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
NAAC A++
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

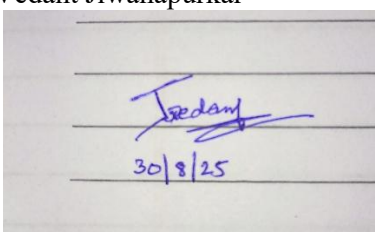
PSO Keywords: Cutting edge technologies, Research

"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)

Vedant Jiwanapurkar



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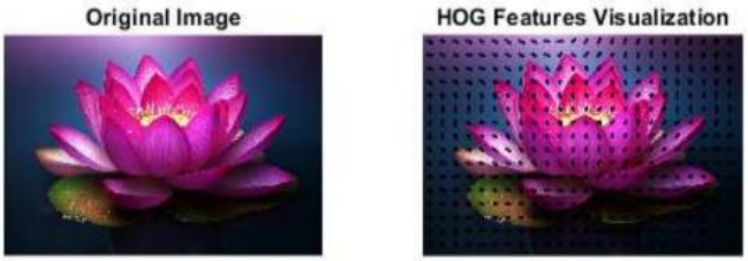
Session	**2025-26 (ODD)**	**Course Name**	**Computer vision Lab**
Semester	**5**	**Course Code**	**CT**
Roll No	**81**	**Name of Student**	**Vedant Jiwanapurkar**

Practical Number	**3**
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	Implement **Histogram of Oriented Gradient (HOG)** for Feature extraction.
Problem Definition	Use Matlab to implement HOG features on the image.
Theory (100 words)	**HOG** The Histogram of Oriented Gradients (HOG) is a widely used feature extraction technique in computer vision and image processing. It is primarily applied in object detection, human recognition, and image classification tasks. HOG captures the shape and structure of objects by analyzing the distribution of gradient orientations in localized image regions.
Procedure and Execution (100 Words)	Algorithm: • Start • Read the input image. • If the image is colored (RGB), convert it to grayscale. • Extract HOG features from the grayscale image using: • Cell size = 64×64 • Number of bins = 64 • Display the original image. • Display the HOG features visualization on the image. • Show the size of the HOG feature vector. • End

Code:

```
img = imread('C:\Users\mithi\OneDrive\ドキュメント
\MATLAB\MATLAB\dramatic-scenery-3840x2160-20802.jpg');

if size(img, 3) == 3
    grayImg = rgb2gray(img);
else
    grayImg = img;
end

[hogFeatures, hogVisualization] = extractHOGFeatures(grayImg,
...
    'CellSize', [64 64], 'NumBins', 64);

figure;
subplot(1, 2, 1);
imshow(img);
title('Original Image');

subplot(1, 2, 2);
imshow(img);
hold on;
plot(hogVisualization);
title('HOG Features Visualization');

fprintf('Size of HOG feature vector: %d\n', numel(hogFeatures));
```

Output:



Output Analysis	The output consists of two images. The first image represents the original input, while the second image shows the Histogram of Oriented Gradients (HOG) features superimposed on the same image. The visualization highlights the edges and dominant gradient directions within the image using small line markers.
Link of student Github profile where lab assignment has	https://github.com/VedantJiwanapurkar/CV_LAB.git

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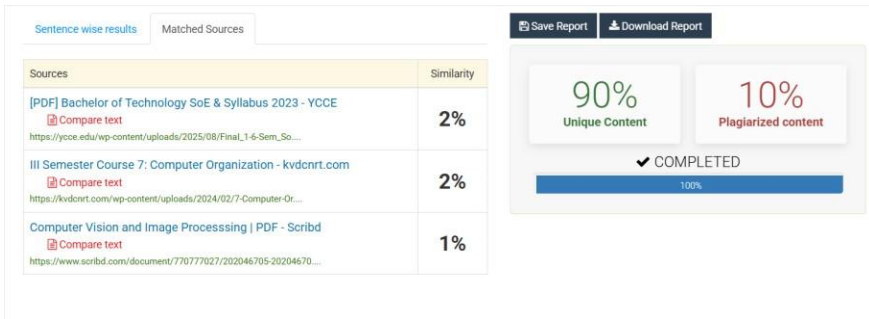
been uploaded	
Conclusion	From the results, it can be concluded that HOG is effective in capturing the structural and shape-related information of an image. It emphasizes key features such as edges, contours, and textures, while ignoring irrelevant details like illumination and color variations.
Plag Report (Similarity index < 12%)	
Date	30/08/25