Yahboom Raspberry Pi Line-Following Robot

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A Python script to control your Yahboom Raspberry Pi kit so it follows a black line using IR sensors and basic motor commands.

1. Overview

Read left/right line sensors and drive two DC motors to keep the robot centered on a black line. Press a push-button to start, and use Ctrl+C to stop safely, cleaning up GPIO pins.

2. Hardware Pin Configuration

Function	GPIO Pin
Left motor IN1	20
Left motor IN2	21
Right motor IN3	19
Right motor IN4	2
Motor enable A	16
Motor enable B	13
Left sensor 1	3
Left sensor 2	5
Right sensor 1	4
Right sensor 2	18
Start button	8

3. Motor Control Functions

- forward(): Both motors spin forward
- left(): Pivot left (left motor backward, right motor forward)
- right(): Pivot right (left motor forward, right motor backward)
- stop(): Disable both motors

4. Line-Following Logic

- Read sensors L1, L2 (left) and R1, R2 (right)
- Sensors output LOW (0) on black line, HIGH (1) on white surface

- If L1 and R2 detect black → forward
- If only L1 detects black → turn left
- If only R2 detects black → turn right
- If neither detects black → stop

5. Main Loop

Wait for button press to start. In a continuous loop, read sensor values, execute the corresponding motor command, sleep 10ms, repeat. On Ctrl+C, stop motors and clean up GPIO.

6. Usage

- Wire hardware according to the pin configuration above.
- Install RPi.GPIO: pip install RPi.GPIO
- Run script: sudo python3 line_following.py
- Press the start button to begin line following.

Tips & Extensions

- Adjust conditions to include L2 or R1 for finer control.
- Use PWM on ENA/ENB pins for variable speed control.
- Implement sensor reading smoothing or hardware filtering to reduce noise.