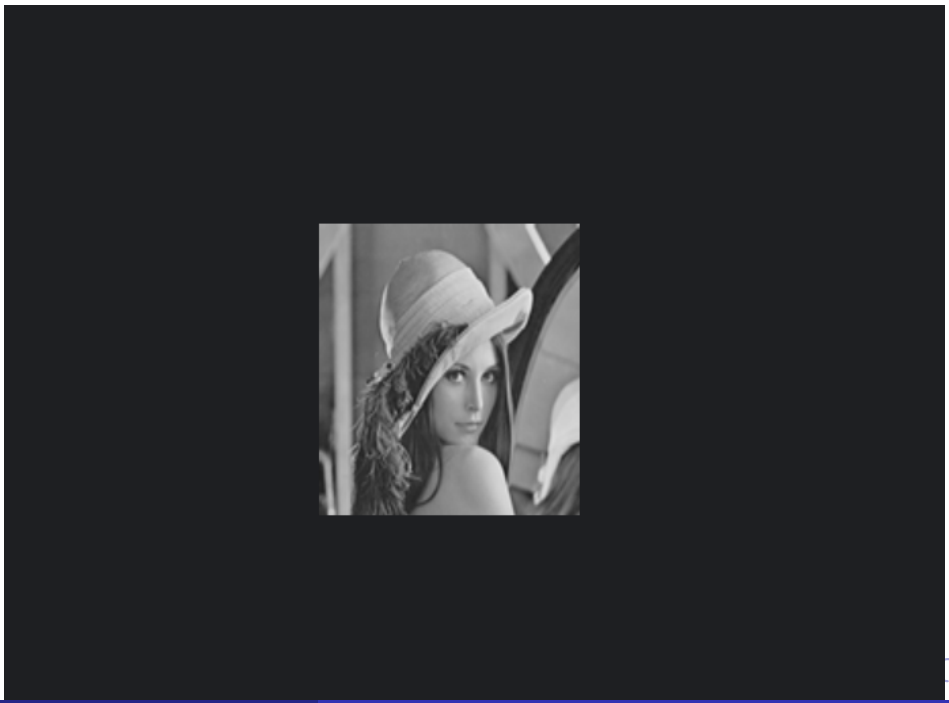
The image is loaded using a Python imaging library and converted to grayscale.
This reduces data complexity and focuses analysis on structural content.



2. Rescaling and 3. Centered Cropping

Rescaling with Aspect Ratio Preservation

The image is resized using high-fidelity interpolation to ensure one side reaches the target length (2^N), without distortion.
The resized image is cropped to $2^N \times 2^N$, ensuring input uniformity without compromising important visual features.



4. Matrix Output

Step Explanation

The final image is converted into a matrix format suitable for:

- Mathematical operations (e.g., wavelet transforms)
- Storage and machine learning integration

128	135	142
130	138	145
125	132	139

Example of 3x3 image matrix (simplified)

5. Convert Matrix Information into an Image

Concept

Each matrix element represents the gray value of a pixel. Using this matrix, we can reconstruct the grayscale image.

```
[[162 161 162 ... 117 165 167]
 [160 160 160 ... 127 130 101]
 [157 156 157 ... 105  53  40]
 ...
 [ 54  56  58 ...  57  52  61]
 [ 50  53  52 ...  57  70  88]
 [ 48  53  49 ...  67  93 103]]
矩阵形状：(128, 128)
图像尺寸：(128, 128)
```

Figure: Matrix Information

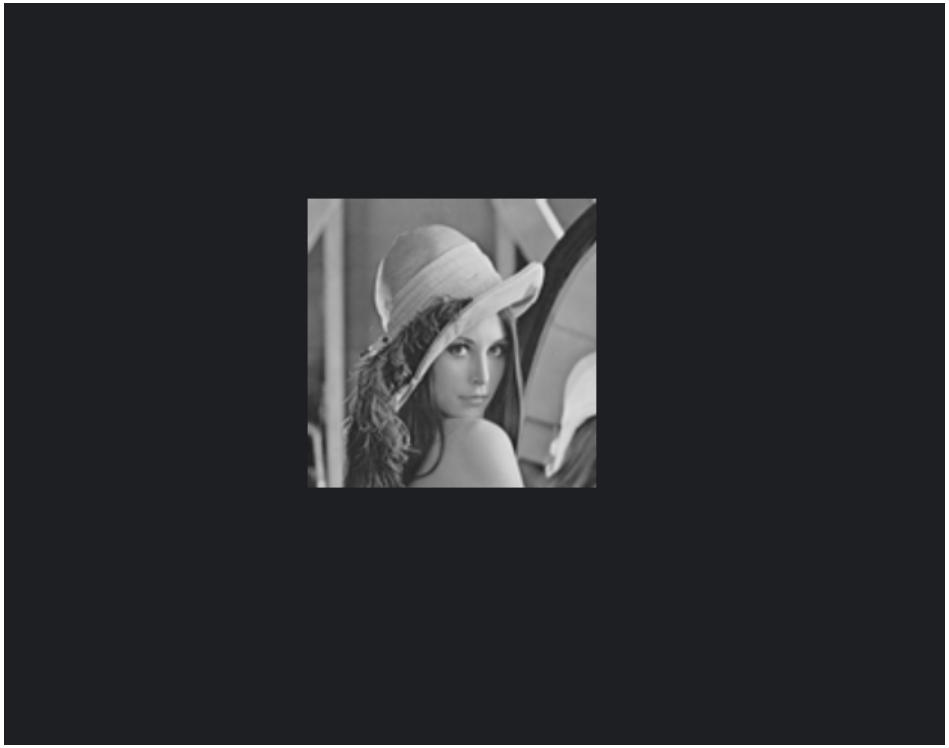


Figure: Reconstructed Image