

Додаток А

Код програми модуля

```
pip install ultralytics RPi.GPIO
```

```
import cv2
from ultralytics import YOLO
import RPi.GPIO as GPIO
import time
```

```
GPIO.setmode(GPIO.BCM)
GRAB_PIN = 5
MOVE_PIN = 6
DESTROY_PIN = 13
RETURN_PIN = 19
RELEASE_PIN = 26
```

```
GPIO.setup(GRAB_PIN, GPIO.OUT)
GPIO.setup(MOVE_PIN, GPIO.OUT)
GPIO.setup(DESTROY_PIN, GPIO.OUT)
GPIO.setup(RETURN_PIN, GPIO.OUT)
GPIO.setup(RELEASE_PIN, GPIO.OUT)
```

```
class DetectionAlgo:
    def __init__(self):
        self.model = YOLO("yolov8n.pt")

    def detect_from_image(self, image_path):
        results = self.model([image_path])

        for result in results:
            self.process_change(result)

    def detect_from_camera(self):
        cap = cv2.VideoCapture(0)

        while cap.isOpened():
            success, frame = cap.read()

            if success:
                # Track objects in frames if available
                results = self.model.track(frame, persist=True)
```

```

res_plotted = results[0].plot()
cv2.imshow(f"Tracking_Stream", res_plotted)

self.process_change(results)
# Break the loop if 'q' is pressed
if cv2.waitKey(1) & 0xFF == ord("q"):
    break
else:
    # Break the loop if the end of the video is reached
    break

# Release the video capture object and close the display window
cap.release()
cv2.destroyAllWindows()

def move_manipulator(self, pin):
    GPIO.output(pin, GPIO.HIGH)
    time.sleep(1)
    GPIO.output(pin, GPIO.LOW)

def destroy_bomb(self):

    self.move_manipulator(GRAB_PIN)
    time.sleep(1)
    self.move_manipulator(MOVE_PIN)
    time.sleep(2)
    self.move_manipulator(RELEASE_PIN)
    time.sleep(1)
    self.move_manipulator(RETURN_PIN)
    time.sleep(2)
    self.move_manipulator(DESTROY_PIN)
    time.sleep(1)

def process_change(self, result):
    cls = result.bboxes.cls.tolist()
    conf = result.bboxes.conf.tolist()
    result.save(filename="result.jpg")
    print(cls, conf)
    if cls[0] == 0 and conf[0] >= 0.75:
        self.destroy_bomb()

d = DetectionAlgo()
d.detect_from_image("")
GPIO.cleanup()

```

ДОДАТОК Б

Демонстраційний матеріал

