TEXT CHARACTERISTICS

PIPELINE:

TEXT LOCALIZATION

MERGE CHECK

FLIP CHECK

TEXT LOCALIZATION

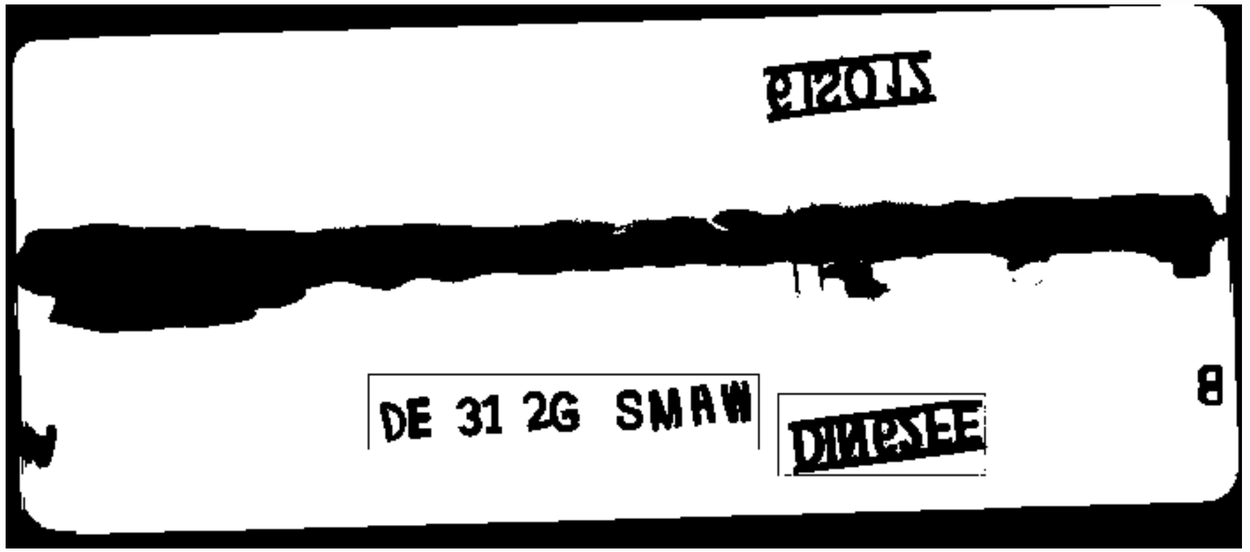
⟶ Contour detection

⟶ MSER(Maximally Stable Extremal Regions)

⟶ SWT (Stroke Width Transform)

TEXT LOCALIZATION

Example image



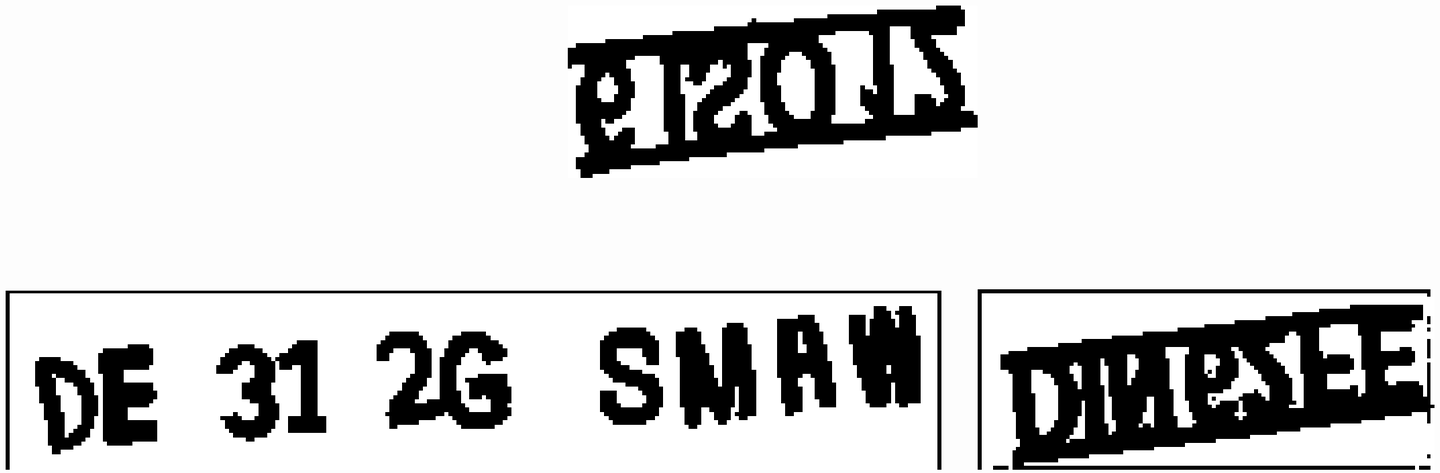
contour and filtering

contour detected sub-images

TEXT LOCALIZATION

MSER results

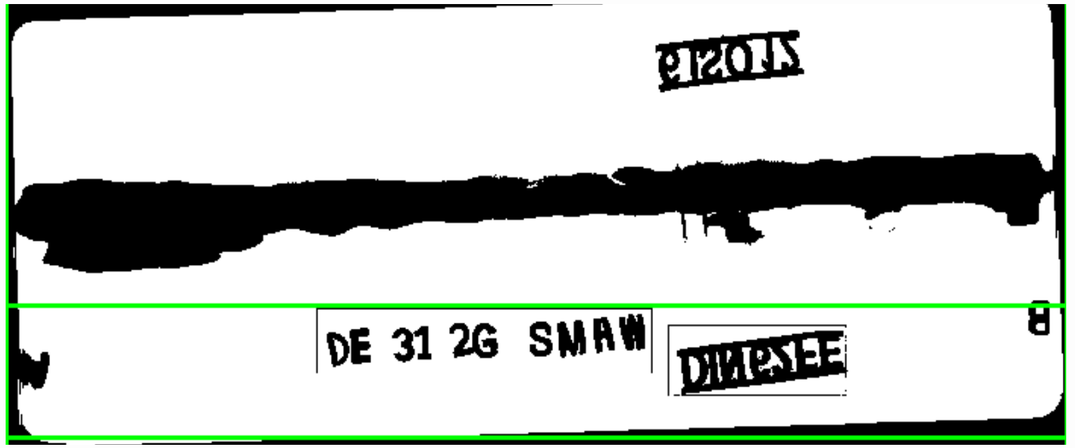
MSER and contouring



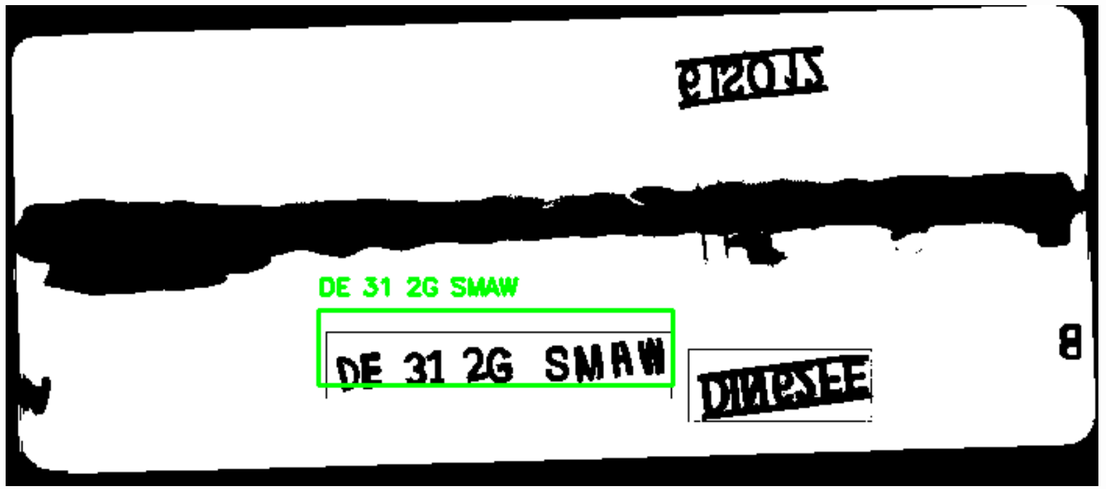
contour detected sub-images

TEXT LOCALIZATION

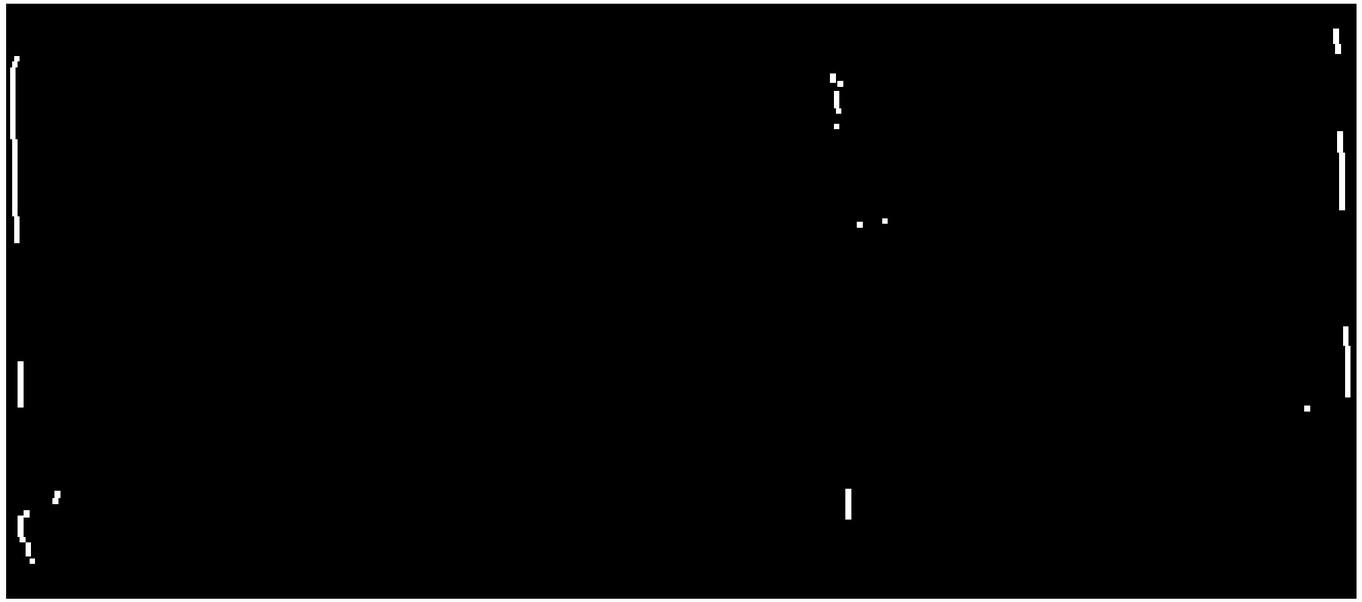
SWT



SWT with MSER



TEXT LOCALIZATION



The SWT is inaccurately detecting lines in areas without text, particularly at the corners of the images, leading to poor performance on the dataset and hence is avoided

MSER with contour detection is found to be the best for the dataset in localization of the text

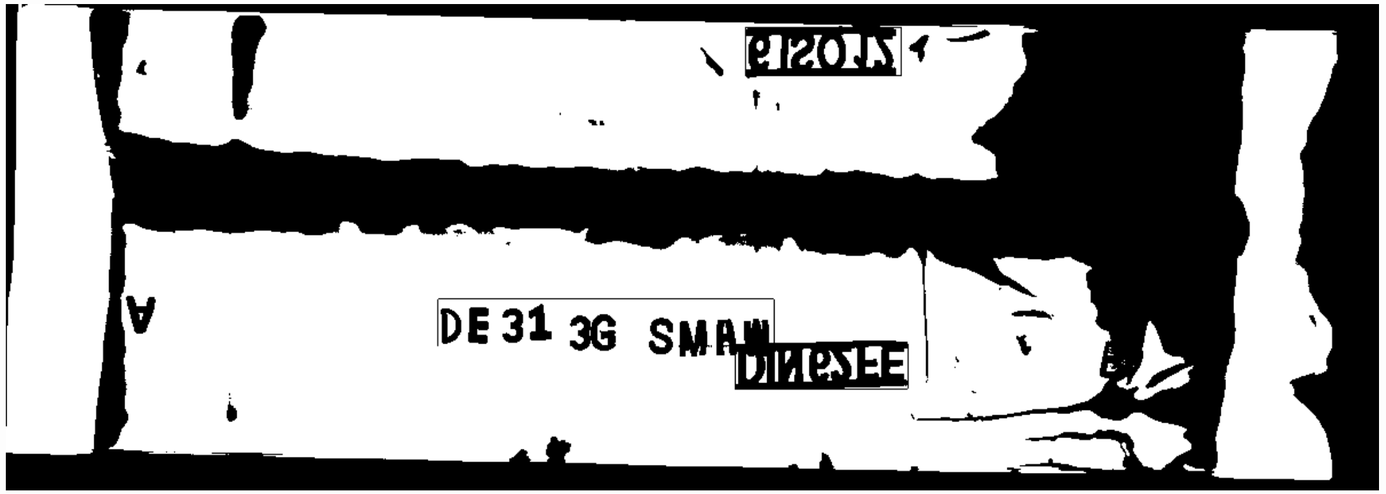
MERGE CHECK

⟶ Contour overlap

⟶ Contour with IOU(intersection of union)

MERGE CHECK

Example image



bounding box overlap

detected merged areas in the image

MERGE CHECK

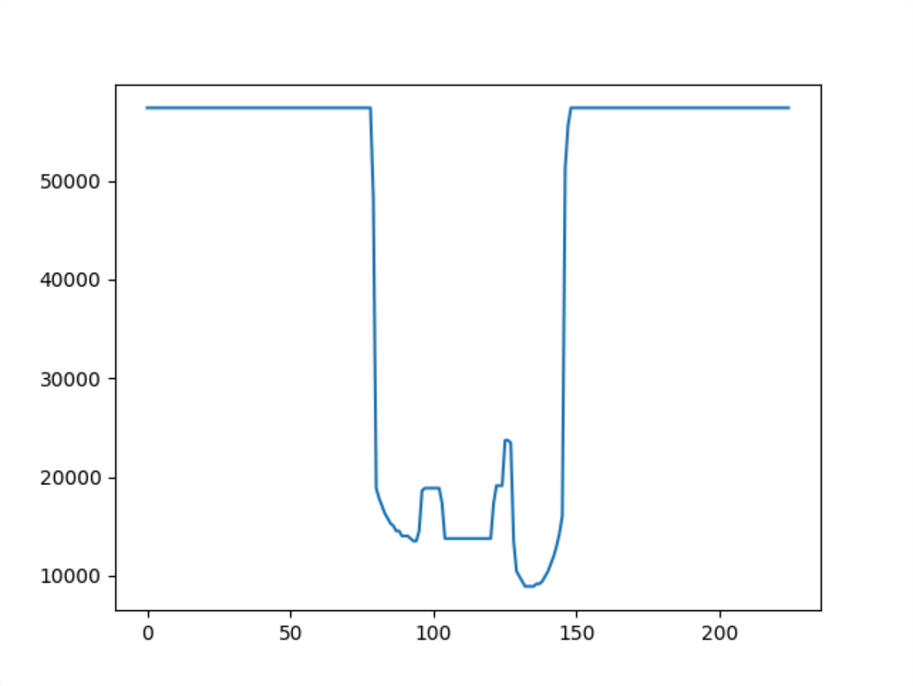
IOU

detected merged areas in the image

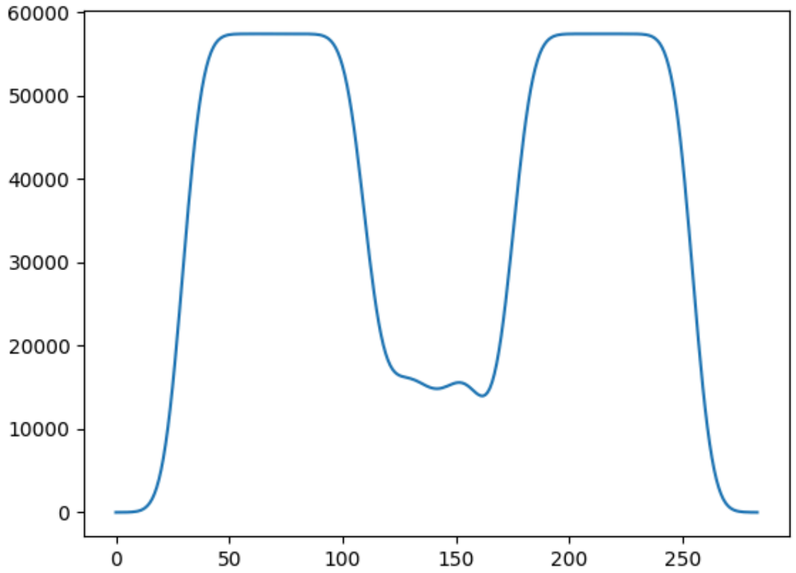
The contour overlap method outperforms the Intersection over Union (IoU) approach for merge checks, as it effectively identifies text regions while IoU is prone to including non-text merges and is more sensitive to noise.

Hence bounding box overlap method is preferred

FLIP CHECK



ORIGINAL PROJECTION



SMOOTHENED PROJECTION

- The code plots the original and smoothed projection of pixel intensities to visualize text lines, with the smoothed projection reducing noise for clearer identification.
- It detects the start and end of text lines using a mask and convolution, marking transitions where text appears.
- A confidence score is calculated by counting peaks in the lower half of text lines, indicating whether the image is upright (≥50%) or flipped (<50%).

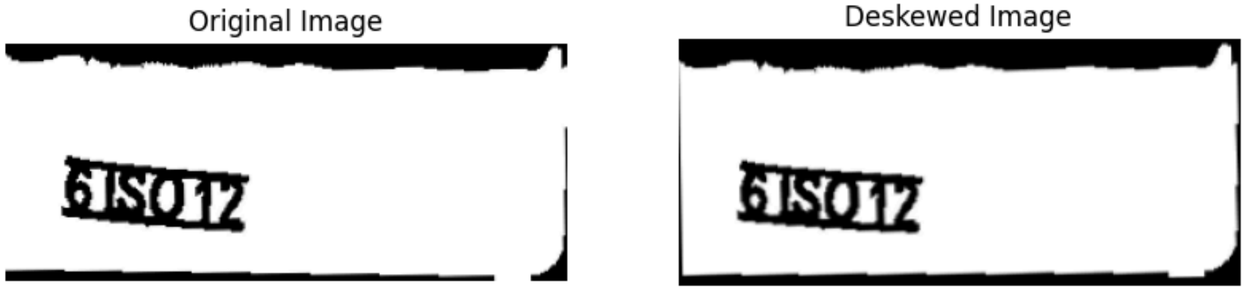
FLIP CHECK

SUB-IMAGES ARE CHECKED FOR CONFIDENCE SCORE AND IF IT IS (<50%)THEN THE IMAGES ARE FLIPPED

```
(venv) C:\Users\sruth\Desktop\OCR>python final_flipped.py
Image: C:\Users\sruth\Desktop\bounded_after_prep\filtered_images\merged_region_1.png
Flipped: True, Confidence: 33.33333333333333
Images saved successfully.
```

SOME UPRIGHT IMAGES ARE ALSO CONSIDERED AS FLIPPED , HENCE WE PERFORM OCR BEFORE AND AFTER THE FLIP CHECK. OCR VALUE FOR THEM

FLIP CHECK



DESKEWING DOES NOT WORK WELL WITH THESE SUB-IMAGES HENCE WE PREPROCESS AGAIN BEFORE OCR

WE GIVE REFERENCE NUMBERS AND A CONFIDENCE PERCENT AND TRY TO MATCH THE OCR AND AFTER OCR FLIPPED TO THE REFERENCE NUMBERS AND RETURN THE MOST MATCHED REFERENCE NUMBER.

reference_numbers = ["61S012", "DIN62FE", "DE 31 2G SMAW"]

```
Image: C:\Users\sruth\Desktop\bounded_after_prep\filtered_images\merged_region_0.png
Flipped: True, Confidence: 0.0
Extracted Text: DE 31 5@ enum
Best Matching Reference Number: DE 31 2G SMAW
Image saved at: C:\Users\sruth\Desktop\bounded_after_prep\unflip\unflipped_merged_region_0.png
```