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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Ph.: 07104-237919, 234623, 329249, 329250 Fax: 07104-232376, Website: www.ycce.edu
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

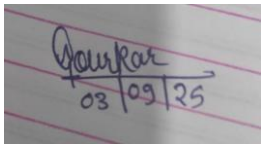
PSO Keywords: Cutting edge technologies, Research

"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	**4**
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	To write a program that applies **Scale-Invariant Feature Transform (SIFT)** on an input image in order to detect and display keypoints that are invariant to scale, rotation, and illumination changes.
Problem Definition	Write a Program To Apply Scale Invarient Feature Transform On Input Image.
Theory (100 words)	• **Definition & Process** – SIFT detects unique keypoints in images that remain stable under scale, rotation, and illumination changes by using Gaussian filtering, refining keypoints, assigning orientations, and generating distinctive descriptors. • **Applications** – It is widely applied in object recognition, panoramic image stitching, 3D reconstruction, and robot navigation, where reliable feature matching is required. • **Advantages** – SIFT is scale and rotation invariant, highly robust to noise and lighting changes, and produces distinctive descriptors that ensure accurate feature matching across images.

Procedure and Execution (100 Words)	Algorithm: • Read the input image. • Convert the image to grayscale if it is colored. • Detect SIFT keypoints in the grayscale image. • Extract feature descriptors from the keypoints. • Select the strongest keypoints for display. • Show the original image with the strongest keypoints marked.

	Code:
	clear;
	close all;
	clc;
	img=imread('greens.jpg');
	if size(img, 3) == 3
	grayImg = rgb2gray(img);
	else
	grayImg = img;
	end
	keypoints detectSIFTFeatures (grayImg);
	[features, valid_points] extract Features (grayImg, keypoints);
	imshow(img);
	hold on;
	plot(valid_points.selectStrongest(100)); % plot strongest 100 keypoints title('Detected SIFT Keypoints');
	hold off;

	Output: 
Output Analysis	The program successfully detects and highlights the keypoints in the given input image using the Scale-Invariant Feature Transform (SIFT) algorithm. The strongest 75 features are marked on the image, showing points that are invariant to scale, rotation, and illumination changes. These points represent the most distinctive regions in the image, which can later be used for feature matching,

	object recognition, image stitching, or 3D reconstruction.
Link of student Github profile where lab assignment has	https://github.com/Nikhil07Gourkar/CV_Lab

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Conclusion	The SIFT algorithm is effective in identifying distinctive and stable keypoints from an image. The experiment demonstrates that SIFT features are scale and rotation invariant, making them highly reliable for computer vision tasks. Thus, SIFT plays a crucial role in applications like object detection, image stitching, and robot navigation due to its robustness and accuracy.
Plag Report (Similarity index < 12%)	
Date	03/09/25