

START

// Initialize Libraries

IMPORT cv2

IMPORT numpy AS np

IMPORT ezdxf

IMPORT os

// Define Capture Image Function

FUNCTION CAPTURE_IMAGE(camera_port = 0)

cap = cv2.VideoCapture(camera_port)

IF NOT cap.isOpened() THEN

RAISE Exception("Could not open video device")

END IF

ret, frame = cap.read()

cap.release()

IF NOT ret THEN

RAISE Exception("Failed to capture image")

END IF

RETURN frame

END FUNCTION

// Define Show Image Function

FUNCTION SHOW_IMAGE(image)

cv2.imshow('Captured Image', image)

cv2.waitKey(0)

cv2.destroyAllWindows()

END FUNCTION

// Define Detect Contour Function

FUNCTION DETECT_CONTOUR(image)

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

blurred = cv2.GaussianBlur(gray, (5, 5), 0)

edged = cv2.Canny(blurred, 50, 150)

contours, _ = cv2.findContours(edged, cv2.RETR_EXTERNAL, cv2.CHAIN_APPROX_SIMPLE)

RETURN contours

END FUNCTION

// Define Optimize Contour Function

FUNCTION OPTIMIZE_CONTOUR(contour, epsilon = 0.02)

hull = cv2.convexHull(contour)

epsilon = epsilon * cv2.arcLength(hull, True)

optimized = cv2.approxPolyDP(hull, epsilon, True)

RETURN optimized

END FUNCTION

// Define Export DXF Function

FUNCTION EXPORT_DXF(contours, directory, filename = "output.dxf")

// Ensure the directory exists

IF NOT os.path.exists(directory) THEN

os.makedirs(directory)

END IF

// Construct the full file path

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filepath = os.path.join(directory, filename)

doc = ezdxf.new(dxfversion='R2010')
msp = doc.modelspace()
FOR contour IN contours DO
    points = [(point[0][0], point[0][1]) FOR point IN contour]
    msp.add_lwpolyline(points, close = True)
END FOR
doc.saveas(filepath)
PRINT("File saved as '" + filepath + "'")
END FUNCTION

// Main Process Flow
FUNCTION MAIN()
    TRY
        image = CAPTURE_IMAGE()
        SHOW_IMAGE(image) // Show captured image
        contours = DETECT_CONTOUR(image)
        optimized_contours = [OPTIMIZE_CONTOUR(contour) FOR contour IN contours]

        // Specify the directory where to save the DXF file
        save_directory = "C:/Users/aksha/.vscode"
        EXPORT_DXF(optimized_contours, save_directory)
        PRINT("Contour detection and export complete.")
    CATCH Exception AS e
        PRINT("Error: " + e)
    END TRY
END FUNCTION

// Run Main if Script is Executed Directly
IF __name__ == "__main__" THEN
    MAIN()
END IF

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