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# smart_energy_saver.py

import cv2
import RPi.GPIO as GPIO
import time

# Setup relay
RELAY_PIN = 17 # GPIO pin connected to relay
GPIO.setmode(GPIO.BCM)
GPIO.setup(RELAY_PIN, GPIO.OUT)
GPIO.output(RELAY_PIN, GPIO.LOW) # OFF initially

# Person detection using HOG
hog = cv2.HOGDescriptor()
hog.setSVMDetector(cv2.HOGDescriptor_getDefaultPeopleDetector())

# Camera setup
cap = cv2.VideoCapture(0)

last_seen_time = time.time()
OFF_DELAY = 120 # Delay before turning off devices

print("System running. Press 'q' to exit.")

while True:
    ret, frame = cap.read()
    if not ret:
        break

    frame = cv2.resize(frame, (640, 480))

    (boxes, weights) = hog.detectMultiScale(frame, winStride=(8,8))

    if len(boxes) > 0:
        print("Person detected.")
        last_seen_time = time.time()
        GPIO.output(RELAY_PIN, GPIO.HIGH)
    else:
        print("No person detected.")

    if time.time() - last_seen_time > OFF_DELAY:
        GPIO.output(RELAY_PIN, GPIO.LOW)

    for (x, y, w, h) in boxes:

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        cv2.rectangle(frame, (x, y), (x + w, y + h), (0, 255, 0), 2)

cv2.imshow("Occupancy Monitor", frame)

if cv2.waitKey(1) & 0xFF == ord('q'):
    break

cap.release()
cv2.destroyAllWindows()
GPIO.cleanup()
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