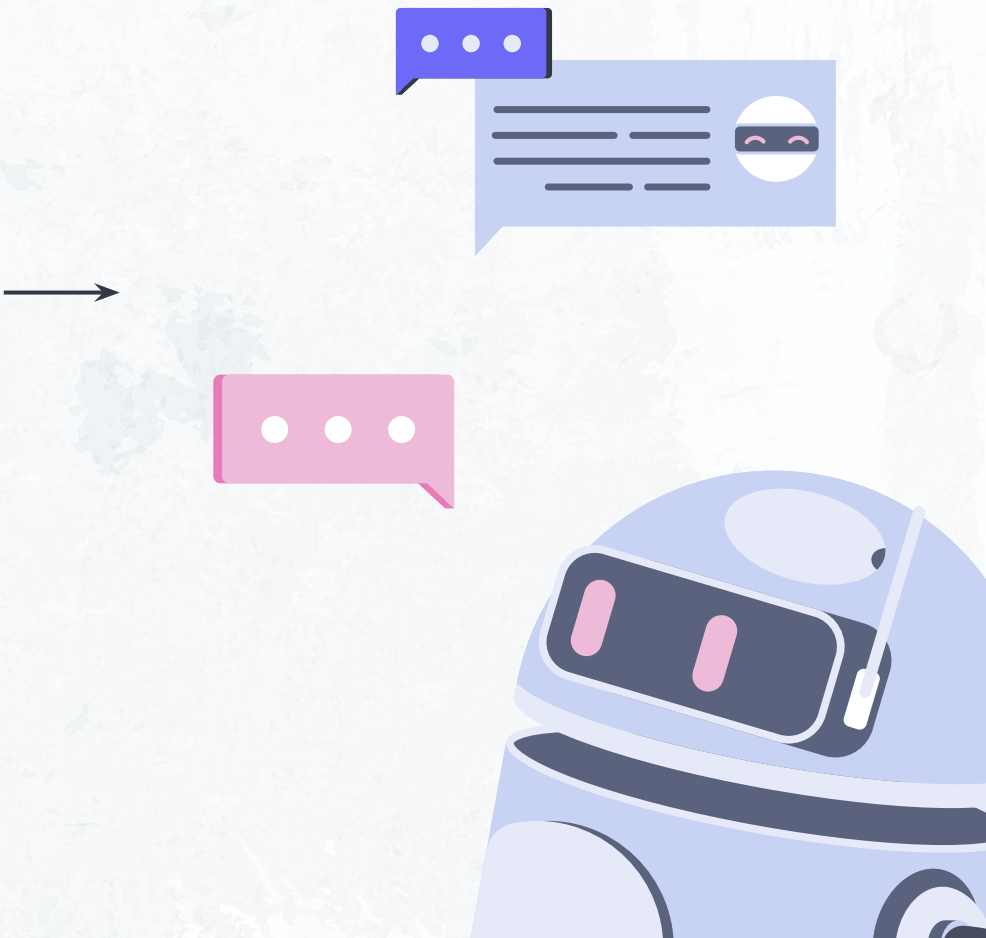
Auto Bin Bottle Cap Collection



Features

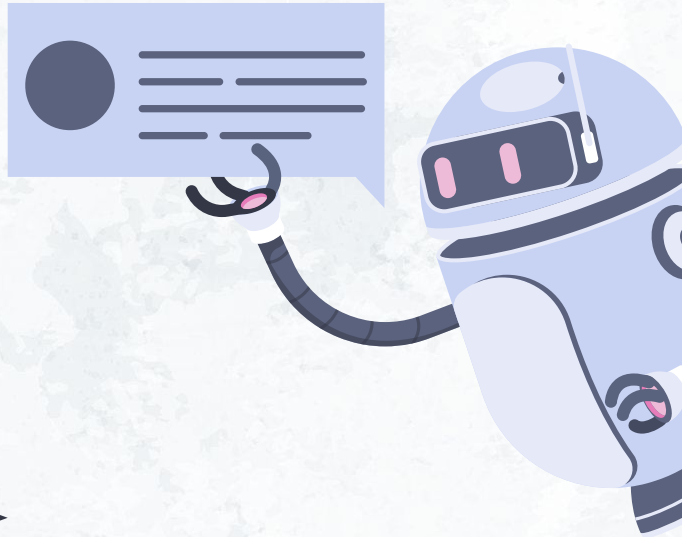
01 → Automatic Lid

02 → Weight measurement

03 → Bin full notification

04 → Blynk

Module mechanism →



01 →

Servo & PIR

for Automatic Lid

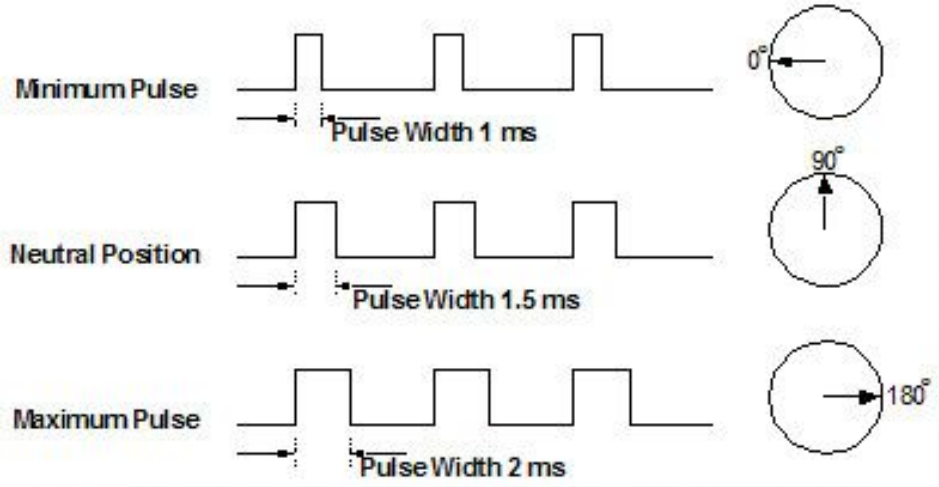
PIR [Detect motion]

bin's lid will open if detect motion, close if no motion detected longer than 5 seconds

- **Detects any motion :** pulls the out (DATA) pin HIGH
- **Otherwise :** pulls the out (DATA) pin LOW

Servo

- The period must be 20ms or the frequency must be 50 Hz.
- Control the turning degree of the servo (0 - 180 degree) by applying 2 - 12 % duty cycles.



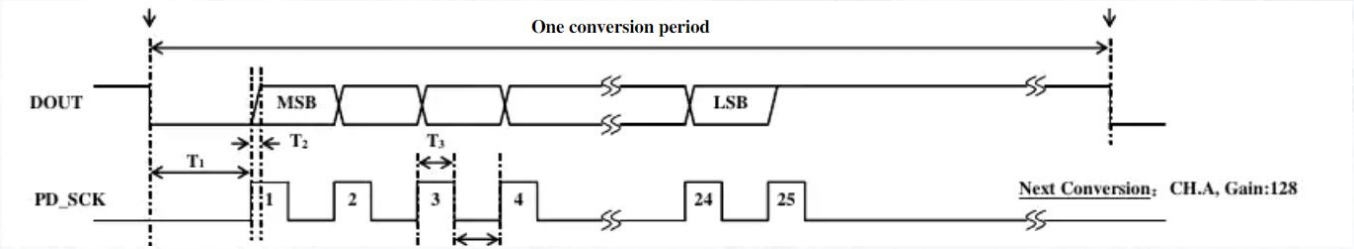
02 →

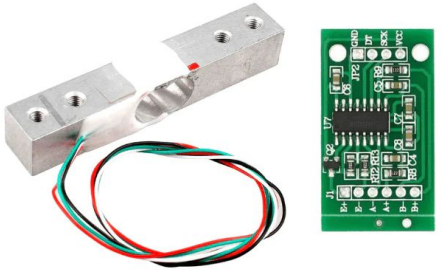
HX711 & Load cell

for Weight measurement

HX711 and Load cell

- The 24 bits data can be read by applying 25-27 positive clock pulses.
- Mapping the data ranging from -800,000 to +800,000 in non-gram units to 0 - 5000 gram.
- Send weight value to NodeMCU via UART





03 →

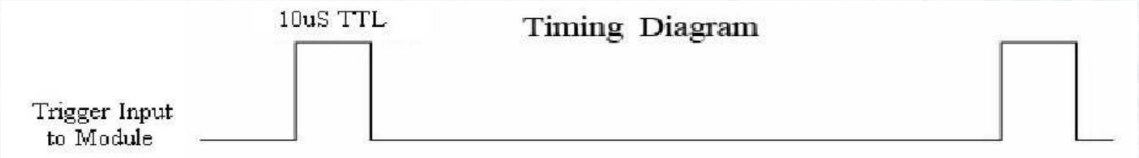
Ultrasonic sensor

for Bin full notification

Ultrasonic sensor

Measure distance between sensor and object, use as bin full detector

(a) Input (Trigger pin): pulse >= 10 us (HIGH), followed by >= 50us LOW (Use PWM)



(b) Output (Echo pin): HIGH as long as the time of wave send out from sensor and reflex to a object back to itself (Mapping 0 - 50 us to 2 - 500 cm range)

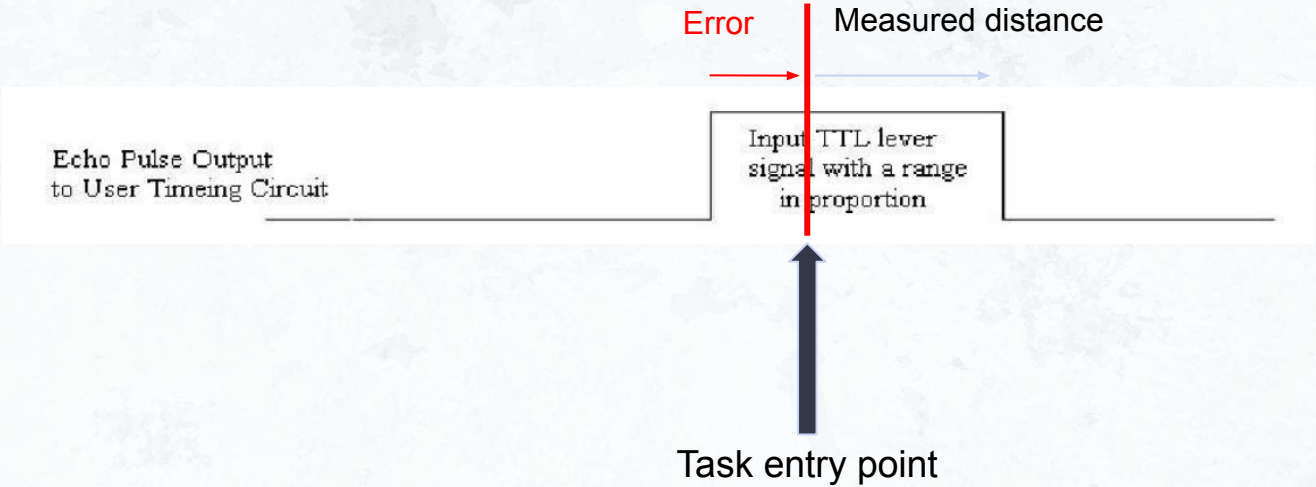
(c) Interpretation: distance < 5 cm (Estimately) send logic HIGH to NodeMCU. Otherwise, send LOW

04 →

IOT platform : Blynk

Problems

1. **Unstable distance measurement of ultrasonic [Improved]**
    a. Calculate average of last 20 value measured
    b. Use interrupt instead of task
        i. prevent error from entering task in the middle of echo signal
        ii. reduce frequency of measuring (giving clock cycle to other task)



Problems

2. PIR detection range overly sensitive [Not fixed]

Should use other sensor instead, e.g. ultrasonic sensor

3. Inaccuracy weight measurement [Not fixed]

Temperature effect accuracy of load cell