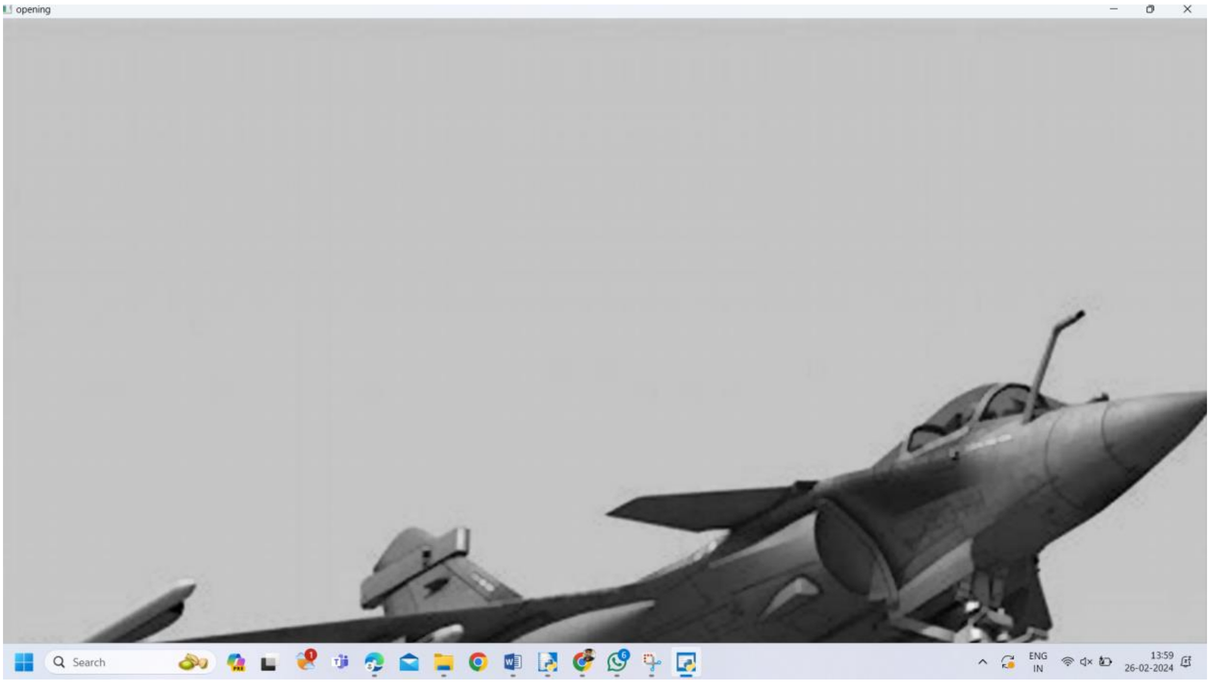
31. Morphological operations based on OpenCV using Opening technique.

PROGRAM:

```
import cv2

import numpy as np

img = cv2.imread(r"C:\Users\ACER\Downloads\JET .JPG", cv2.IMREAD_GRAYSCALE)

kernel = np.ones((5,5), np.uint8)

opening = cv2.morphologyEx(img, cv2.MORPH_OPEN, kernel)

cv2.imshow("Original", img)

cv2.imshow("opening", opening)

cv2.waitKey(0)

cv2.destroyAllWindows()
```

OUTPUT:

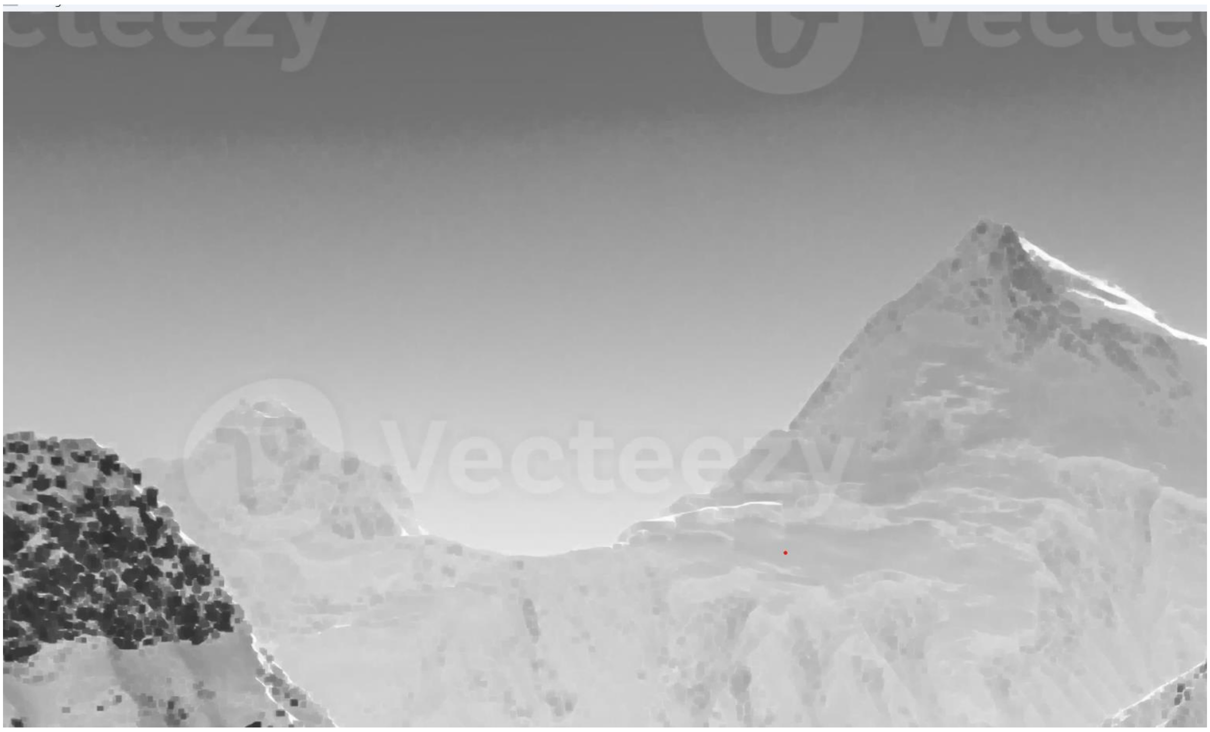


32. Morphological operations based on OpenCV using Closing technique.

PROGRAM:

```
import cv2
import numpy as np
img = cv2.imread(r"C:\Users\ACER\Downloads\MOUNTAIN.jpg", cv2.IMREAD_GRAYSCALE)
kernel = np.ones((5,5), np.uint8)
closing = cv2.morphologyEx(img, cv2.MORPH_CLOSE, kernel)
cv2.imshow("Original", img)
cv2.imshow("Closing", closing)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:

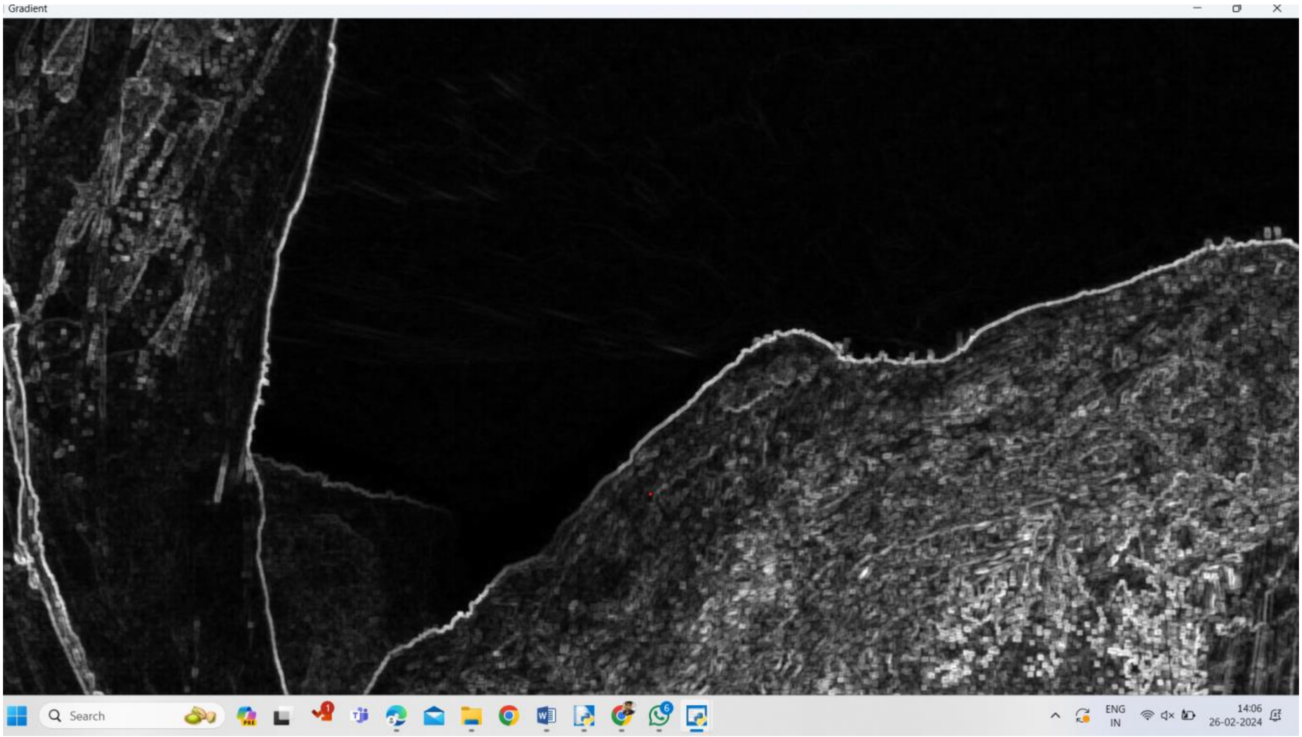


33. Morphological operations based on OpenCV using Morphological Gradient technique

PROGRAM:

```
import cv2

import numpy as np

img = cv2.imread(r"C:\Users\ACER\Downloads\Waterfall .jpg", cv2.IMREAD_GRAYSCALE)

kernel = np.ones((5,5), np.uint8)

grad = cv2.morphologyEx(img, cv2.MORPH_GRADIENT, kernel)

cv2.imshow("Original", img)

cv2.imshow("Gradient", grad)

cv2.waitKey
```

OUTPUT:

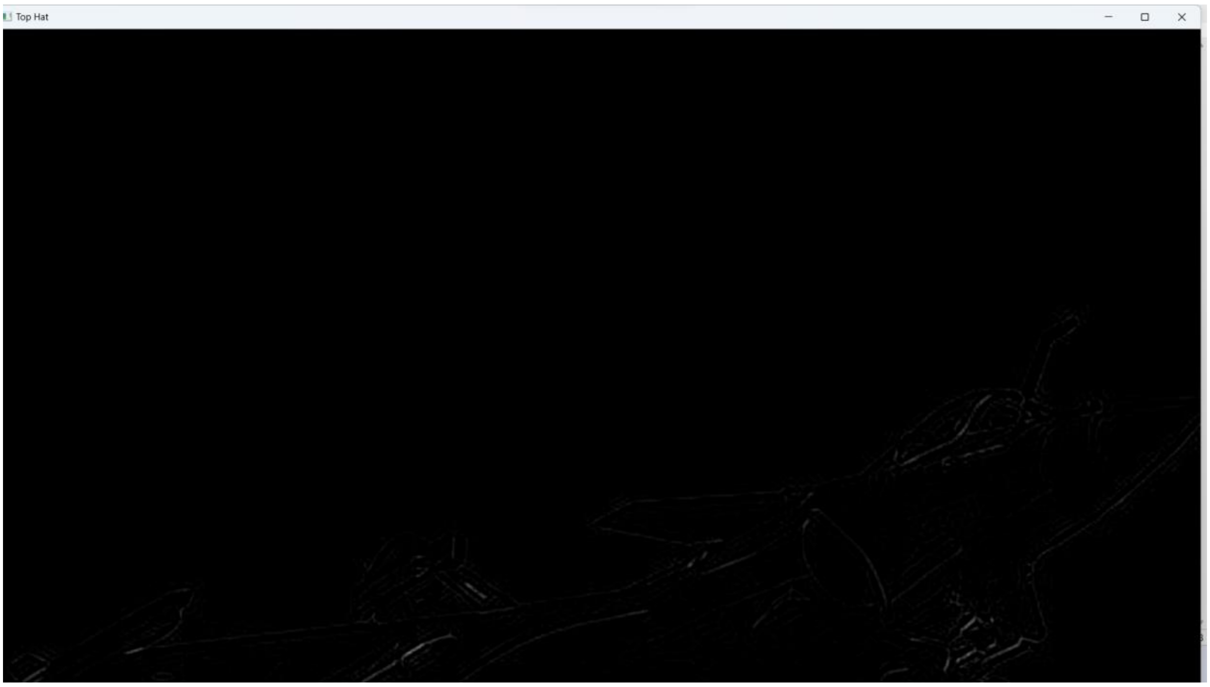


34. Morphological operations based on OpenCV using Top hat technique.

PROGRAM:

```
import cv2

import numpy as np

img = cv2.imread(r"C:\Users\ACER\Downloads\JET .JPG",

cv2.IMREAD_GRAYSCALE)

kernel = np.ones((5,5), np.uint8)

tophat = cv2.morphologyEx(img, cv2.MORPH_TOPHAT, kernel)

cv2.imshow("Original", img)

cv2.imshow("Top Hat", tophat)

cv2.waitKey(0)

cv2.destroyAllWindows()
```

OUTPUT:

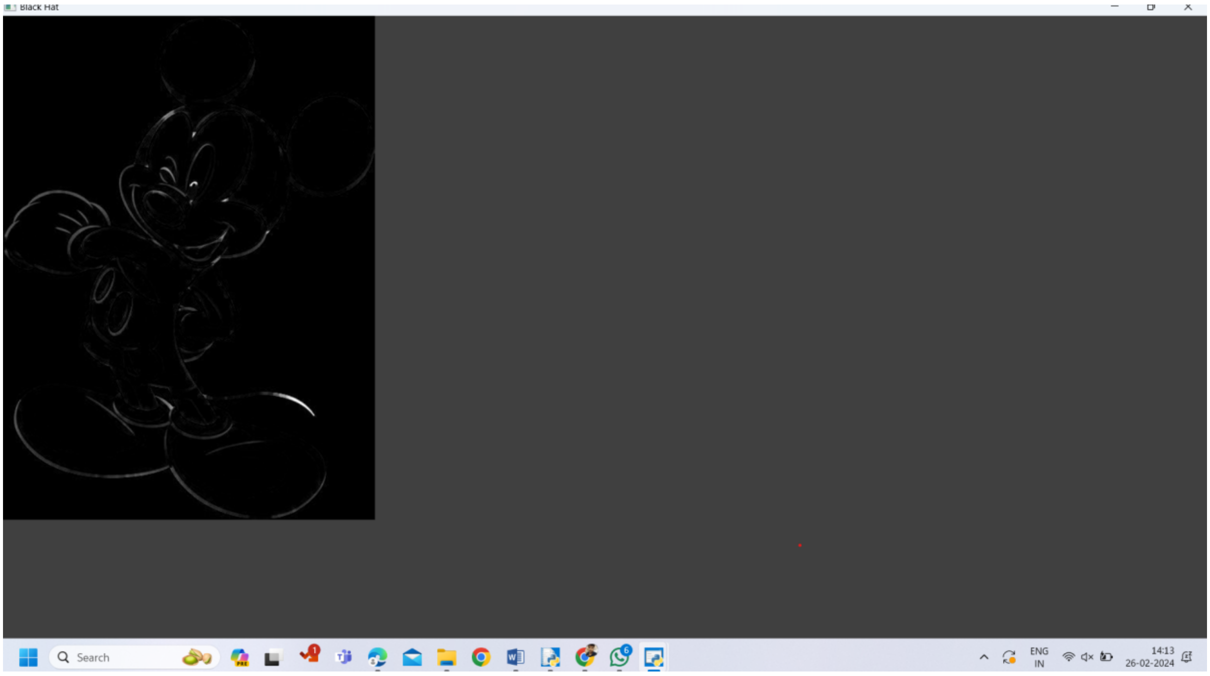


35. Morphological operations based on OpenCV using Black hat technique.

PROGRAM:

```
import cv2

import numpy as np

img = cv2.imread(r"C:\Users\ACER\Downloads\MICKYMOUSE.JPG",

cv2.IMREAD_GRAYSCALE)

kernel = np.ones((5,5), np.uint8)

blackhat = cv2.morphologyEx(img, cv2.MORPH_BLACKHAT, kernel)

cv2.imshow("Original", img)

cv2.imshow("Black Hat", blackhat)

cv2.waitKey(0)

cv2.destroyAllWindows()
```

OUTPUT:

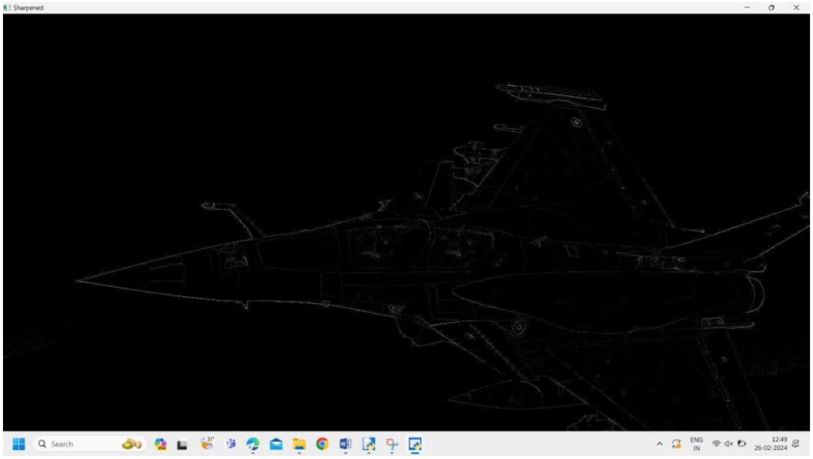


36. Recognise watch from the given image by general Object recognition using OpenCV.

PROGRAM:

```
import cv2
watch_cascade =
cv2.CascadeClassifier("C:/Users/ACER/OneDrive/Documents/CO
MPUTER
VISION/watch-cascade.xml")
img = cv2.imread("C:/Users/ACER
/OneDrive/Documents/COMPUTER VISION/COMPUTER
VISION/watch.jpg")
gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
watches = watch_cascade.detectMultiScale(gray,
scaleFactor=1.2, minNeighbors=5)
for (x, y, w, h) in watches:
cv2.rectangle(img, (x, y), (x + w, y + h), (0, 255, 0), 2)
cv2.imshow('Watches Detected', img)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:



37. Using Opencv play Video in Reverse mode.

PROGRAM:

```
import cv2
cap = cv2.VideoCapture(r"C:\Users\ACER\Videos\Hanuman 2024 Telugu HDTS 1080p x264 AAC HC-ESub CineVood.mkv")
total_frames = cap.get(cv2.CAP_PROP_FRAME_COUNT)
current_frame = total_frames - 1
while current_frame >= 0:
    cap.set(cv2.CAP_PROP_POS_FRAMES, current_frame)
    ret, frame = cap.read()
 if not ret:
        break
  cv2.imshow('Video in Reverse', frame)
if cv2.waitKey(25) & 0xFF == ord('q'):
        break
current_frame -= 1
cap.release()
cv2.destroyAllWindows()
```

OUTPUT:

38. Face Detection using Opencv

PROGRAM:

```
import cv2

img = cv2.imread(r"C:\Users\ACER\Downloads\army-jet-5.JPG")

gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)

face_cascade =
cv2.CascadeClassifier(r"C:\Users\ACER\Downloads\MERCEDES-
BENZ.JPG")

faces = face_cascade.detectMultiScale(gray, scaleFactor=1.1,
minNeighbors=5)

for (x, y, w, h) in faces:

   cv2.rectangle(img, (x, y), (x + w, y + h), (0, 255, 0), 2)

   cv2.imshow('Faces Detected', img)

   cv2.waitKey(0)

   cv2.destroyAllWindows()
```

OUTPUT:

39. Vehicle Detection in a Video frame using OpenCV

PROGRAM:

```
import cv2
car_cascade = cv2.CascadeClassifier("C:/Users/ACER
/OneDrive/Documents/COMPUTER
VISION/cars.xml")
cap = cv2.VideoCapture("C:/Users/ACER /Downloads/car.mp4")
while True:
ret, frame = cap.read()
gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
cars = car_cascade.detectMultiScale(gray, 1.1, 1)
for (x,y,w,h) in cars:
cv2.rectangle(frame, (x,y), (x+w,y+h), (0,0,255), 2)
cv2.imshow('frame', frame)
if cv2.waitKey(1) & 0xFF == ord('q'):
break
cap.release()
cv2.destroyAllWindows()
```

OUTPUT

40. Draw Rectangular shape and extract objects

PROGRAM:

```
import cv2
img = cv2.imread(r"C:\Users\ACER\Downloads\JET .JPG")
x, y = 100, 100
width, height = 200, 150
roi = img[y:y+height, x:x+width]
cv2.imshow('ROI', roi)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT: