Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
Hingna Road, Wanadongri, Nagpur - 441 110
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Department of Computer Technology

Vision of the Department

To be a well-known centre for pursuing computer education through innovative pedagogy, value-based education and industry collaboration.

Mission of the Department

To establish learning ambience for ushering in computer engineering professionals in core and multidisciplinary area by developing Problem-solving skills through emerging technologies.

Session 2025-2026

Vision: Dream of where you want.	**Mission:** Means to achieve Vision

Program Educational Objectives of the program (PEO): (broad statements that describe the professional and career accomplishments)

PEO1	**Preparation**	**P: Preparation**	**Pep-CL abbreviation pronounce as Pep-si-lL easy to recall**
PEO2	**Core Competence**	**E: Environment (Learning Environment)**	
PEO3	**Breadth**	**P: Professionalism**	
PEO4	**Professionalism**	**C: Core Competence**	
PEO5	**Learning Environment**	**L: Breadth (Learning in diverse areas)**	

Program Outcomes (PO): (statements that describe what a student should be able to do and know by the end of a program)

Keywords of POs:
Engineering knowledge, Problem analysis, Design/development of solutions, Conduct Investigations of Complex Problems, Engineering Tool Usage, The Engineer and The World, Ethics, Individual and Collaborative Team work, Communication, Project Management and Finance, Life-Long Learning

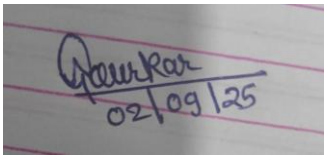
PSO Keywords: Cutting edge technologies, Research

"I am an engineer, and I know how to apply engineering knowledge to investigate, analyse and design solutions to complex problems using tools for entire world following all ethics in a collaborative way with proper management skills throughout my life." *to contribute to the development of cutting-edge technologies and Research*.

Integrity: I will adhere to the Laboratory Code of Conduct and ethics in its entirety.

Name and Signature of Student and Date
(Signature and Date in Handwritten)

Nikhil Gourkar



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Session	2025-26 (ODD)	Course Name	Computer vision Lab
Semester	5	Course Code	CT
Roll No	59	Name of Student	Nikhil Gourkar

Practical Number	**2**
Course Outcome	**Upon successful completion of the course the students will be able to** 1. Apply image enhancement and smoothing techniques to improve image quality for further analysis. 2. Extract meaningful features from images using descriptors such as HOG and SIFT. 3. Implement and evaluate modern object detection methods including YOLO and R-CNN. 4. Analyze and develop solutions for motion estimation, object recognition, and facial expression recognition using classical and learning-based methods.
Aim	Write a program to apply convolution process on an input image for image smoothing
Problem Definition	Use Matlab and Google colab for doing image soothing using Guassian filter and Average filter.
Theory (100 words)	**Filters for image smoothing.** The averaging filter is a simple smoothing technique where each pixel value is replaced by the mean of its neighbors. For example, a 3×3 averaging filter (ones(3,3)/9) assigns equal weight (1/9) to all surrounding pixels, resulting in uniform blurring and noise reduction, though edges may become less sharp. In contrast, the Gaussian filter uses a weighted average based on the Gaussian distribution (fspecial('gaussian',[5 5],1.5)), where central pixels are given higher importance than distant ones. This produces a smoother and more natural blur, effectively reducing noise while preserving edges better than the averaging filter.
Procedure and Execution (100 Words)	Algorithm: • Start • Read the input image. • Convert it to grayscale and double format. • Define a 3×3 averaging filter and apply convolution. • Define a 5×5 Gaussian filter with σ = 1.5 and apply convolution. • Normalize both filtered results for display. • Display Original, Averaging Filter, and Gaussian Filter outputs side by side. • End

```
clear;
close all;
clc;
original_image_rgb = imread('greens.jpg');
original_image_gray = rgb2gray(original_image_rgb);
original_image_double double (original_image_gray);
averaging_filter = ones (3, 3) / 9;
smoothed_image_avg = conv2(original_image_double,
averaging_filter, 'same');
gaussian_filter = fspecial('gaussian', [55], 8);
smoothed_image_gaussian = conv2(original_image_double,
gaussian_filter, 'same');
smoothed_image_avg_norm = mat2gray (smoothed_image_avg);
smoothed_image_gaussian_norm = mat2gray
(smoothed_image_gaussian);
figure;
subplot(1, 3, 1);
imshow(original_image_gray);
title('Original Grayscale Image');
subplot(1, 3, 2);
imshow(smoothed_image_avg_norm);
title('Smoothed with Averaging Filter (conv2)');
subplot(1, 3, 3);
imshow(smoothed_image_gaussian_norm);
title('Smoothed with Gaussian Filter (conv2)');
```

Output:

Output Analysis	The results clearly show the effect of both filters on the image. The **Averaging filter** produces a uniformly blurred image where all pixels in the neighborhood contribute equally, leading to loss of sharpness but still retaining basic structures. On the other hand, the **Gaussian filter** provides a smoother and more natural blur because it assigns higher weights to central pixels and lower weights to those farther away.
Link of student Github profile where lab assignment has	https://github.com/Nikhil07Gourkar/CV_Lab

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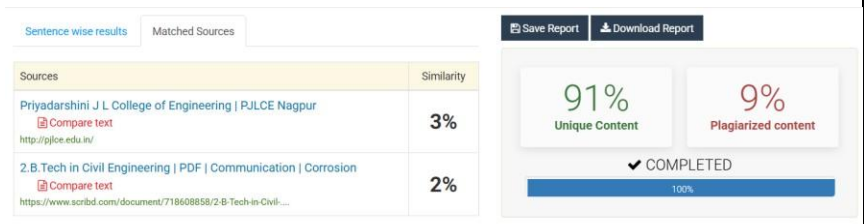
been uploaded	
Conclusion	Both filters reduce noise, but their effects differ. The Averaging filter is simple and effective for basic smoothing, though it reduces image details. The Gaussian filter provides smoother results with less distortion, making it more suitable for practical image processing applications.
Plag Report (Similarity index < 12%)	
Date	02/09/25