



DepartmentofComputerTechnology

Vision of the Department

Mission of the Department

Session 2025-2026

Vision: Dreamofwhereyouwant.	Mission: MeanstoachieveVision
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Program Educational Objectives of the program(PEO):(broadstatementshatdescribethe professionalandcareeraccomplishments)

PEO1	Preparation	P: Preparation	Pep-CL abbreviation pronounce as Pep-si-IL 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):(statementshatdescribewhatastudentshouldbeabletodoandknowbytheend of a program)

Keywords of POs:

Engineeringknowledge,Problemanalysis,Design/developmentofsolutions,ConductInvestigationsofComple
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
complexproblemsusingtoolsforentireworldfollowingallethicsinacollaborativewaywithpropermanagement

Skills throughout my life."

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is an/Real

Integrity:I will adhere tothe Laboratory Code of Conduct and ethics inits entirety.

Siddhesh Pitale

03/09/25

Name and Signature of Student and Date
(SignatureandDateinHandwritten)



NagarYuwakShikshanSanstha's
YeshwantraoChavanCollegeofEngineering
(AnAutonomousInstitutionaffiliatedtoRashtrasantTukadojiMaharajNagpurUniversity)
HingnaRoad,Wanadongri,Nagpur
-441110NAACA++




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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 for further analysis.
Aim	Write a Program to apply convolution processes on an input image for image smoothing.
ProblemDefinition	
Theory (100words)	<p>FILTERSUSEDFORIMAGESMOOTHING</p> <p>Average (or mean) and Gaussian filters are used for image smoothing and noise reduction, but they differ in how they achieve this. Average filters apply a simple averaging of pixel values within a kernel. Gaussian filters use a weighted average where the center pixel has the highest weight, decreasing with distance. This leads to Gaussian filters better preserving image details like edges and corners compared to average filters.</p> <p><code>averaging_filter=ones(3,3)/9;</code> This creates a 3x3 averaging filter. Each element in the filter is 1/9, meaning each pixel in the 3x3 neighborhood will contribute equally to the smoothed output pixel. <code>gaussian_filter=fspecial('gaussian',[55],1.5);</code> This uses the <code>fspecial</code> function to create a 5x5 Gaussian filter with a standard deviation (sigma) of 1.5. Gaussian filters are commonly used for smoothing as they provide a weighted average, giving more importance to central pixels.</p>
Procedureand Execution (100Words)	<p>Algorithm:</p> <ol style="list-style-type: none">1. Start2. Read input image3. Convert to grayscale if required4. Define convolution filter (average / Gaussian)5. Apply convolution using <code>imfilter</code>6. Display original and filtered images7. Stop

	<p>Code:</p> <pre> 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); </pre>
	<pre> 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)'); </pre> <p>Output:</p> <div style="text-align: center;">  </div>
OutputAnalysis	<p>Theaveragefilterreducesrandomnoisebutalsocausesblurringatedges.</p> <p>TheGaussianfilterprovidesbettersmoothingbygivingmoreweighttocentralpixels,hencepreservingedgesmoreeffectively.</p> <p>Both methods show significant reduction of noise, but Gaussian is more visuallypleasing.</p>
LinkofstudentGithubprofilewherelabassignment has	<p>https://github.com/Siddheshpitale/Computer-Vision-</p>



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Conclusion	Convolution with smoothing filters is an essential image processing technique. The average filterperformssimplenoisereduction, whiletheGaussianfilterprovidessuperiorresultswithbettered gepreservation. Thesetechniquesarewidelyusedinpreprocessingstepsforapplications like medical imaging, computer vision, and pattern recognition.
PlagReport(Similarityindex<12%)	Yes
Date	3-09-2025