

6.

Code:

```
# Python program to illustrate # foreground extraction using # GrabCut
algorithm
# organize imports
import numpy as np
import cv2
from matplotlib import pyplot as plt
# path to input image specified and
# image is loaded with imread command
image = cv2.imread('image.jpg')
# create a simple mask image similar
# to the loaded image, with the
# shape and return type
mask = np.zeros(image.shape[:2], np.uint8)
# specify the background and foreground model
# using numpy the array is constructed of 1 row
# and 65 columns, and all array elements are 0
Data type for the array is np.float64 (default)
backgroundModel = np.zeros((1, 65), np.float64)
foregroundModel = np.zeros((1, 65), np.float64)
# define the Region of Interest (ROI)
# as the coordinates of the rectangle
# where the values are entered as
# (startingPoint_x, startingPoint_y, width, height)

# these coordinates are according to the input image
it may vary for different images
rectangle = (20, 100, 150, 150)
# apply the grabcut algorithm with appropriate
# values as parameters, number of iterations =
# cv2.CC_INIT_WITH_RECT is used because
# of the rectangle mode is used
cv2.grabCut(image, mask, rectangle,
backgroundModel, foregroundModel, 3,
cv2.CC_INIT_WITH_RECT)
# In the new mask image, pixels will # be marked with
four flags
# four flags denote the background / foreground #
mask is changed, all the 0 and 2 pixels
# are converted to the background
# mask is changed, all the 1 and 3 pixels # are now the part of the
foreground
# the return type is also mentioned, # this gives us the
final mask
mask2 = np.where((mask == 2),(mask == 0), 0, 1).astype('uint8')
# The final mask is multiplied with
# the input image to give the segmented image.
image = image * mask2[:, :, np.newaxis]
# output segmented image with colorbar
plt.imshow(image)
plt.colorbar()
plt.show()
```