

231501037

EXP NO: 06

DATE: 22-08-2025

SIFT and HOG features for image analysis

Aim: Utilization of SIFT and HOG features for image analysis

Algorithm:

1. Read image and convert to grayscale.
2. Initialize SIFT/HOG detector (cv2.SIFT_create(), cv2.HOGDescriptor()).
3. Detect keypoints and compute descriptors.
4. Draw keypoints on the image.
5. Display or store the extracted features.
6. Use features for comparison or matching.

Code:

```
import cv2

import matplotlib.pyplot as plt

from skimage.feature import hog

from skimage import color

# -----SIFT-----

img = cv2.imread('/content/drive/MyDrive/input.jpg')

# Check if image was loaded successfully

if img is None:

    print("Error: Could not load image from the specified path. Please check the file path and ensure the image exists.")

else:

    gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
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```
# SIFT detector
sift = cv2.SIFT_create()

keypoints, descriptors = sift.detectAndCompute(gray, None)

# Draw keypoints
sift_img = cv2.drawKeypoints(img, keypoints, None,
flags=cv2.DRAW_MATCHES_FLAGS_DRAW_RICH_KEYPOINTS)

# ----- HOG -----
# Convert to grayscale for HOG
gray_hog = color.rgb2gray(cv2.cvtColor(img, cv2.COLOR_BGR2RGB))

# Compute HOG features and visualization
hog_features, hog_img = hog(gray_hog, orientations=9, pixels_per_cell=(8, 8),
cells_per_block=(2, 2), visualize=True, channel_axis=None)

# ----- Display Results -----
plt.figure(figsize=(10,5))

plt.subplot(1,2,1)
plt.imshow(cv2.cvtColor(sift_img, cv2.COLOR_BGR2RGB))
plt.title("SIFT Features")
plt.axis('off')

plt.subplot(1,2,2)
plt.imshow(hog_img, cmap='gray')
plt.title("HOG Features")
plt.axis('off')
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plt.show()

Output:

SIFT Features



HOG Features



Result: Thus, Utilization of SIFT and HOG features for image analysis was implemented successfully.