Tuğberk Dikmen

21802480

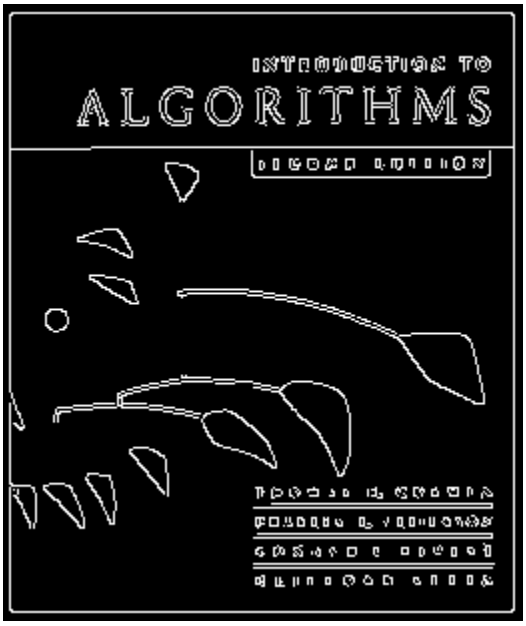
CS-484

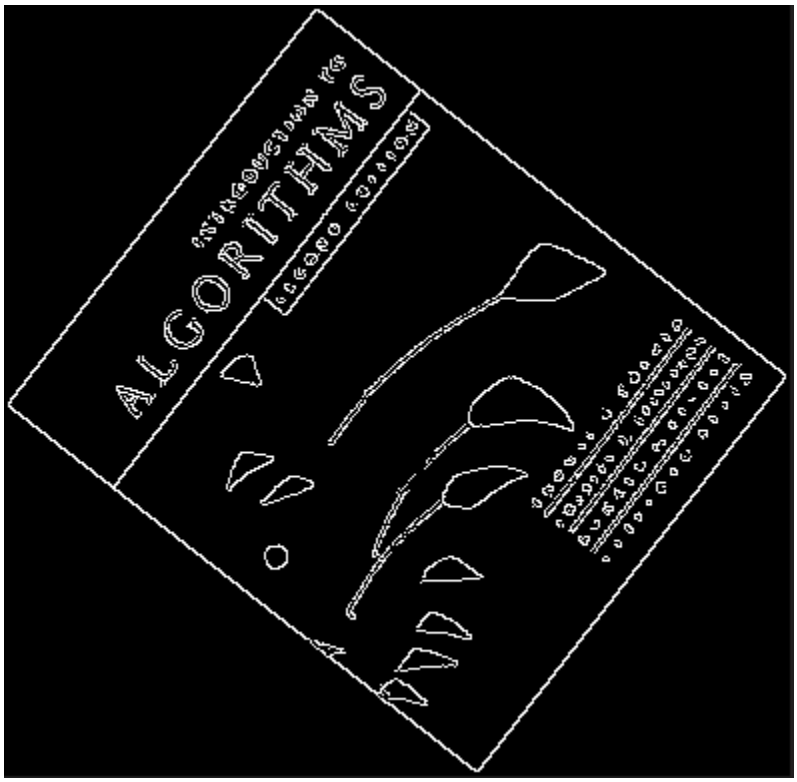
Homework-2

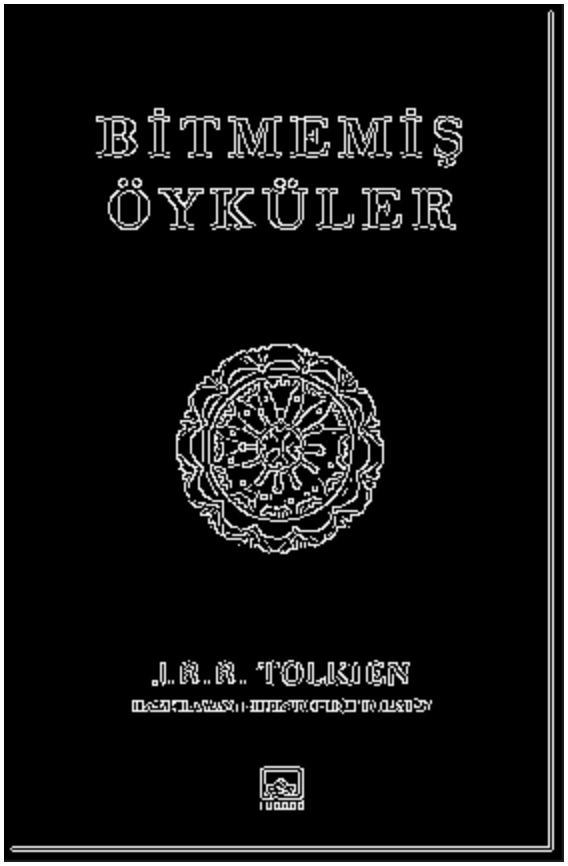
Bilkent University

26.04.2023

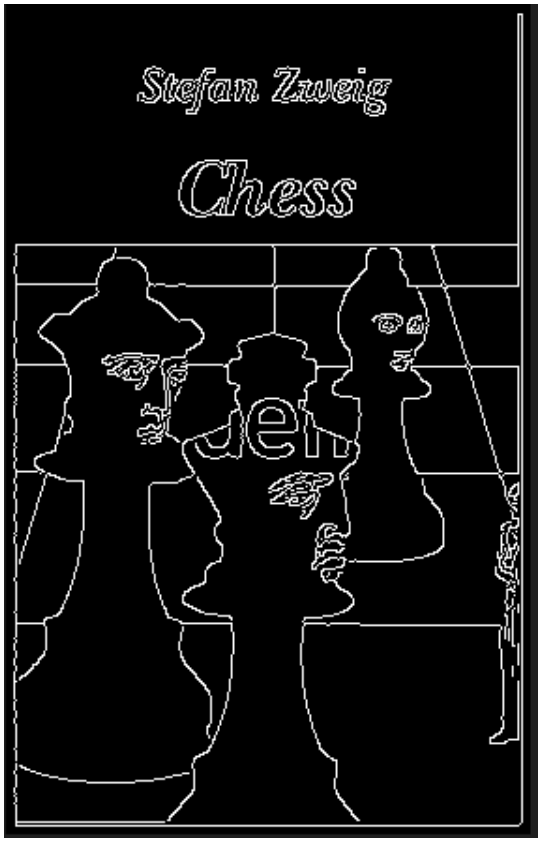
1) The results for edge detection for different parameters

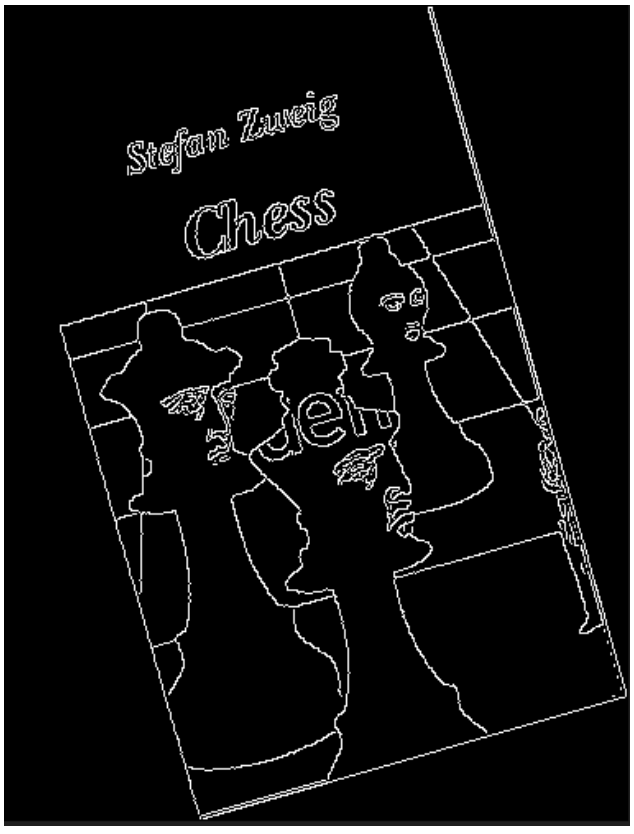





BİTMEMİŞ
ÖYKÜLER
J.R.R. TOLKIEN


BİTMEMİŞ
ÖYKÜLER
J.R.R. TOLKIEN


Stefan Zweig
Chess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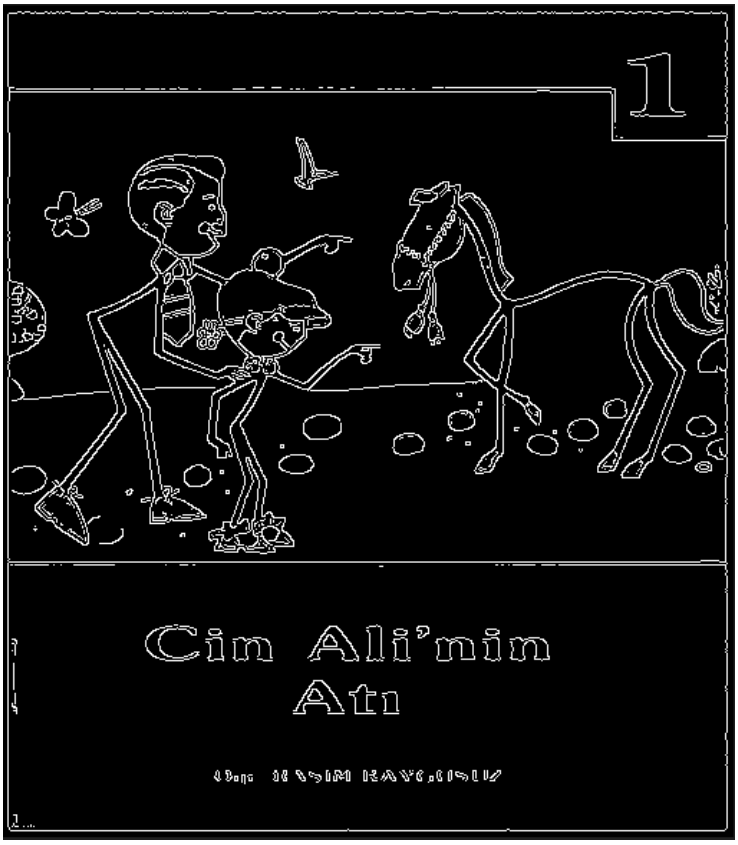
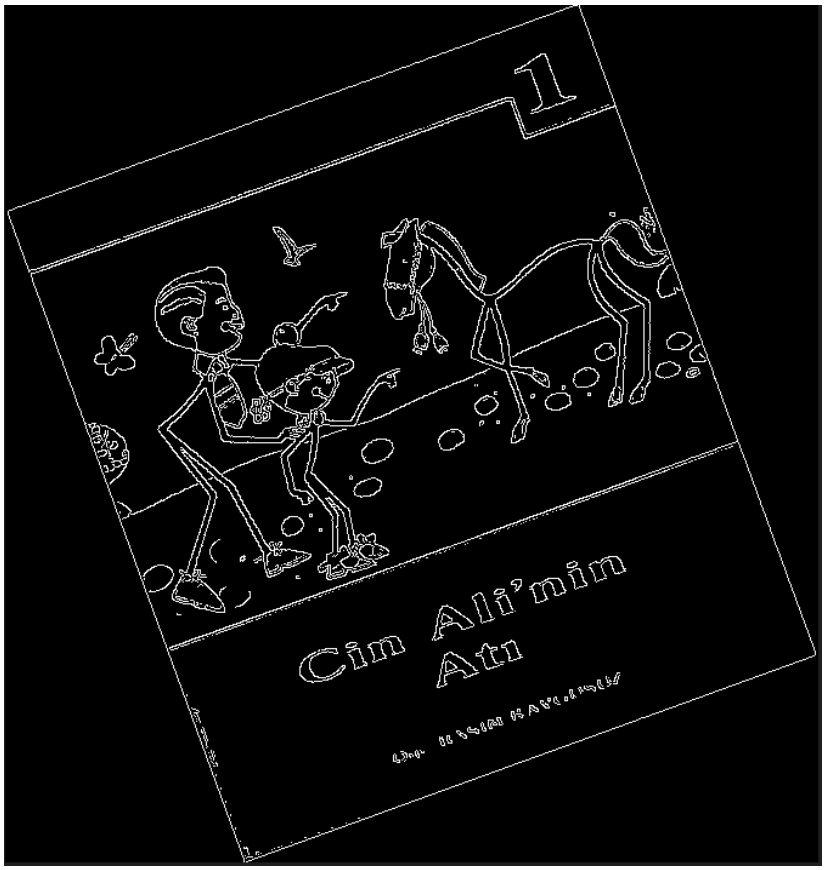
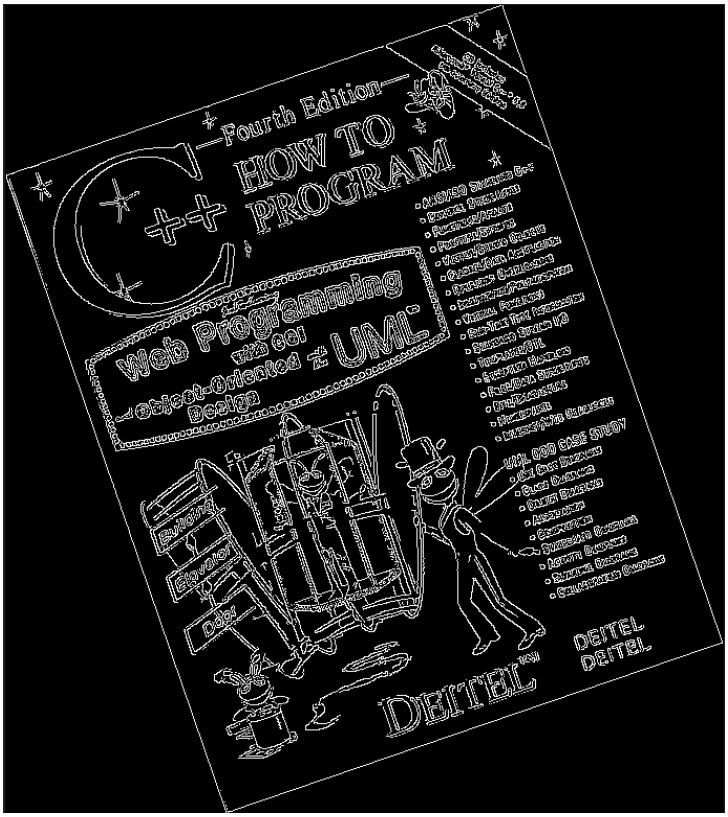
Chess


1
Cin Ali'nin
Atı


1
Cin Ali'nin
Atı


Fourth Edition
C++
HOW TO PROGRAM
Web Programming with CGI
and Object-Oriented UML Design
Building
Elevator
Door
DEITEL
DEITEL
DEITEL


Fourth Edition
C++
HOW TO PROGRAM
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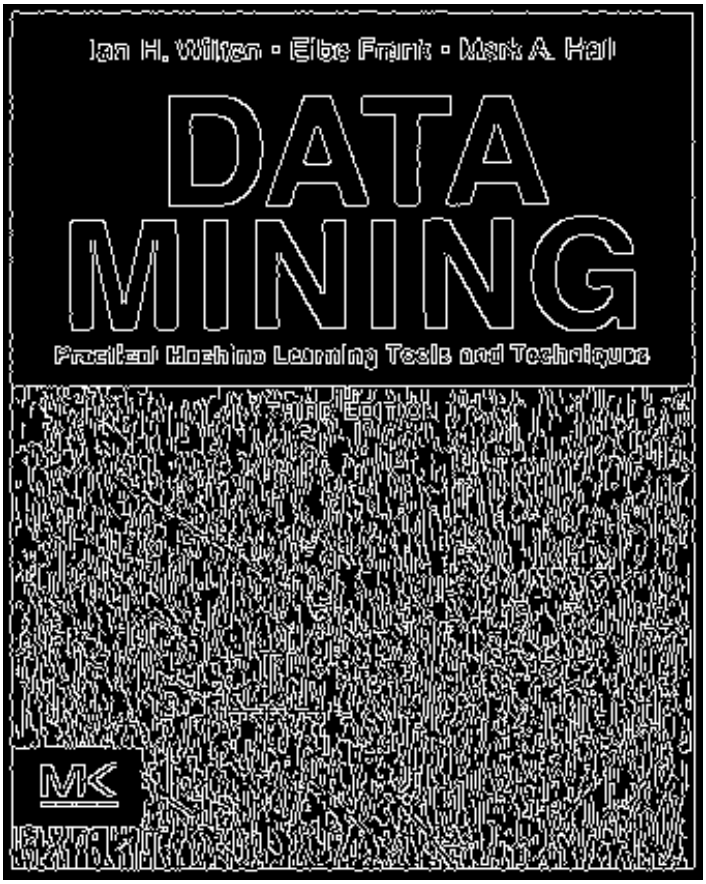
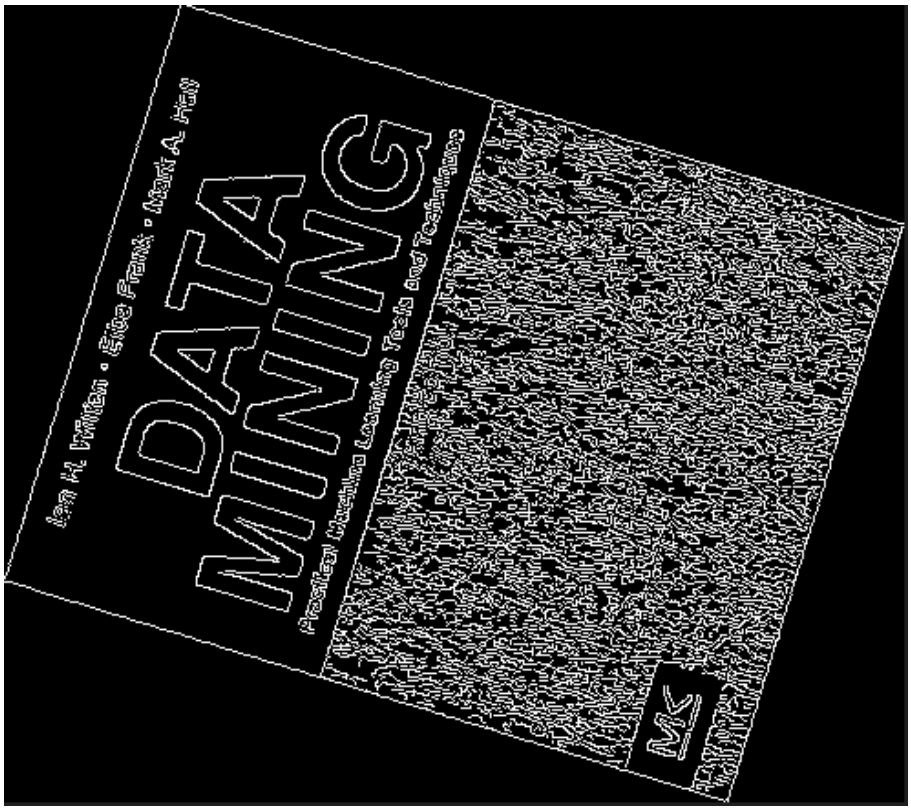
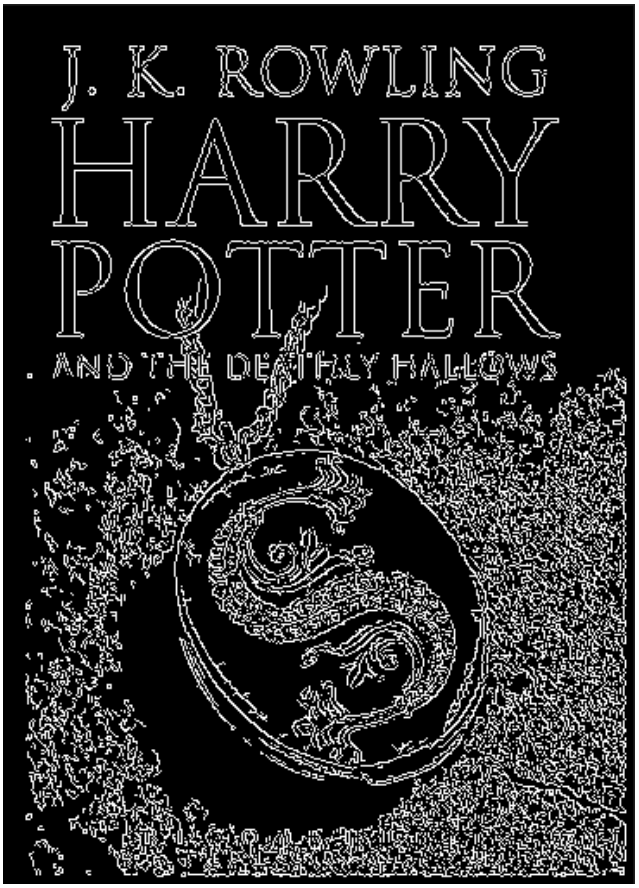
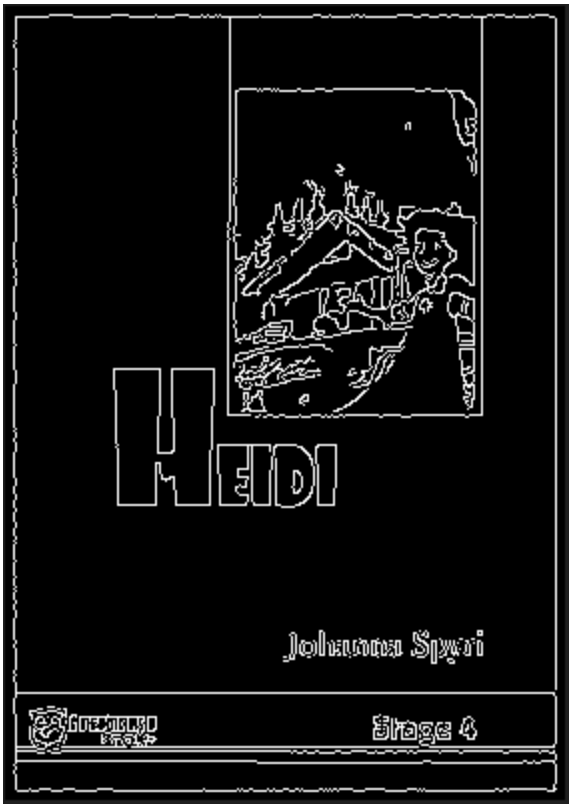
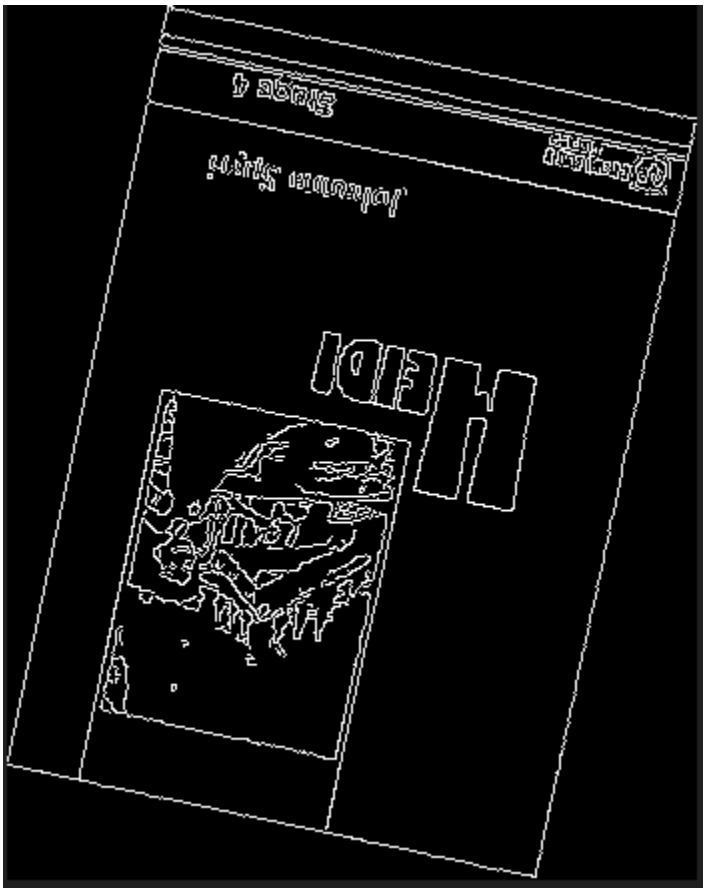
DEITEL
DEITEL
DEITEL


Ian H. Witten • Eibe Frank • Mark A. Hall
DATA
MINING
Practical Machine Learning Tools and Techniques
MK

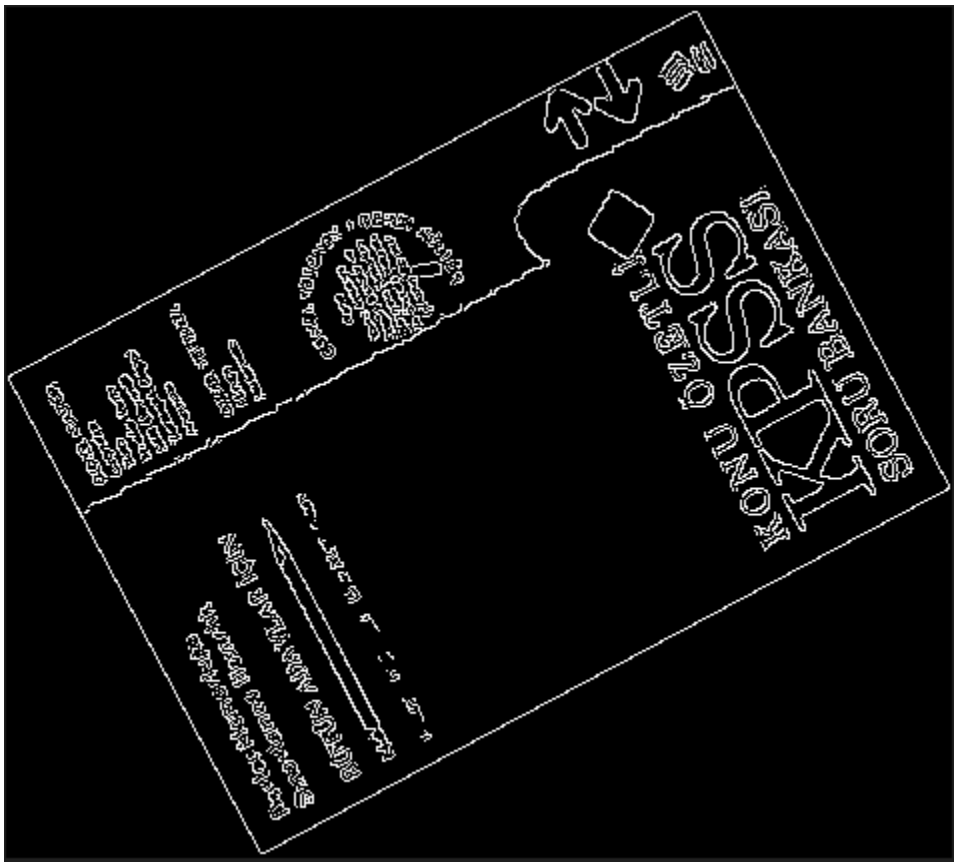

Ian H. Witten • Eibe Frank • Mark A. Hall
DATA
MINING
Practical Machine Learning Tools and Techniques
MK

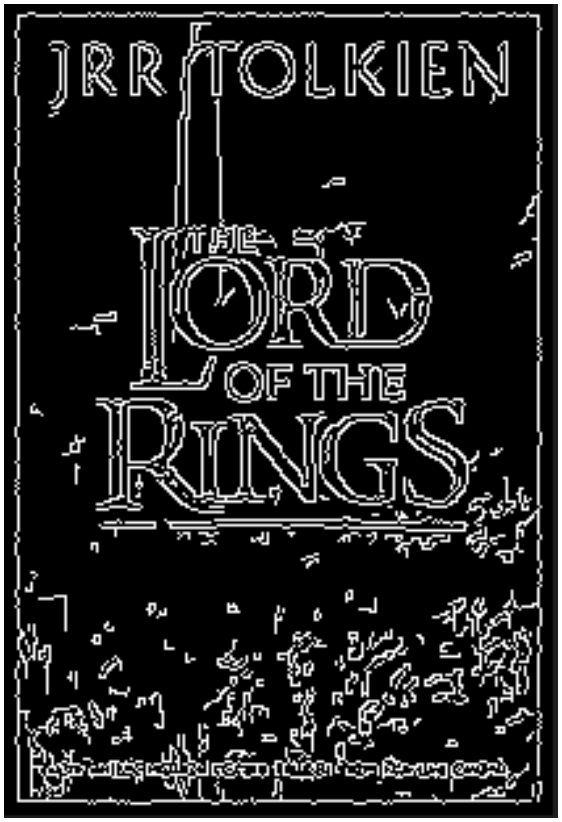

J. K. ROWLING
HARRY
POTTER
AND THE DEATHLY HALLOWS

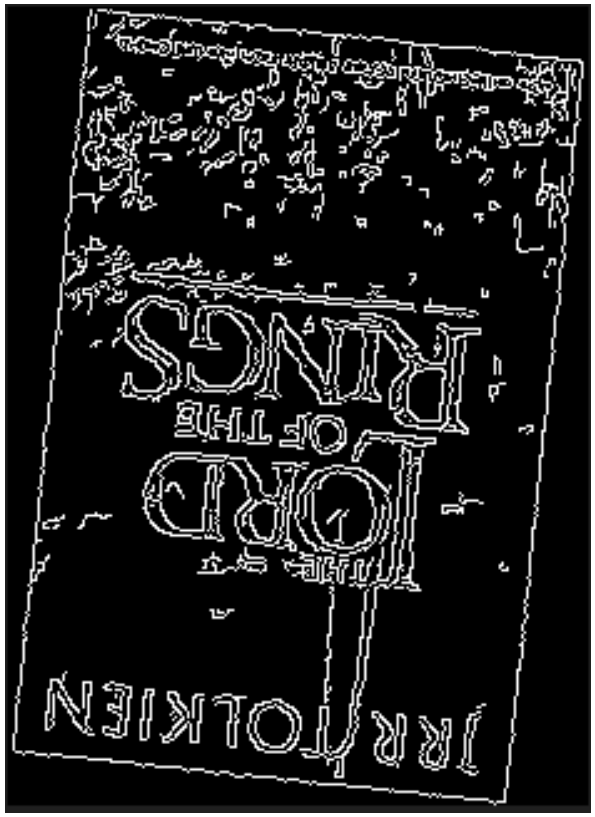

HEIDI
Johanna Spyri
Stage 4



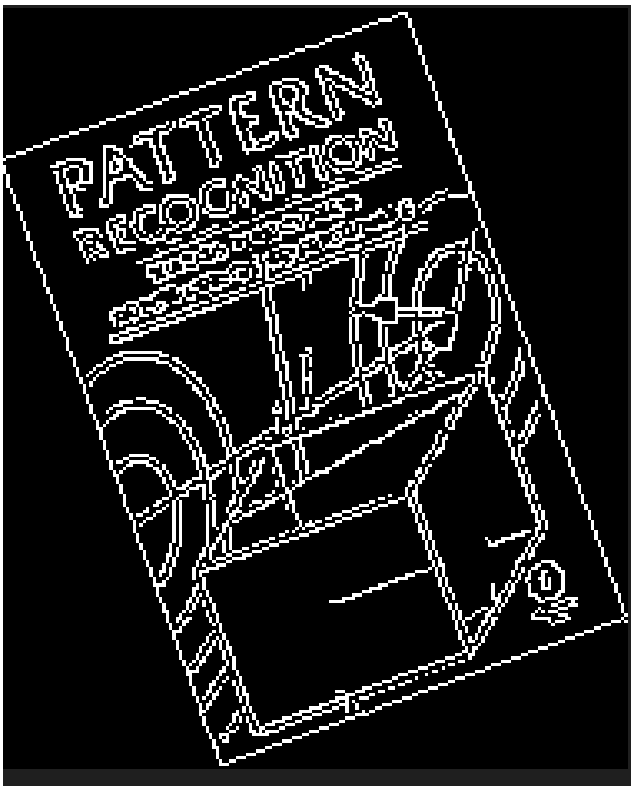

Dahiyel Memurluğu
Sınavlarının Hazırlık
BÜTÜN ADAYLAR İÇİN
KONU ÖZETLİ
KPSS
SORU BANKASI

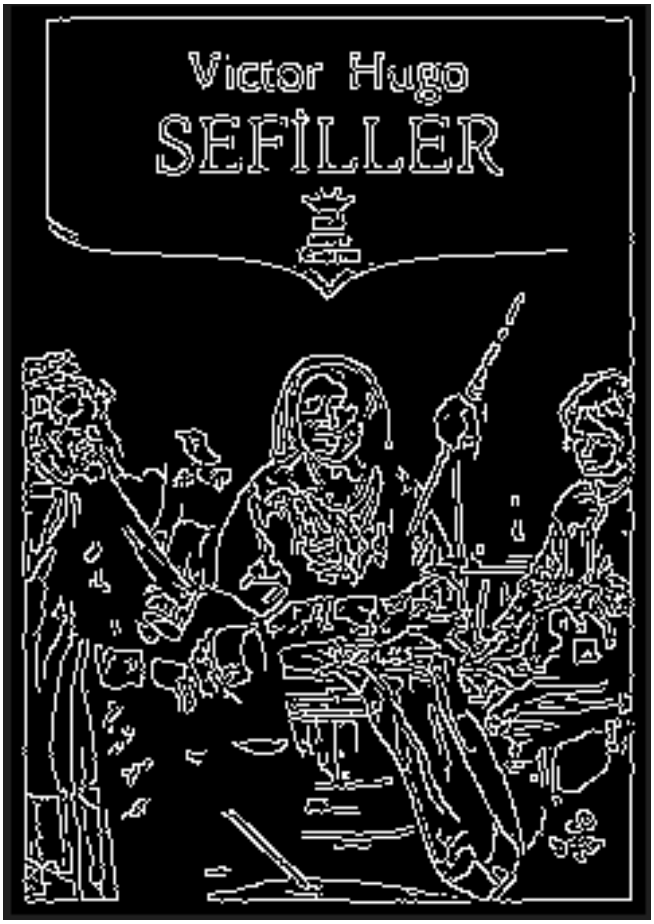


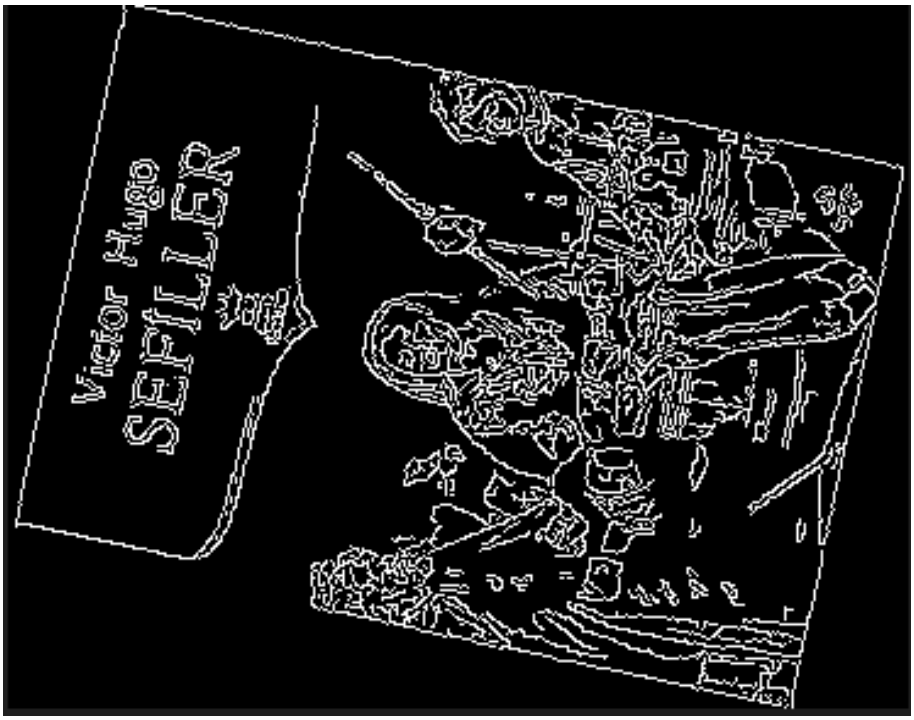

J.R.R. TOLKIEN
THE LORD OF THE RINGS

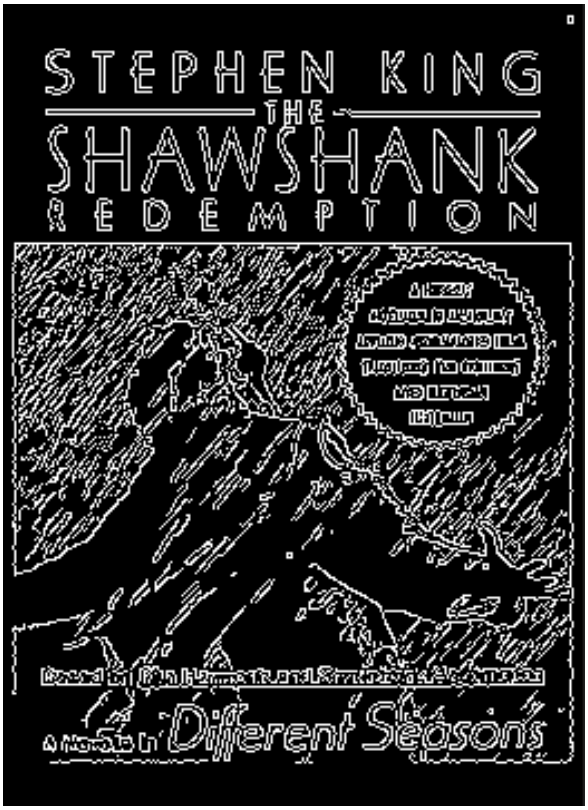


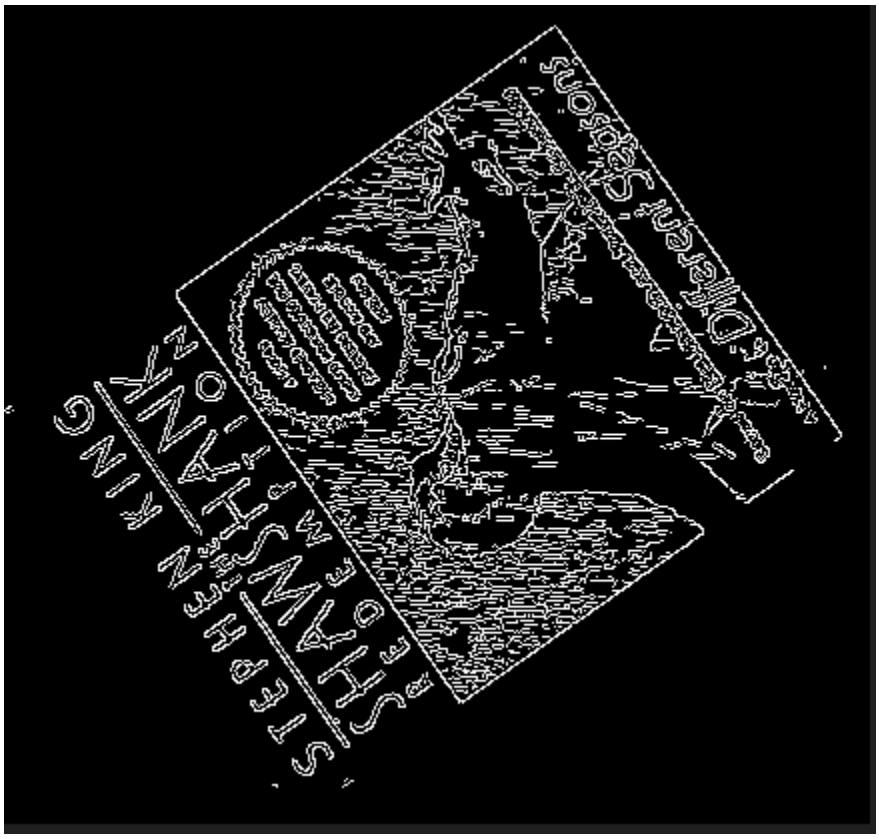

PATTERN
RECOGNITION

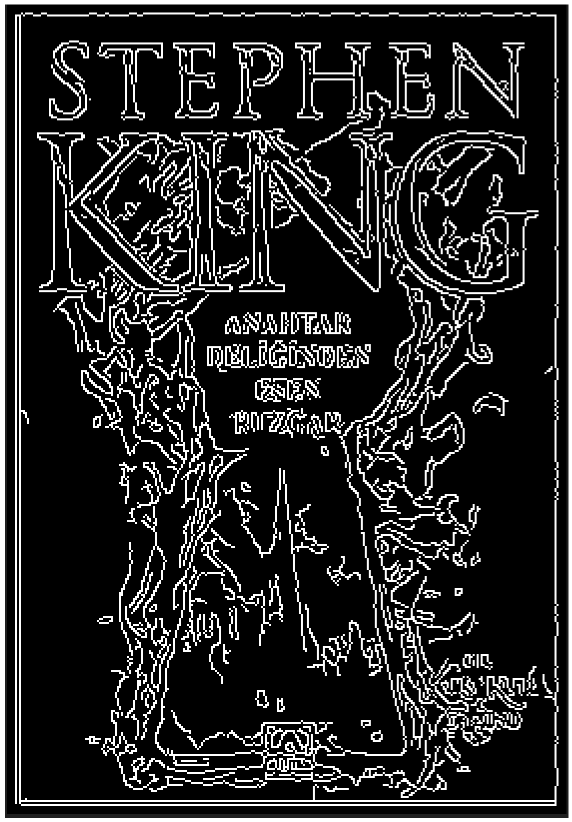

PATTERN
RECOGNITION

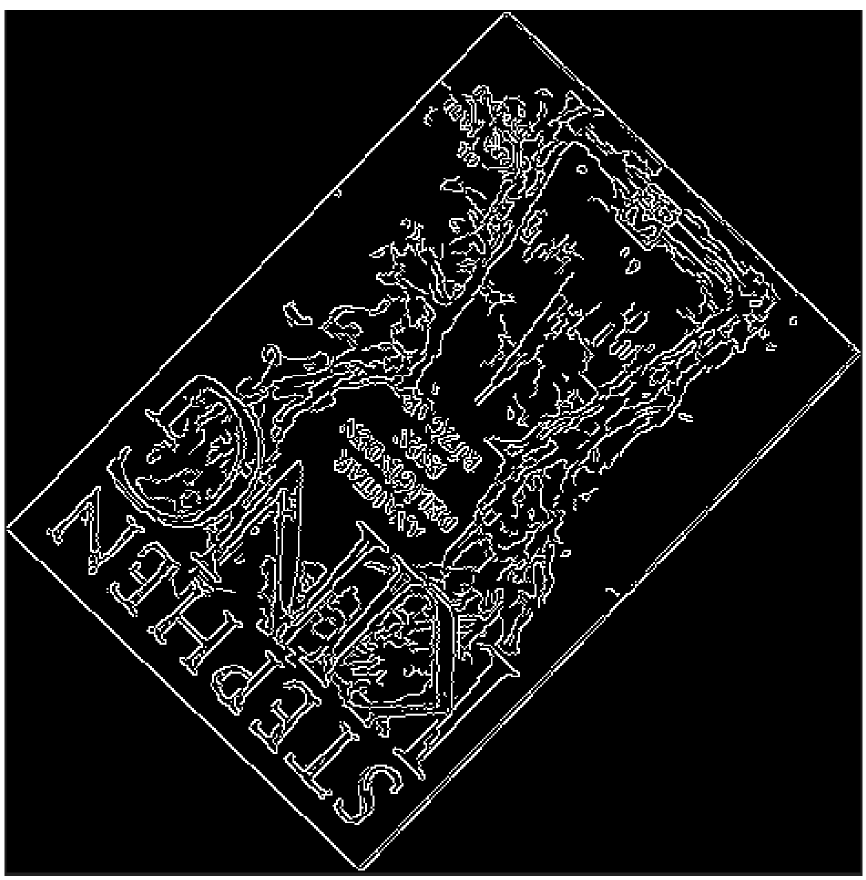

Victor Hugo
SEFİLLER


Victor Hugo
SEFİLLER


STEPHEN KING
THE
SHAWSHANK
REDEMPTION
Different Seasons


STEPHEN KING
THE SHAWSHANK REDEMPTION
Different Seasons

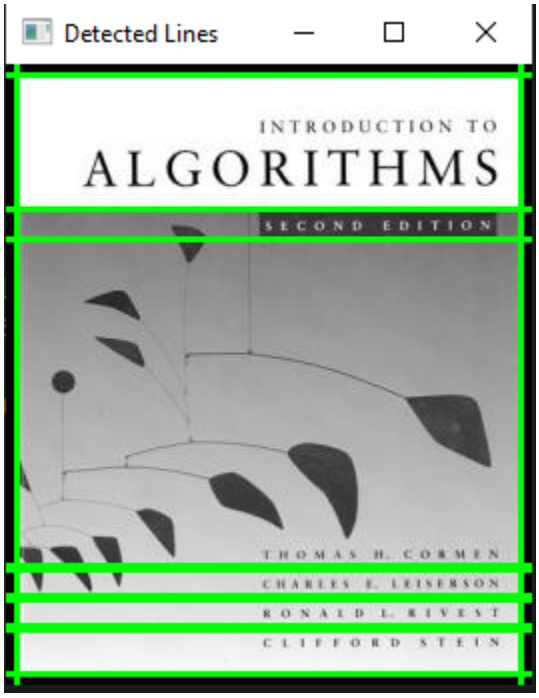

STEPHEN
KING
ANAHTAR
DELİĞİNDEN
ESEN
RÜZGAR

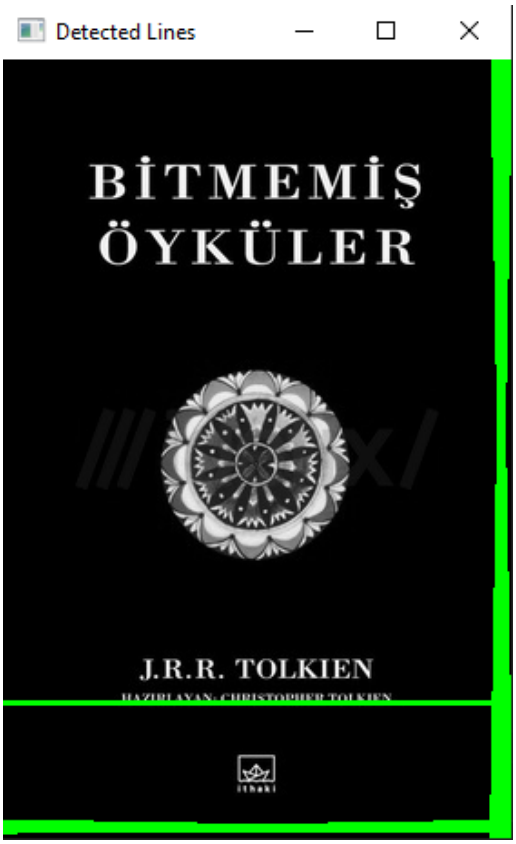


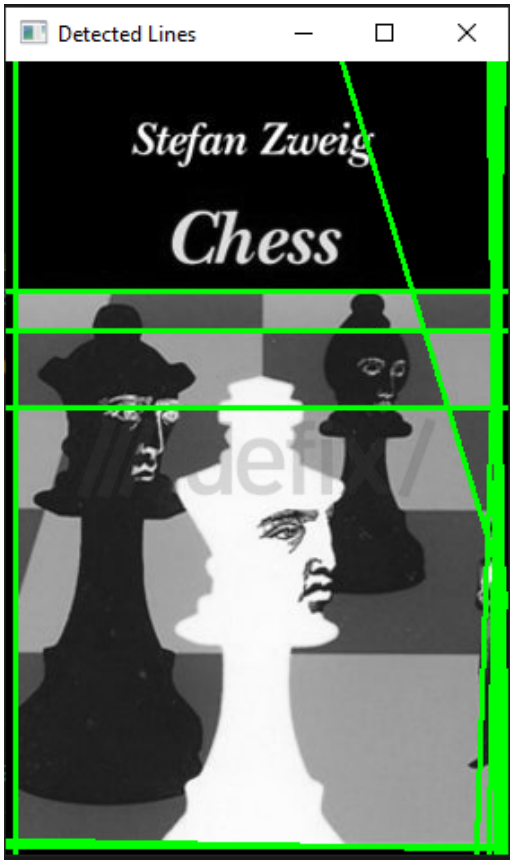
REÇETE KABİLİNDEN
TERS DÜŞÜNLER
Hatice TAŞDELEN

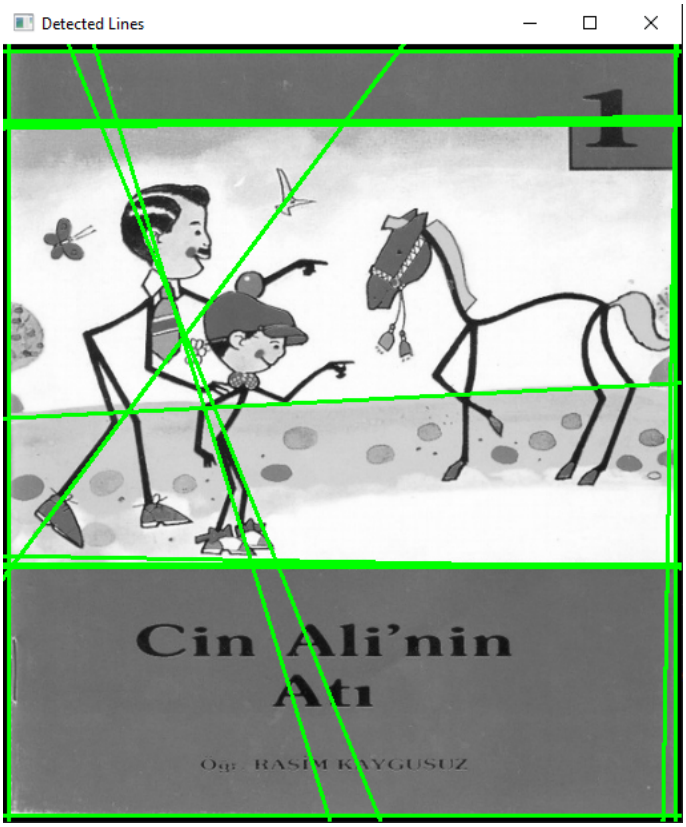
TERS DÜŞÜNLER

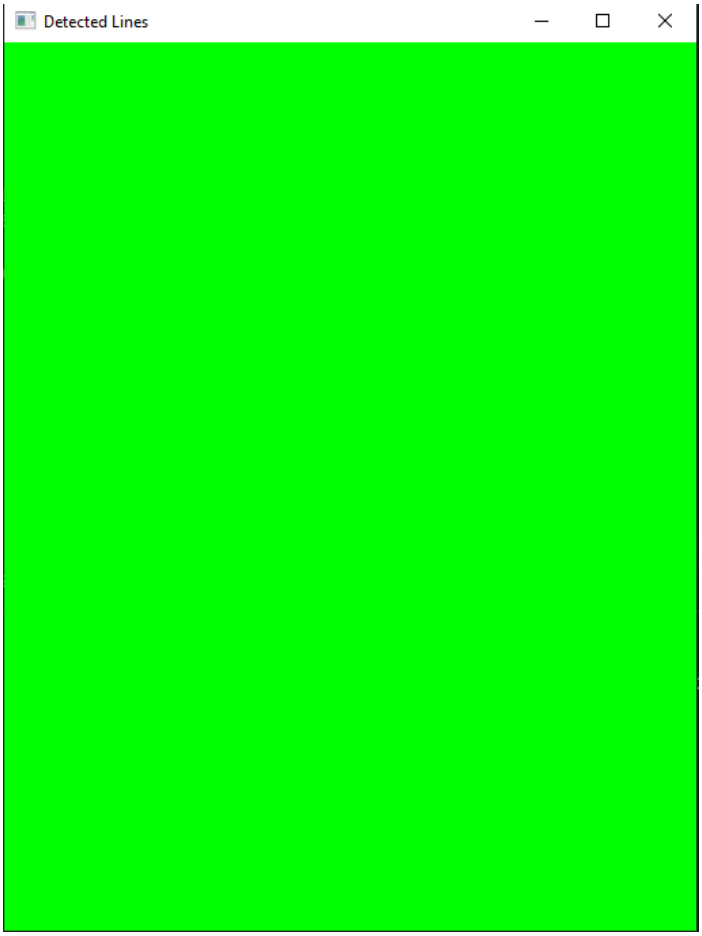
2) The results for line detection in which detected lines are overlayed on the original images

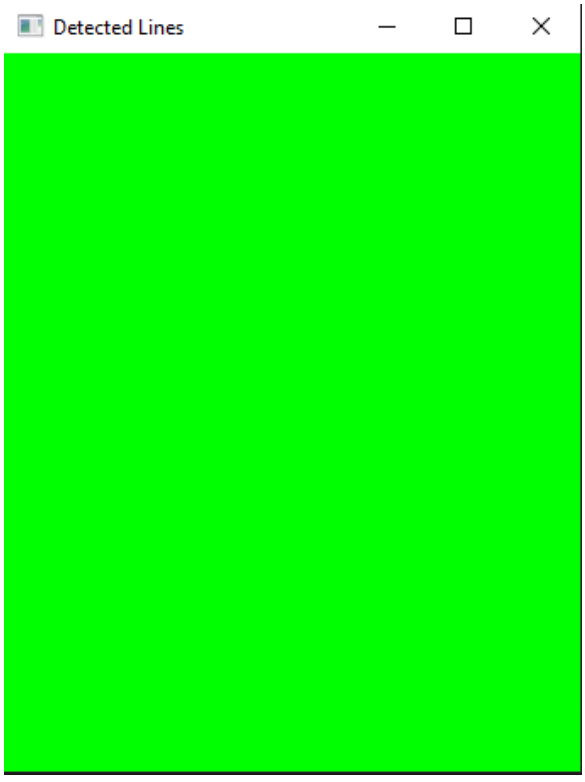


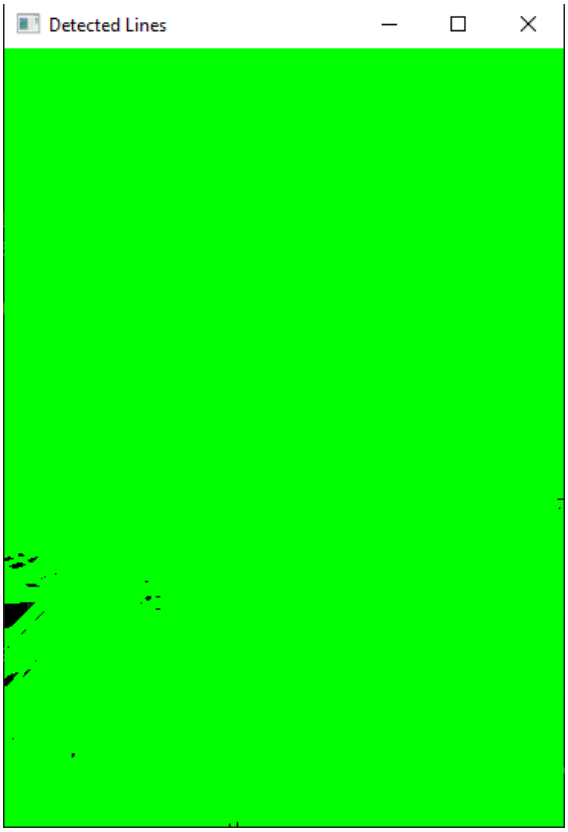


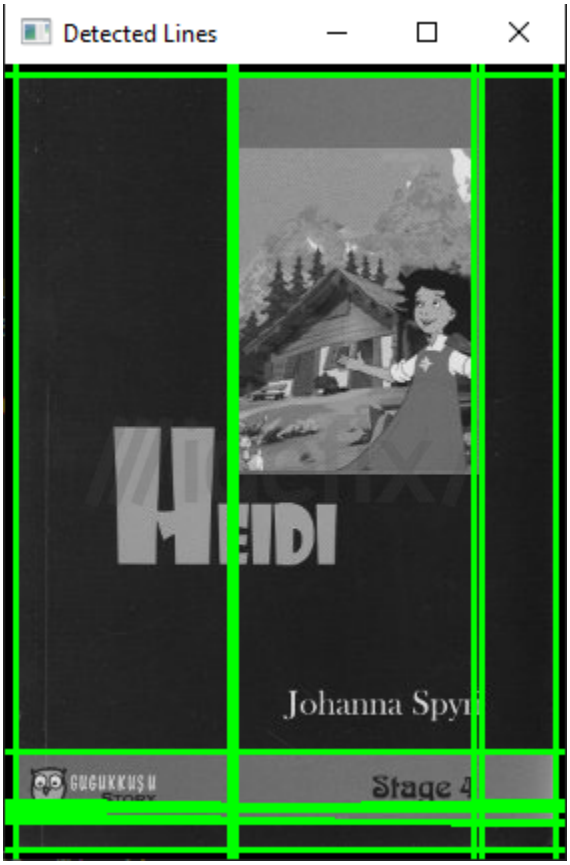

Detected Lines
Stefan Zweig
Chess


Detected Lines
1
Cin Ali'nin
Atı
Oğ. RASİM KAYGUSUZ

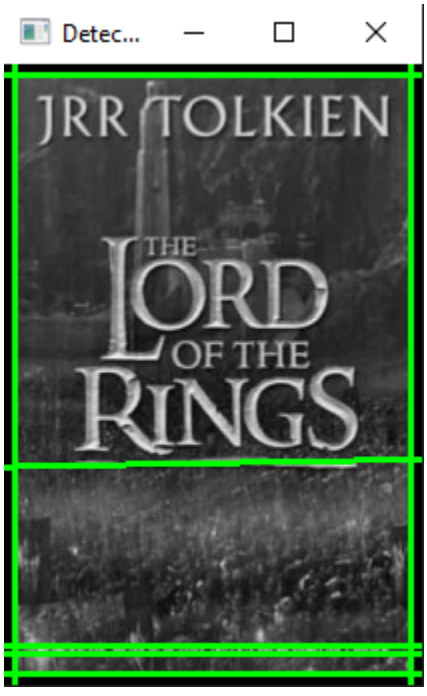

Detected Lines

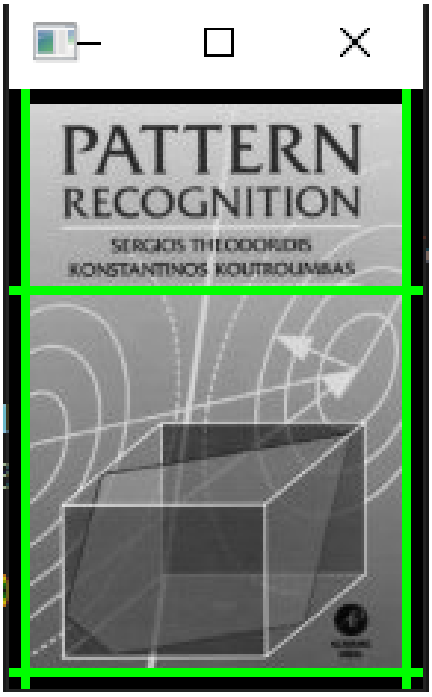

Detected Lines

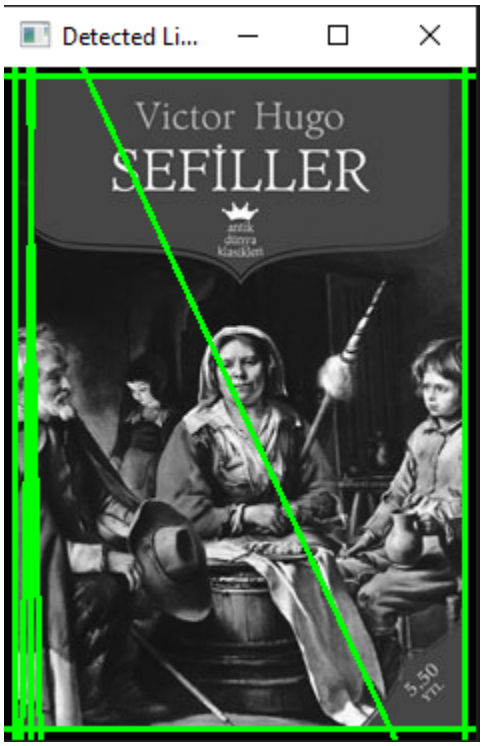

Detected Lines


Detected Lines
HEIDI
Johanna Spyri
Stage 4

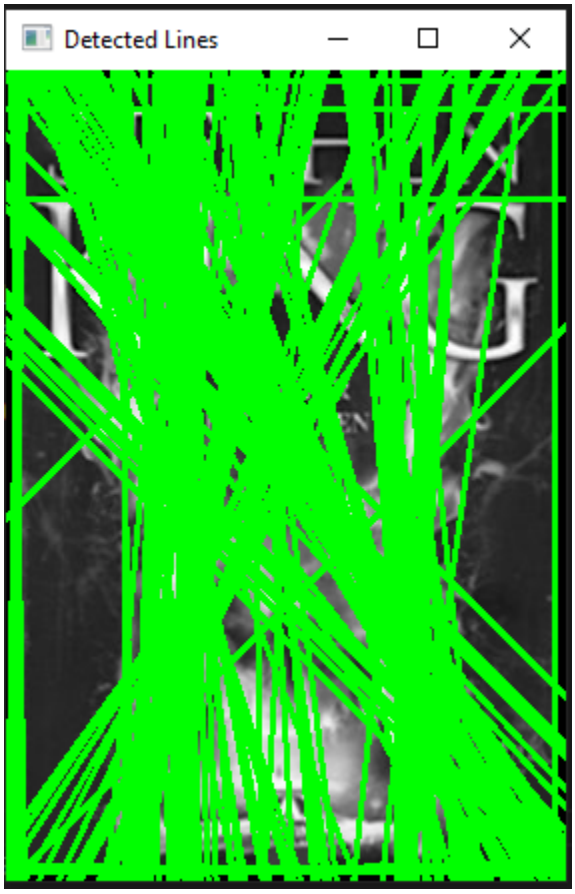

Detected Lines
Devlet Memurluğu
Sınavlarına Hazırlık
BÜTÜN ADAYLAR İÇİN
Lisans - Önlisans - Lise Mezunları
GENEL KÜLTÜR
Coğrafya
Tarih
İnkılâp Tarihi
Milli Güvenlik
Yurttaşlık Bilgisi
Anayasa
GENEL YETENEK
Türkçe
Matematik
GENEL YETENEK
GENEL KÜLTÜR
KONU ÖZETLİ
KPSS
SORU BANKASI


Detec...
JRR TOLKIEN
THE
LORD
OF THE
RINGS

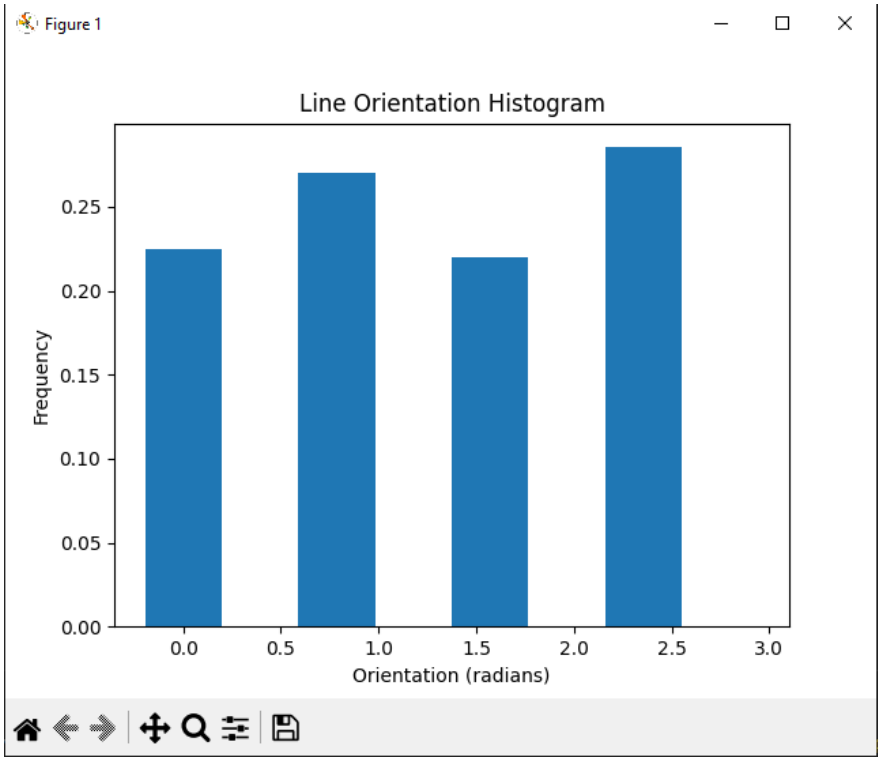

PATTERN
RECOGNITION
SERGIOS THEODORIDIS
KONSTANTINOS KOUTROUMBAS


Detected Li...
Victor Hugo
SEFİLLER
5,50
YTL


Detected Lines


Detected Lines

3) Example line orientation histograms



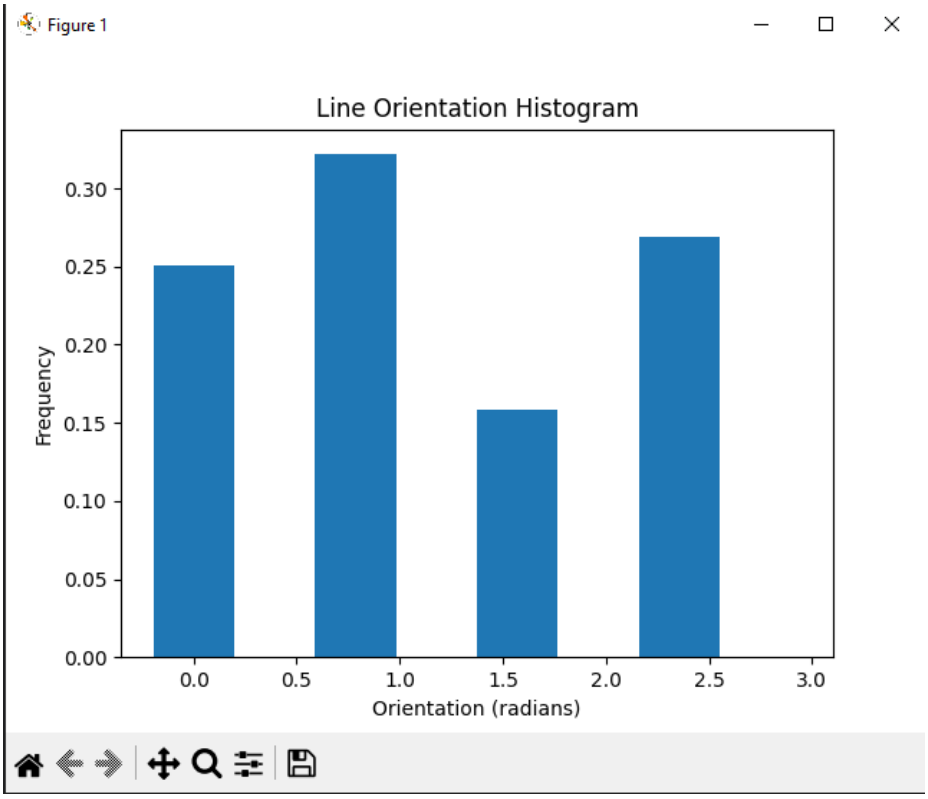


Figure 1
Line Orientation Histogram
Frequency
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Orientation (radians)

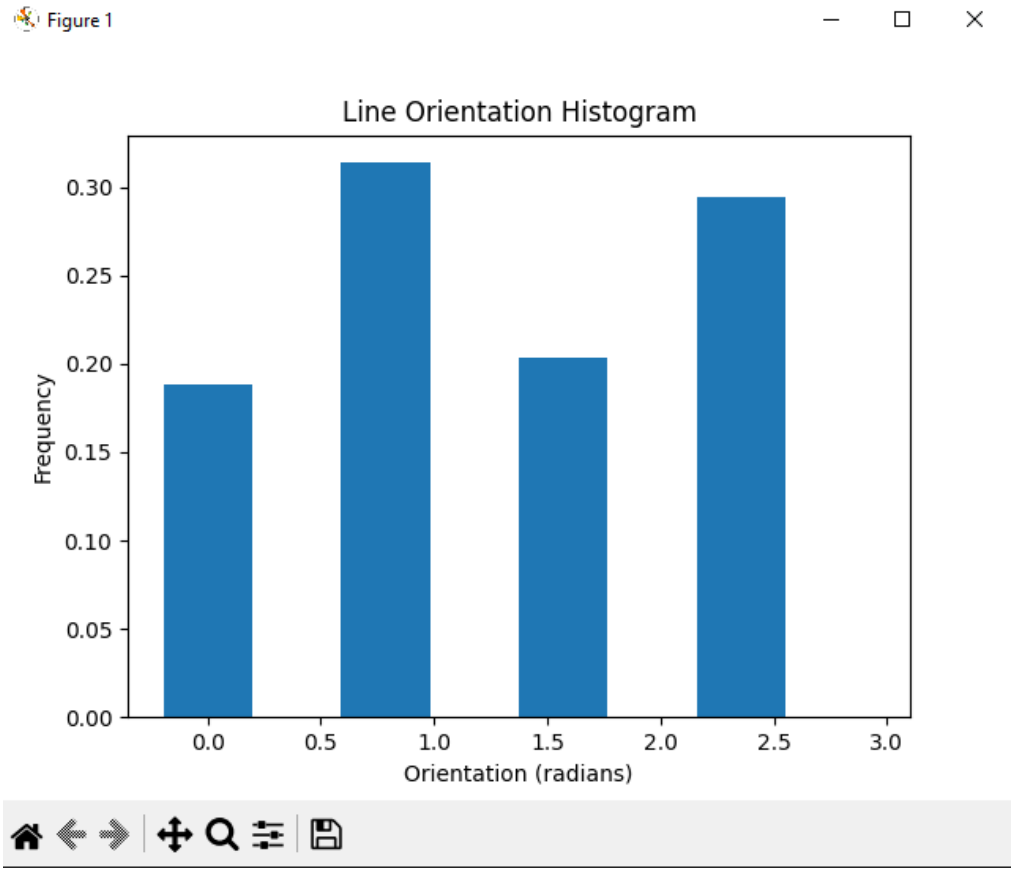


Figure 1
Line Orientation Histogram
Frequency
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Orientation (radians)

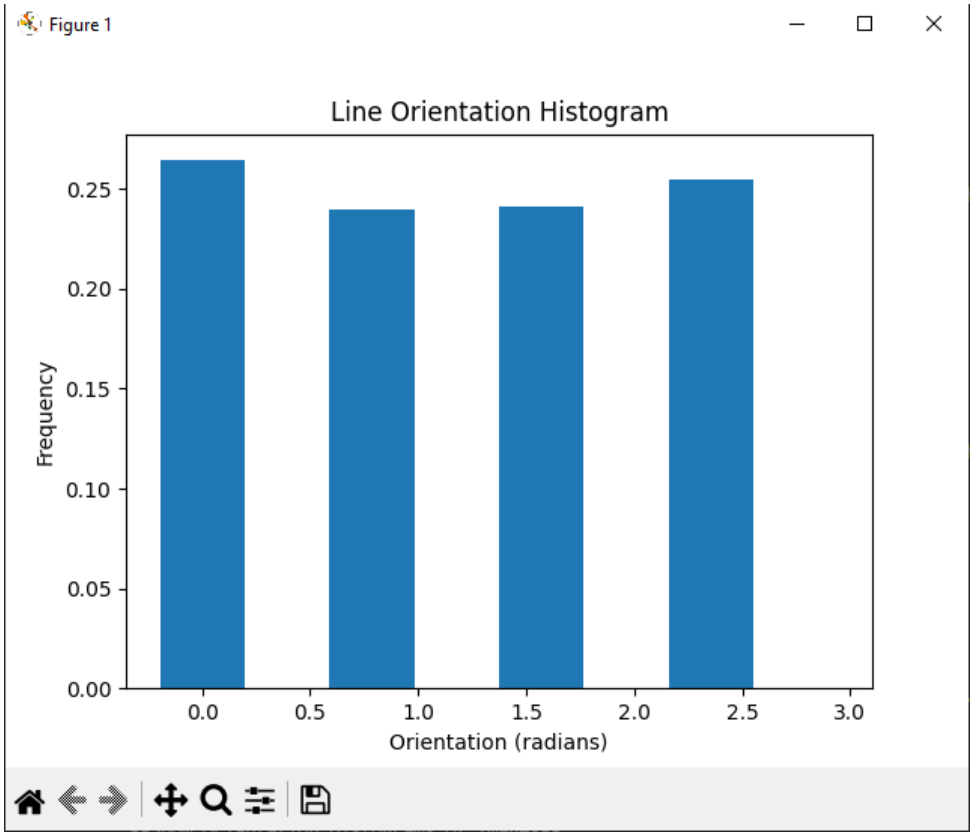


Figure 1
Line Orientation Histogram
Frequency
0.00
0.05
0.10
0.15
0.20
0.25
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Orientation (radians)

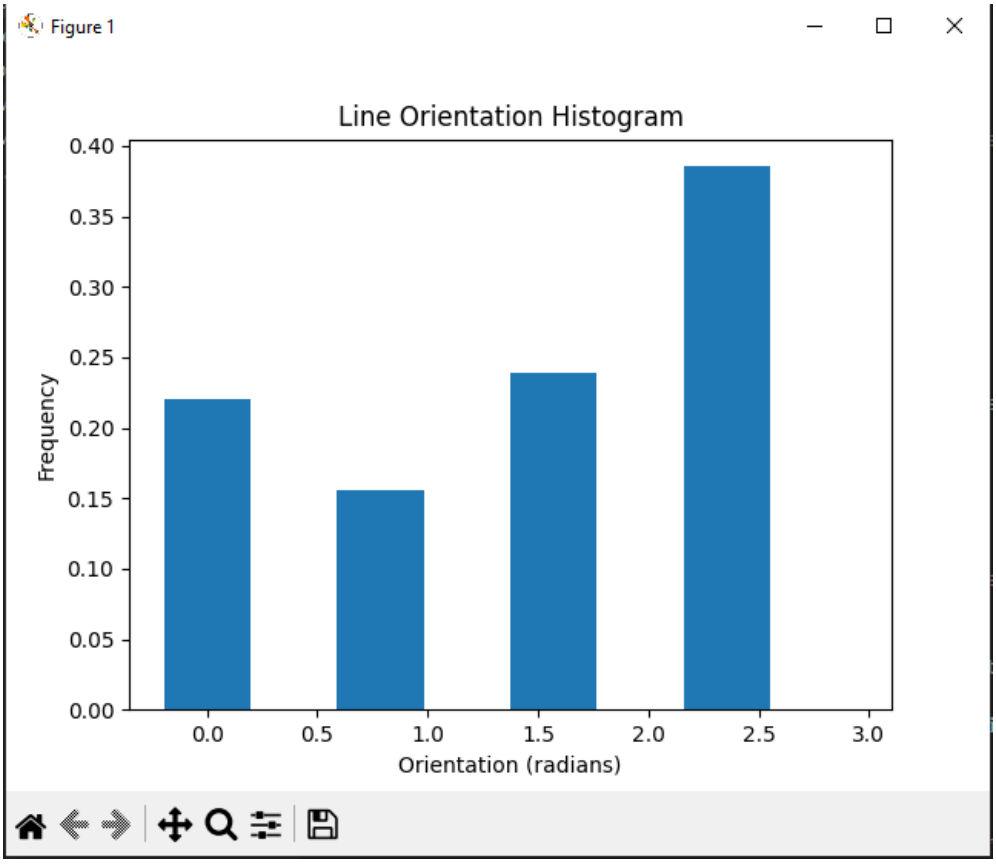


Figure 1
Line Orientation Histogram
Frequency
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Orientation (radians)

4) Results for matching the rotated books to the original books as well as the estimated rotation angles

```
PS C:\Users\Tugberk\Desktop\21802480_hw2> & C:/Users/Tugberk/AppData/Local/Programs/Python/Python311/python.exe c:/Users/Tugberk/Desktop/21802480_hw2/findMatch.py
--Show Edge Detected Images--

--Show Overlaying Lines on Original Images--

--Show Oriantation Histograms of Images--

--Find Matching Images--

Match found for  4 . original image as  1 . rotated image with the rotation angle  0.0

Match found for  10 . original image as  2 . rotated image with the rotation angle  45.0

Match found for  4 . original image as  3 . rotated image with the rotation angle  90.0

Match found for  14 . original image as  4 . rotated image with the rotation angle  90.0

Match found for  9 . original image as  5 . rotated image with the rotation angle  135.0

Match found for  1 . original image as  6 . rotated image with the rotation angle  45.0

Match found for  12 . original image as  7 . rotated image with the rotation angle  135.0

Match found for  2 . original image as  8 . rotated image with the rotation angle  45.0

Match found for  5 . original image as  9 . rotated image with the rotation angle  90.0

Match found for  9 . original image as  10 . rotated image with the rotation angle  135.0

Match found for  14 . original image as  11 . rotated image with the rotation angle  135.0

Match found for  10 . original image as  12 . rotated image with the rotation angle  45.0

Match found for  12 . original image as  13 . rotated image with the rotation angle  90.0

Match found for  6 . original image as  14 . rotated image with the rotation angle  135.0

Match found for  1 . original image as  15 . rotated image with the rotation angle  0.0
```

References

“Canny edge detection,” *OpenCV*. [Online]. Available: https://docs.opencv.org/3.4/da/d22/tutorial_py_canny.html. [Accessed: 26-Apr-2023].

“Hough Line transform,” *OpenCV*. [Online]. Available: https://docs.opencv.org/3.4/d9/db0/tutorial_hough_lines.html. [Accessed: 26-Apr-2023].