UNIVERSIDAD TÉCNICA DEL NORTE
FACULTAD DE INGENIERÍA EN CIENCIAS APLICADAS
CARRERA DE SOFTWARE
ASIGNATURA: Inteligencia Artificial NIVEL: 06

Nombres completos:	Salazar Anrango Mario Andrés
Fecha:	12 de junio de 2022
Tema:	Detección de líneas y círculos con la transformada de Hough

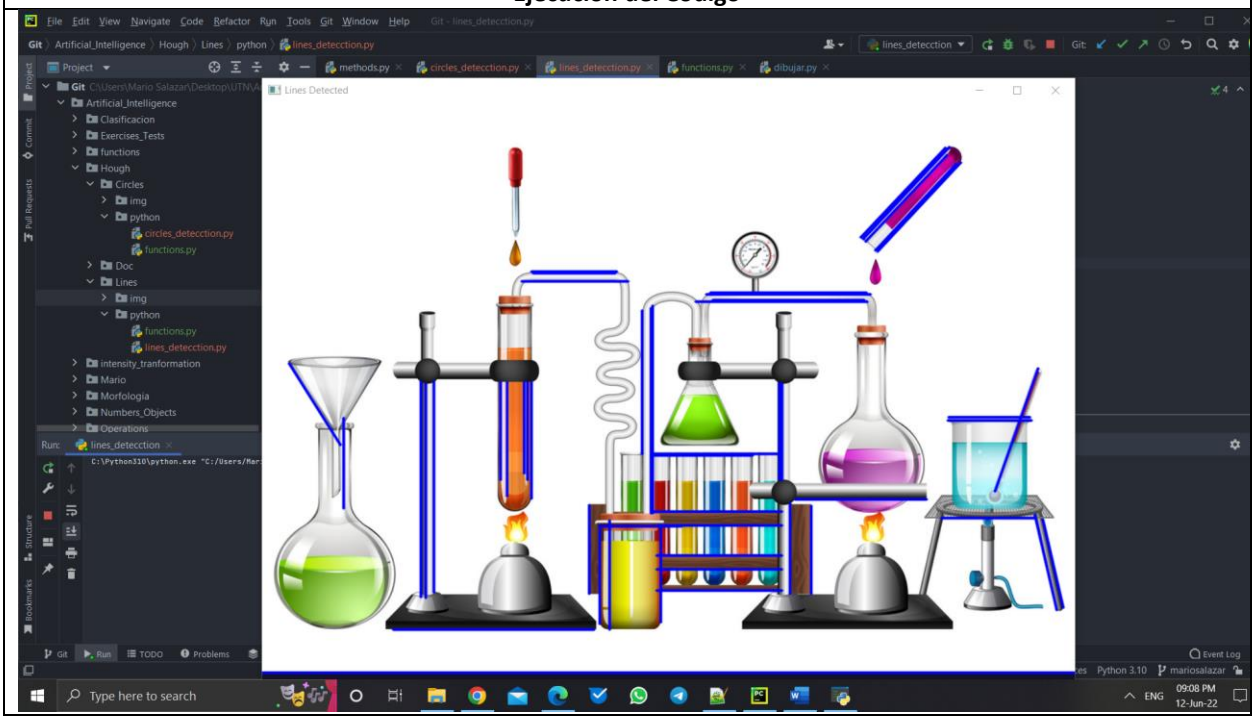
Transformada de Hough

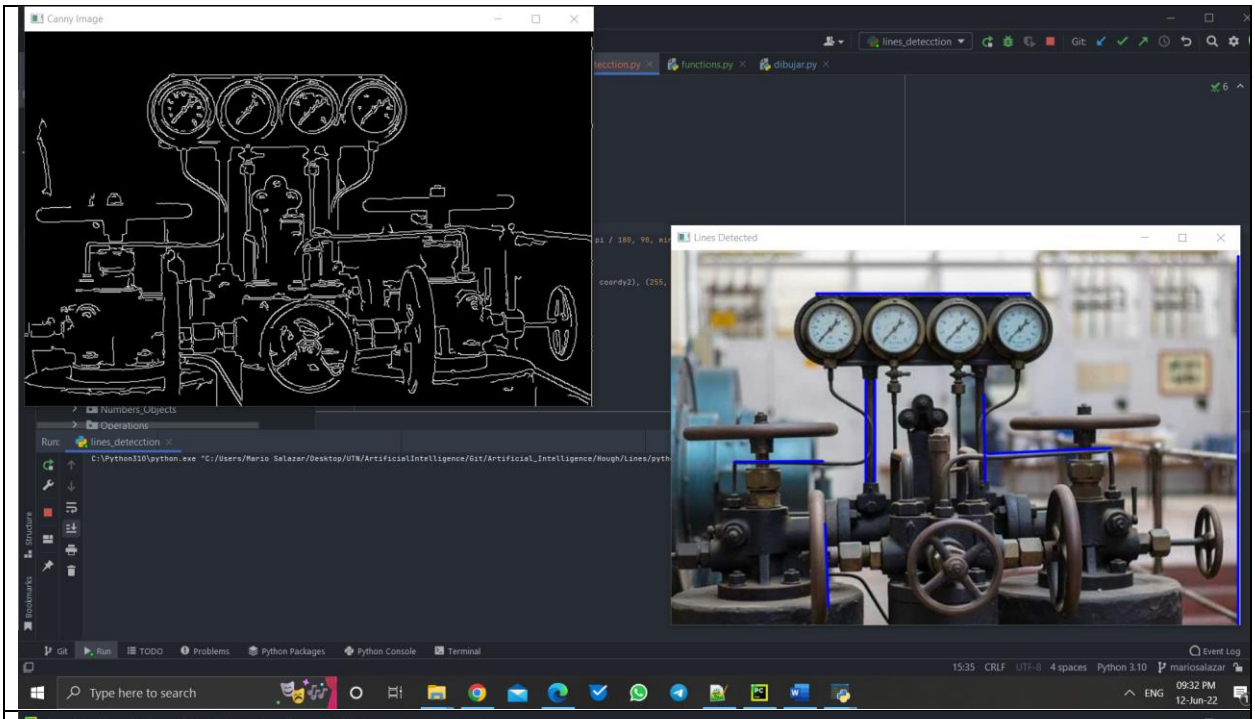
Detección de líneas en Python

Código en Python

```
import cv2 as opencv
import numpy as numpy
import functions as mario

file = "../img/set-science-equipments.jpg"
image = mario.ReadImage(file)
gray = mario.GrayImageCOLOR_BGR2GRAY(file)
canny = mario.Canny(file, 100, 255)
lines_detected = opencv.HoughLinesP(canny, 1, numpy.pi / 150, 90, minLineLength=100, maxLineGap=5)

for line in lines_detected:
    coordx1, coordy1, coordx2, coordy2 = line[0]
    opencv.line(image, (coordx1, coordy1), (coordx2, coordy2), (255, 0, 0), 2, opencv.LINE_AA)

opencv.imshow('Canny Image', canny)
opencv.imshow('Lines Detected', image)
opencv.waitKey()
```

Ejecución del Código




Canny Image
Lines Detected
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Operations
Run:
C:\Python310\python.exe "C:/Users/Mario Salazar/Desktop/UTN/ArtificialIntelligence/Git/Artificial_Intelligence/Hough/Lines/pyth
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Problems
Python Packages
Python Console
Terminal
Event Log
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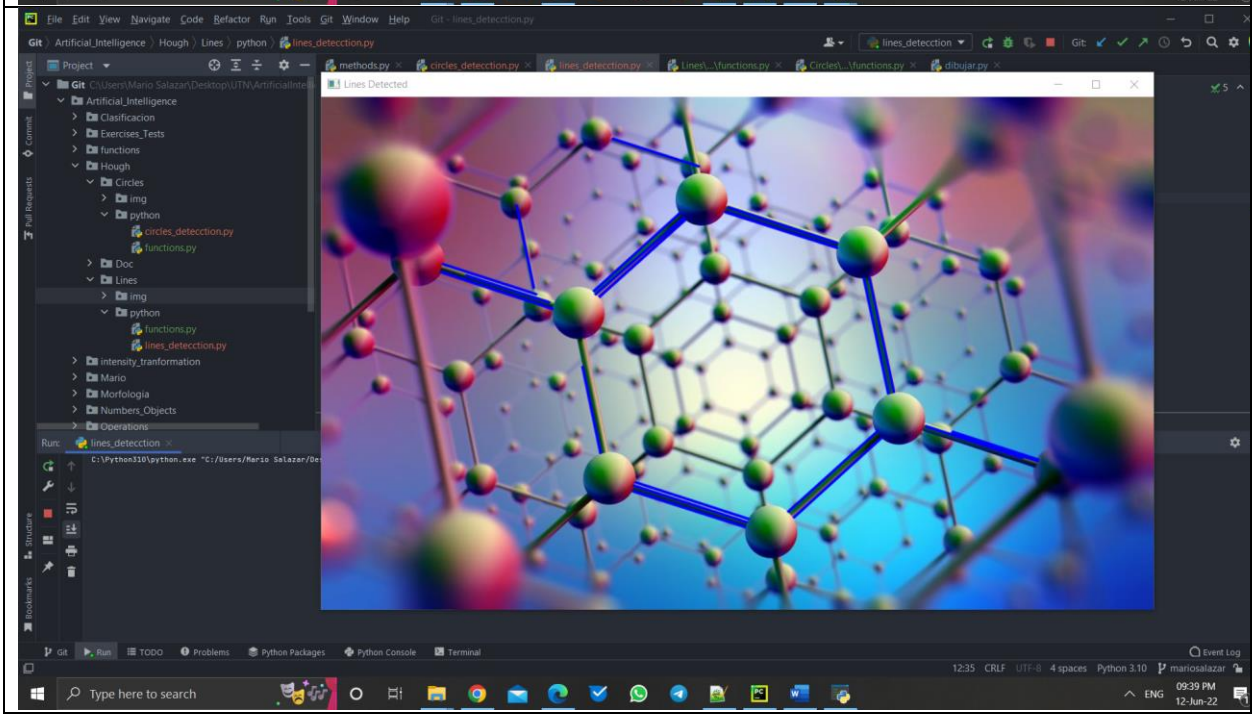
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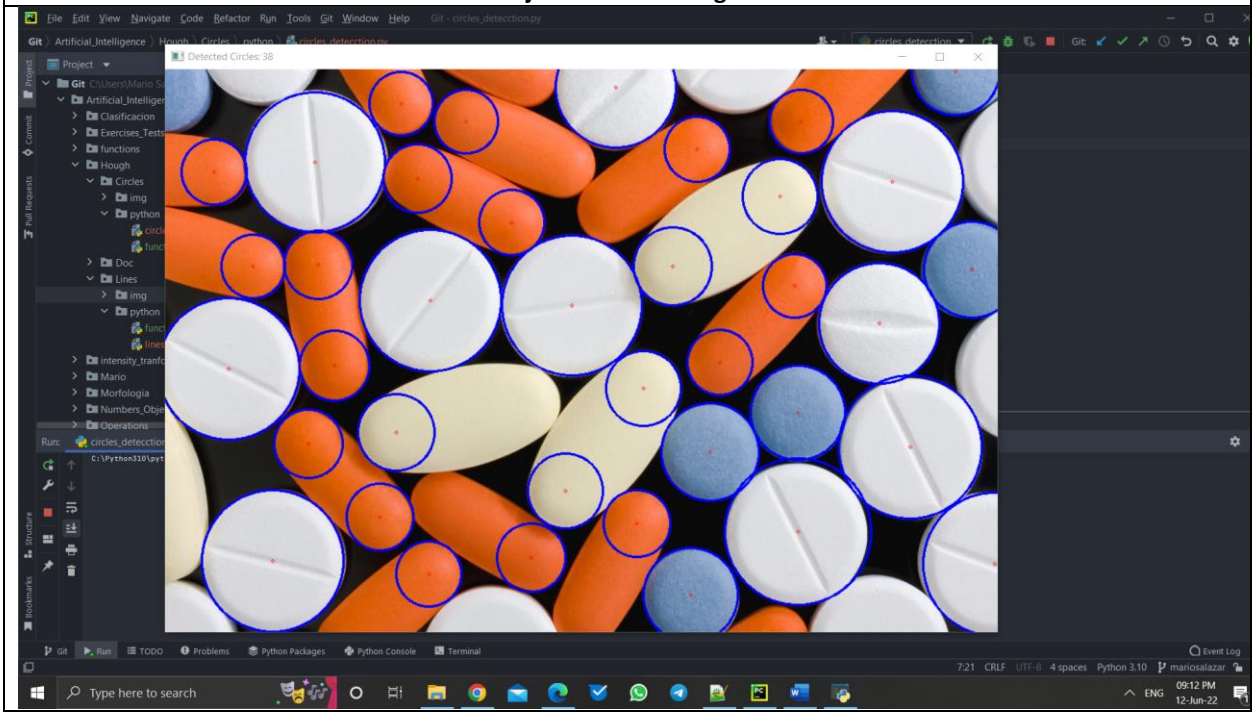
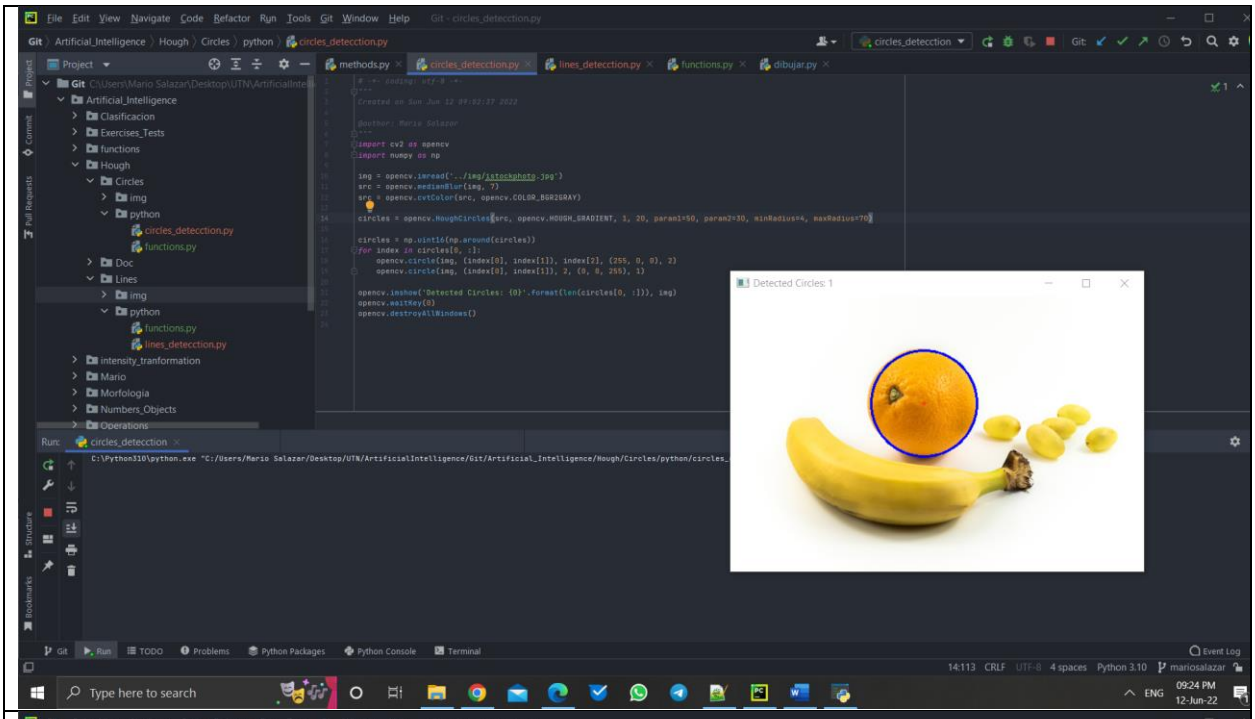
Detección de círculos en Python

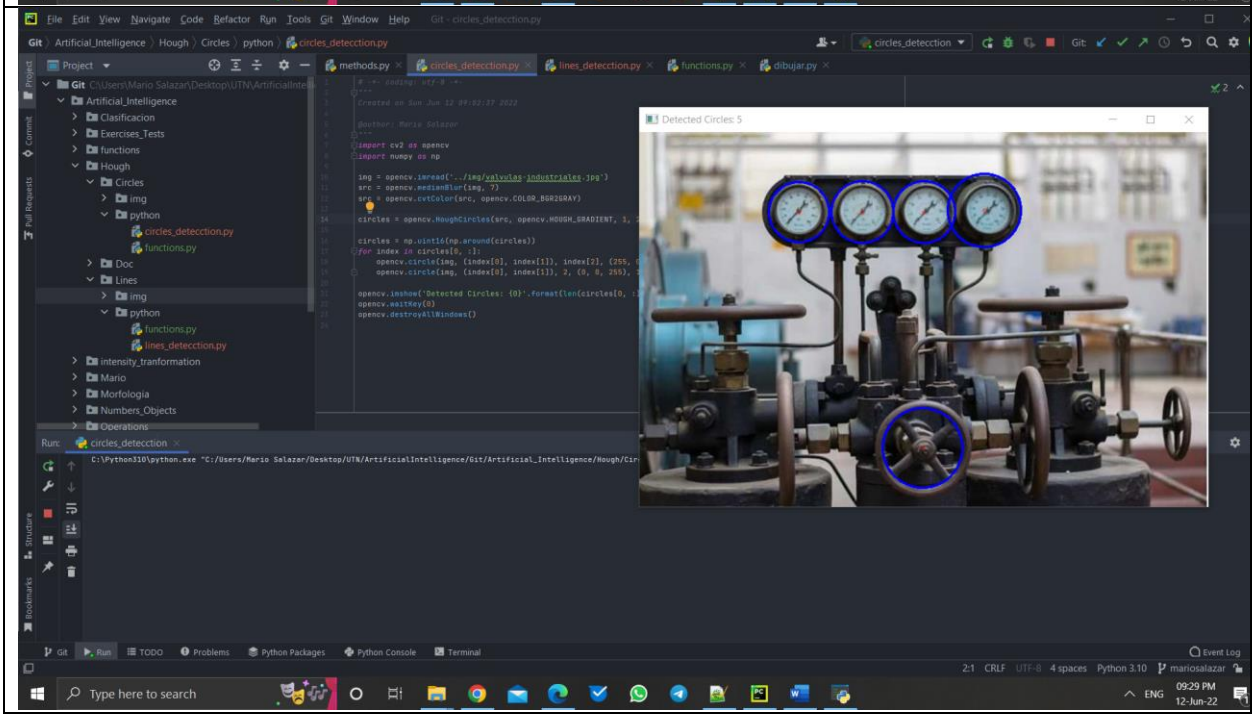
Código en Python

```
import cv2 as opencv
import numpy as np

img = opencv.imread('../img/custom_resized.jpg')
src = opencv.medianBlur(img, 7)
src = opencv.cvtColor(src, opencv.COLOR_BGR2GRAY)

circles = opencv.HoughCircles(src, opencv.HOUGH_GRADIENT, 1, 20, param1=50, param2=30, minRadius=4,
maxRadius=100)

circles = np.uint16(np.around(circles))
for index in circles[0, :]:
    opencv.circle(img, (index[0], index[1]), index[2], (255, 0, 0), 2)
    opencv.circle(img, (index[0], index[1]), 2, (0, 0, 255), 1)

opencv.imshow('Detected Circles: {0}'.format(len(circles[0, :])), img)
opencv.waitKey(0)
opencv.destroyAllWindows()
```

Ejecución del Código




Detected Circles: 1


Detected Circles: 5