# **utils.py**

# utils.py  
import cv2  
import numpy as np  
  
# ----------------------------  
# Image Processing Functions  
# ----------------------------  
  
def to\_grayscale(img):  
 """  
 Convert BGR/RGB image to grayscale using OpenCV.  
 """  
 return cv2.cvtColor(img, cv2.COLOR\_BGR2GRAY)  
  
def to\_hsv(img):  
 """  
 Convert BGR/RGB image to HSV using OpenCV.  
 """  
 return cv2.cvtColor(img, cv2.COLOR\_BGR2HSV)  
  
def rotate\_image(img, angle):  
 """  
 Rotate the image around its center by the given angle.  
 """  
 (h, w) = img.shape[:2]  
 center = (w // 2, h // 2)  
 matrix = cv2.getRotationMatrix2D(center, angle, 1.0)  
 rotated = cv2.warpAffine(img, matrix, (w, h))  
 return rotated  
  
def edge\_detection(img):  
 """  
 Apply Canny edge detection on a BGR/RGB image.  
 """  
 gray = cv2.cvtColor(img, cv2.COLOR\_BGR2GRAY)  
 edges = cv2.Canny(gray, 100, 200)  
 return edges