NagarYuwakShikshanSanstha's

# YeshwantraoChavanCollegeofEngineering

(AnAutonomousInstitutionaffiliatedtoRashtrasantTukadojiMaharajNagpurUniversity)

HingnaRoad,Wanadongri,Nagpur

-441110NAACA++

## DepartmentofComputerTechnology

Vision of the Department

Mission of the Department

Session 2025-2026

| Vision: Dreamofwhereyouwant. | Mission: MeanstoachieveVision |
|---|---|

**Program Educational Objectives of the program(PEO):**(broadstatementsthatdescribethe professionalandcareeraccomplishments)

| | | | |
|---|---|---|---|
| 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):**(statementsthatdescribewhatastudentshouldbeabletodoandknowbytheend of a program)

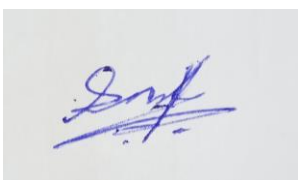
**Keywords of POs:**

Engineeringknowledge,Problemanalysis,Design/developmentofsolutions,ConductInvestigationsofComplex 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 skillsthroughoutmylife."

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



Siddhesh Pitale

3-09-2025

**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 |

| | |
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| PracticalNumber | Practical4 |
| CourseOutcome | Apply image enhancement and smoothing techniques to improve image quality forfurtheranalysis. |
| Aim | WRITEAPROGRAMTOAPPLYSCALEINVARIENTFEATURE TRANSFORM ON INPUT IMAGE. |
| ProblemDefinition | |
| Theory (100words) | TheScale-InvariantFeatureTransform(SIFT)isawidelyused techniqueincomputervisionfordetectinganddescribinglocalfeaturesinimages. .SIFT is a robust algorithm designed to identify and describe local featuresinimagesthatareinvarianttoscale,rotation,andpartially invarianttoaffinetransformationsandilluminationchanges.Thismeans thatSIFTcandetectthe samefeaturesinanimageevenifthe imageis resized, rotated, or viewed under different lighting conditions. This propertymakes SIFT extremely valuable for tasks that require matching pointsbetweendifferentviewsofthesamesceneorobject.<br><br>**Key Steps in the SIFT Algorithm**<br>1. Scale-SpaceExtremaDetection.<br>2. KeypointLocalization<br>3. OrientationAssignment<br>4. KeypointDescriptor<br><br>**Applications of SIFT**<br>1. ObjectRecognition<br>2. ImageStitching<br>3. 3DReconstruction<br>4. RobotNavigation |
| Procedureand Execution<br><br>(100Words) | Algorithm:<br>1. Start<br>2. Readandconvertimagetograyscale<br>3. ApplySIFTtodetectkeypoints<br>4. Computedescriptorsforkeypoints<br>5. Overlaykeypointsonimage<br>6. Displayresults<br>7. Stop |

| | |
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| | Code:<br>clc;clear<br>;closeall;<br>img=imread('pears.png');<br>%Converttograyscaleiftheimageis RGBifsize<br>(img,3)==3<br>grayImg=rgb2gray(img); |
| | else<br>grayImg=img;e<br>nd<br>% Detect SURF features (or you can use detectSIFTFeatures if<br>available)points = detectSURFFeatures(grayImg);<br>%Extractfeatures<br>[features,validPoints]=extractFeatures(grayImg,points);<br>%Displaythestrongestpointsfigure;<br>subplot(1,2,1);ims<br>how(img);hold<br>on;<br>plot(validPoints.selectStrongest(50));<br>title('Image with Strongest Feature<br>Points');hold off;<br>%Displayinformationaboutthefirstpointdisp('Information<br>about the first detected feature point:');disp(validPoints(1)); |
| | Output:<br>  <br> |
| OutputAnalysis | The SIFT algorithm successfully identifies distinct keypoints that remain unchanged under scaling and rotation. The extracted descriptors can be used for matching between different images of the same object. Compared to simple edge detectors, SIFT provides robust and repeatable features, making it effective for real-worldobject recognition tasks. |
| LinkofstudentGithubprofilewherelabassignment has | https://github.com/Siddheshpitale/Computer-Vision- |

| | |
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| beenuploaded | |
| Conclusion | SIFTisapowerfulfeatureextractiontechniqueincomputervision.Itdetectskeypointsthatare invarianttoscale,rotation,andillumination,andrepresentsthemusingdistinctivedescriptors. These properties make SIFT an essential tool for applications like face recognition, imagestitching,robotics,and3Dreconstruction. |
| PlagReport(Similarityindex<12%) | Yes |
| Date | 3-09-2025 |