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## NagarYuwakShikshanSanstha's

### YeshwantraoChavanCollegeofEngineering



(AnAutonomousInstitutionaffiliatedtoRashtrasantTukadojiMaharajNagpurUniversity)
HingnaRoad,Wanadongri,Nagpur

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DepartmentofComputerTech	inology
Vision of the Department	
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	Mission of the Department

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#### Session 2025-2026

Vision: Dreamofwhereyouwant.	Mission: MeanstoachieveVision

**Program Educational Objectives of the program(PEO)**:(broadstatementsthatdescribethe professional and career accomplishments)

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

**Program Outcomes (PO)**:(statementsthatdescribewhatastudentshouldbeabletodoandknowbytheend of a program)

### Keywords of POs:

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Engineeringknowledge, Problemanalysis, Design/developmentofsolutions, ConductInvestigations of Comple x 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 complexproblemsusing tools for entire world following all ethics in a collaborative way with proper management

killsthroughoutmylife."

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istand Reseatch

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

Siddhesh Pitale 03/09/25

Name and Signature of Student and Date

(SignatureandDateinHandwritten)



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Session	2025-26 (ODD)	Course Name	Computer visionLab
Semester	5	Course Code	23CT1522
Roll No	73	Name of Student	Siddhesh Pitale

PracticalNumber	Practical2	
CourseOutcome	Apply image enhancement and smoothing techniques to improve image quality forfurtheranalysis.	
Aim	Write a Program to apply convolution processes on an input image for imagesmoothing.	
ProblemDefinition		
Theory (100words)	FILTERSUSEDFORIMAGESMOTHING Average(ormean)andGaussianfiltersareusedforimagesmoothingand noisereduction,buttheydifferinhowtheyachievethis. Averagefiltersapplyasimpleaveragingofpixelvalueswithinakernel. Gaussianfiltersuse aweighted average where the center pixelhasthehighestweight,decreasingwithdistance. ThisleadstoGaussianfiltersbetterpreservingimagedetailslikeedgesandc ornerscomparedtoaveragefilters.  averaging_filter=ones(3,3)/9; Thiscreatesa3x3averagingfilter.Eachelementinthefilteris1/9,meaningeachpixe the 3x3 neighborhood will contribute equally to the smoothed or pixel.gaussian_filter=fspecial('gaussian',[55],1.5); This uses the fspecial function to create a 5x5 Gaussian filter with a standard deviation (sigma) of 1.5. Gaussian filters are commonly used for smoothing as provide a weighted average, giving more importance to central pixels.	
Procedureand	Algorithm:	
Execution	1. Start	
(100Words)	Readinputimage     Converting rays calcifroguized	
(100Words)	<ul><li>3. Converttograyscaleifrequired</li><li>4. Defineconvolutionfilter(average/Gaussian)</li></ul>	
	5. Applyconvolutionusingimfilter	
	<ul><li>6. Displayoriginalandfilteredimages</li><li>7. Stop</li></ul>	



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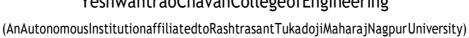


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	Code: clc;clear ;closeall; img=imread('saturn.png'); img = im2double(img); gray_img = rgb2gray(img)average_filter = ones(3, 3) / 9; gaussian_filter = fspecial('gaussian', [5, 5], 1.5); smoothed_avg = imfilter(gray_img, average_filter);smoothed_gaussian = imfilter(gray_img, gaussian_filter); figure;
	subplot(1,3,1)imsho w(gray_img); title('Original Image');subplot(1,3,2),imsho w(smoothed_avg),title('Smoo thed (Average)');subplot(1,3,3),im show(smoothed_gaussian),title(' Smoothed (Gaussian)');
Output Analysis	Original Image Smoothed (Average) Smoothed (Gaussian)
OutputAnalysis	Theaveragefilterreducesrandomnoisebutalsocausesblurringatedges.  TheGaussianfilterprovidesbettersmoothingbygivingmoreweighttocentralpixels, hencep reservingedgesmoreeffectively.  Both methods show significant reduction of noise, but Gaussian is more visuallypleasing.
LinkofstudentGithubp rofilewherelabassig nment has	https://github.com/Siddheshpitale/Computer-Vision-



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Conclusion	Convolution with smoothing filters is an essential image processing technique. The average filterperformssimplenoisereduction, whilethe Gaussian filter provides superior results with bettered gepreservation. These techniques are widely used in preprocessing steps for applications like medical imaging, computer vision, and pattern recognition.
PlagReport(Similarityi ndex<12%)	Yes
Date	3-09-2025