

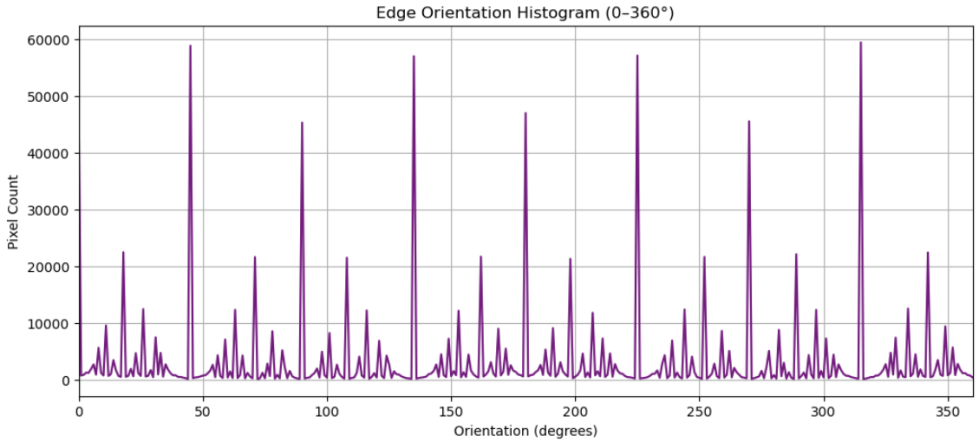
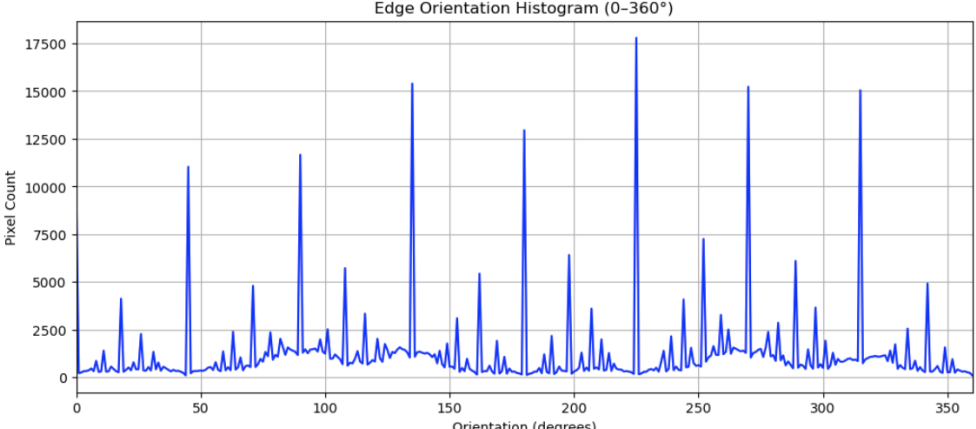
## Task 2.2C Answer sheet

Fill in the “**Results**” column with relevant results

### Notes:

- Missing any required results will result in a re-submission.

### 1. Calculating edge orientations

Result	
Histogram of the edge orientations of fisherman.jpg	 <p>The histogram for fisherman.jpg shows a series of sharp, high-magnitude peaks at regular intervals of approximately 30 degrees. The y-axis, labeled 'Pixel Count', ranges from 0 to 60,000. The x-axis, labeled 'Orientation (degrees)', ranges from 0 to 360. The peaks occur at approximately 45, 90, 135, 180, 225, 270, and 315 degrees, indicating a high degree of structural regularity and dominant edge directions in the image.</p>
Histogram of the edge orientations of empire.jpg	 <p>The histogram for empire.jpg shows a more irregular and lower-magnitude pattern compared to fisherman.jpg. The y-axis, labeled 'Pixel Count', ranges from 0 to 17,500. The x-axis, labeled 'Orientation (degrees)', ranges from 0 to 360. While there are still peaks, they are less sharp and more widely distributed, with notable peaks around 45, 90, 135, 180, 225, 270, and 315 degrees, suggesting a more varied and less consistent edge orientation landscape.</p>

### Discussion the difference between the histograms of the edge orientations of fisherman.jpg and empire.jpg

Strong and regular spikes at specific angles can be seen in the edge orientation histogram for fisherman.jpg, suggesting that the image is highly structured with dominant edge directions. empire.jpg's histogram, on the other hand, shows a lower magnitude pattern that is more uniformly distributed and has fewer sudden peaks. This suggests that the edge orientations are more variable and less repeated, most likely because of curved curves, natural structures, or gentler transitions. The directional elements in fisherman.jpg are more noticeable and repetitive, but the orientation landscape in empire.jpg is more varied and less consistent.

## 2. Applying morphology for document skew estimation

Result

Binary image  
(i.e., doc\_bin)  
for doc.jpg

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure 3 shows a sequence of binary images of a document page, labeled 'doc\_bin' and 'doc\_bin\_1' through 'doc\_bin\_10'. The images show the document page with various features highlighted in white against a black background. The sequence shows the document page being processed by a series of binary images, with the final image showing the document page with all features highlighted.

Figure

Closing result  
(i.e., closing)  
for doc.jpg



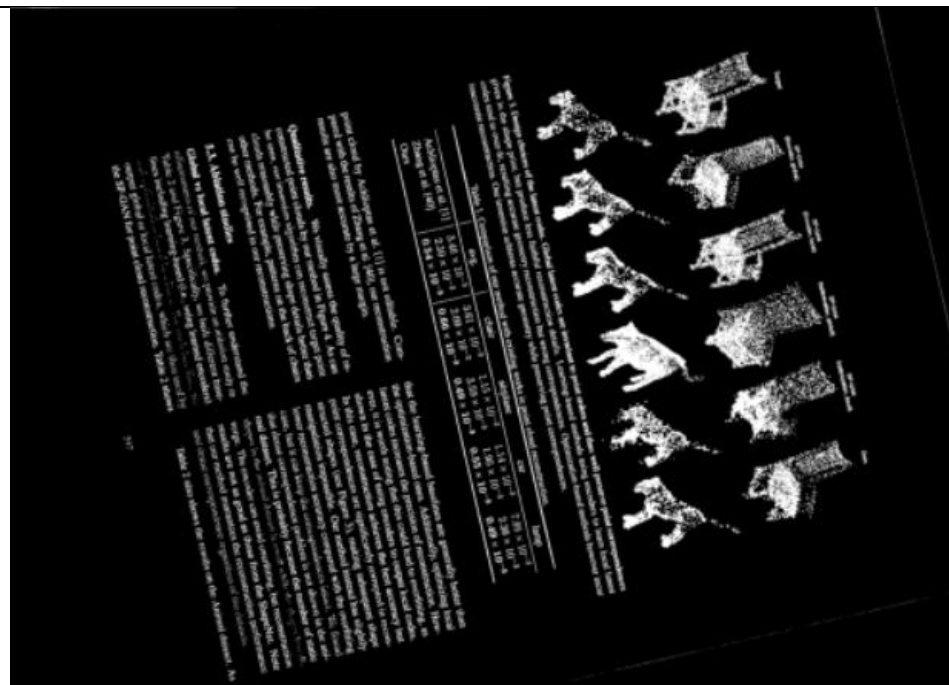
Opening result  
(i.e., opening)  
for doc.jpg



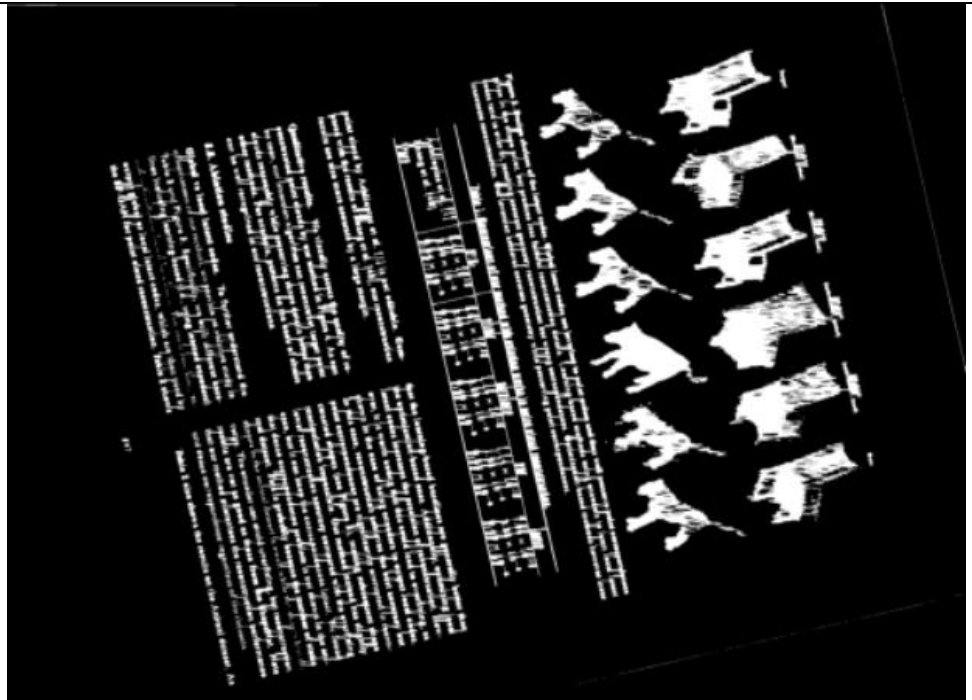
Deskewing  
result (i.e.,  
doc\_deskewed  
) for doc.jpg



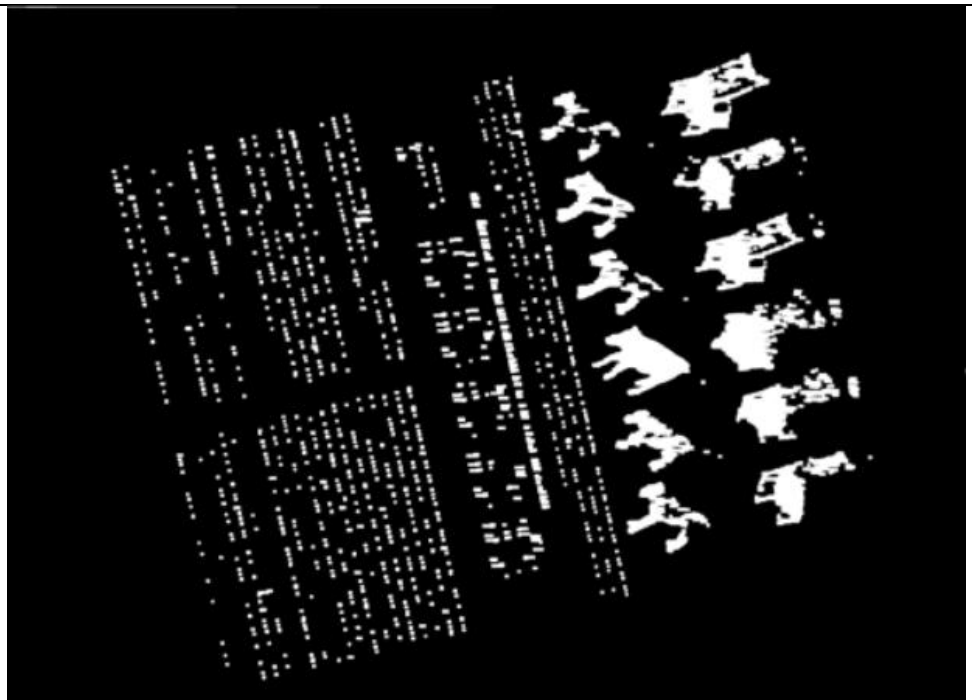
Binary image  
(i.e., doc\_bin)  
for doc\_1.jpg



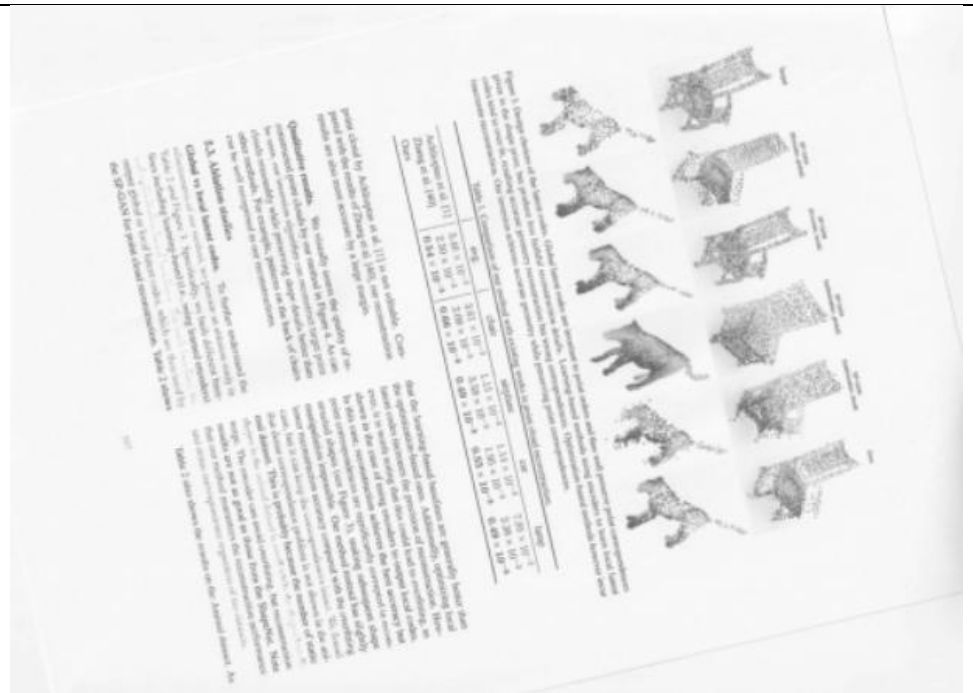
Closing result  
(i.e., closing)  
for doc\_1.jpg



Opening result  
(i.e., opening)  
for doc\_1.jpg



Deskewing  
result (i.e.,  
doc\_deskewed  
) for doc\_1.jpg



Does the method successfully work in this case? If not, what could be the reason? Observe the result and discuss your observations.

The skew correction method successfully deskews doc.jpg because its text is consistently distributed in horizontal lines, allowing the morphological operations and related component analysis to precisely separate and analyze each line. The orientation of these linear components can then be accurately estimated by the least squares regression, producing an image that has been appropriately corrected and a precise median skew angle.

Doc\_1.jpg, however, is not properly deskewed. This is most likely due to the document's high tilt and potential distortion, which causes the morphological procedures to incorrectly group text lines or letters. As a result, the calculated orientations become uncertain, and the connected components might not match up with the appropriate horizontal text lines.