MACHINE LEARNING INTERNSHIP
QUALIFICATION TASK 2

Title: Numbering of Rectangles

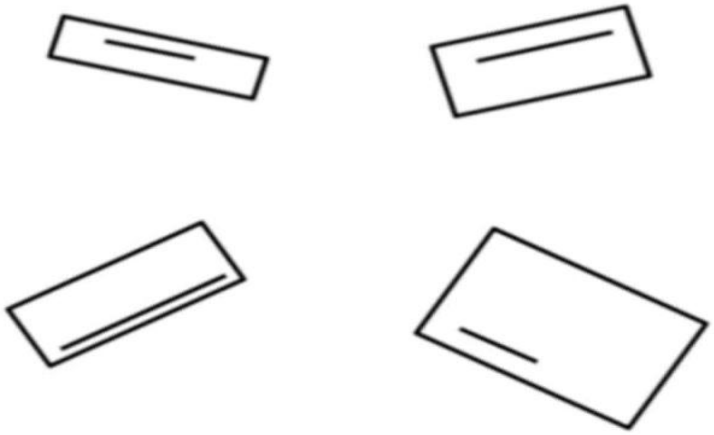
Summary:

The provided code performs contour analysis on an input image to detect and differentiate between line contours and rectangle contours. The code further improves the alignment of rectangles by considering the position of line contours. The processed image is displayed with the identified contours and improved alignment of rectangles.

Problem statement:

Align(make the rectangle image straight) all the given images of the rectangle.

Image:



Tools & Technology:

- Python
- OpenCV
- vs-code

Approach:

1. **Preprocessing:** The image is loaded and preprocessed by applying Gaussian blur to reduce noise and converting it to grayscale.

2. **Contour Detection**: Canny edge detection is applied to the grayscale image to obtain the contours.
3. **Contour Analysis**: The `getContours` function is used to extract line contours and rectangle contours separately. The function calculates properties like area, bounding box, center, size, and angle for each contour.
4. **Line Contour Processing**: Line contours with small area and size are filtered out, and similar line contours are grouped together. The resulting line contours are sorted based on their lengths.
5. **Rectangle Contour Processing**: The rectangle contours are processed individually, and their centers are used to determine their numbering order based on the sorted line contours. The code calculates the perpendicular distances from line points to the rectangle corners to improve the alignment of rectangles

Output: