Comparison of Image Processing Techniques

Blurring Techniques	Comparison				
	Blurring	**Noise Reduction**	**Edge Preservation**	**Artistic Effects**	**Sharpening**
1. Gaussian Blur	✔	✔			
2. Median Blur			✔		
3. Bilateral Filter		✔	✔		
4. Box Filter	✔	✔			
5. Motion Blur				✔	
6. Unsharp Mask					✔

Blurring Techniques

• **Gaussian blur** is often used to reduce noise and soften edges. It's a popular choice for general-purpose blurring.
• **Median blur** is particularly effective at removing salt-and-pepper noise (random black and white pixels). It preserves edges better than Gaussian blur.
• **Bilateral filter** is useful for preserving edges while reducing noise. It's a good choice for images with fine details.
• **Box filter** is a simple blurring technique that can smooth out noise. However, it can also blur edges.
• **Motion blur** can be used to create artistic effects or to simulate real-world motion.
• **Unsharp mask** is often used to enhance image details and make them appear sharper.

Edge Detection Techniques	Comparison			
	Sensitivity to Noise	**Edge Thinness**	**Edge Continuity**	**Computational Efficiency**
1. Sobel Edge Detection	✔		✔	
2. Laplacian Edge Detection			✔	
3. Prewitt Edge Detection	✔		✔	✔

4. Canny Edge Detection		✔	✔	

Edge Detection Techniques

- **Sobel edge detection** is a simple and computationally efficient method. It's sensitive to noise and can produce double edges.
- **Laplacian edge detection** is less noise-sensitive than Sobel edge detection but can be more susceptible to noise. It may also produce multiple edges for a single edge.
- **Prewitt edge detection** is also a simple and computationally efficient method. It's like Sobel edge detection in terms of sensitivity to noise and the potential for double edges.
- **Canny edge detection** is considered one of the most robust edge detection algorithms. It's less sensitive to noise than Sobel and Laplacian, and it can produce thin, continuous edges.