Marwadi University	**Marwari University** **Faculty of Technology** **Department of Information and Communication Technology**	
Subject: Digital Signal and Image Processing(01CT0513)	**Aim:** Apply non-linear filters on images and investigate its application in noise-removal.	
Experiment No: 09	**Date:**	**Enrollment No: 92200133030**

Aim: Apply non-linear filters on images and investigate its application in noise-removal.

Theory:-

- Non-linear filters are image processing techniques used for noise removal by considering the local neighborhood of each pixel. Unlike linear filters, non-linear filters modify pixel values based on their relationship with neighboring pixels, allowing them to effectively suppress different types of noise.

Programm:-

```
import cv2
import numpy as np

# Load the noisy image
noisy_image = cv2.imread("./Images.jpg", 0)  # Load as grayscale
if noisy_image is None:
    raise FileNotFoundError(
        "The image './Images.jpg' could not be loaded. Check the file path."
    )

# Apply a median filter to remove noise
filtered_image = cv2.medianBlur(noisy_image, 5)  # 5x5 neighborhood window size

# Save the filtered image
cv2.imwrite("filtered_image.jpg", filtered_image)

# Wait for a key press and then close the windows
cv2.waitKey(0)
cv2.destroyAllWindows()

print("Filtered image saved as 'filtered_image.jpg'")
```

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Output:-

Original Image	Non Linear Image