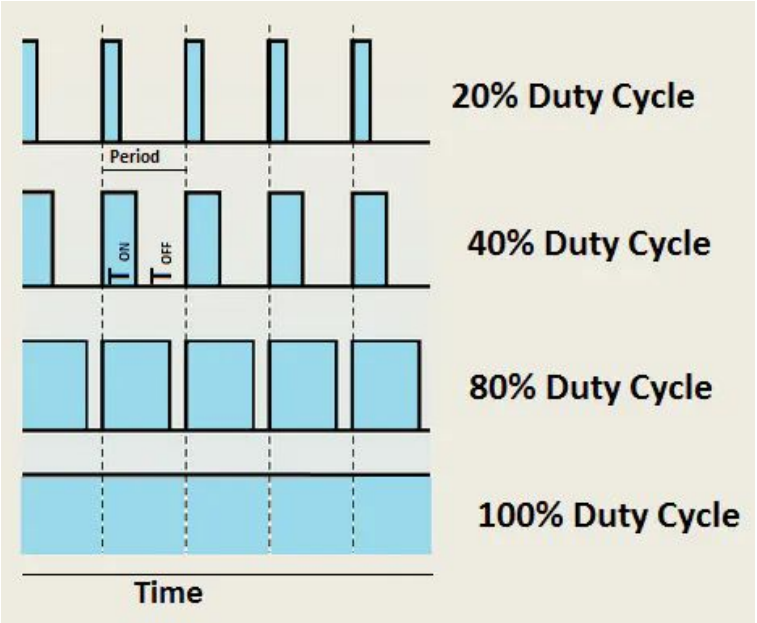
checkBin - Evaluation

Energy consumption

- Sensors: ultrasonic and load cell
- Actuators: OLED display and stepper motor
- Board
- Radio

Analysis on sampling frequency

- Continuous sampling of all the sensors
- Continuous sampling of one sensor and sensing of the other only when needed
- **Periodic sensing**

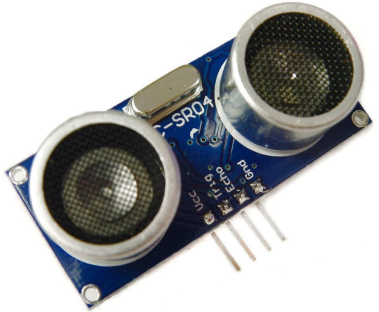


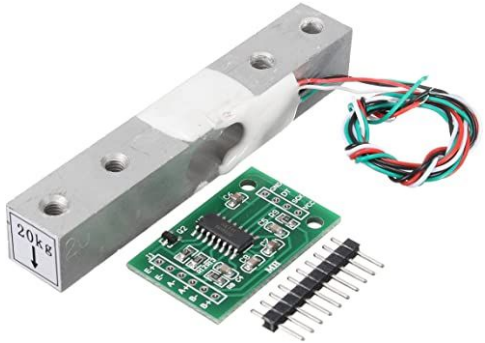
Analysis on radio usage

- Transmit the fill level every time a new one is computed

- **Transmit the fill level every time it changes with respect to the last measured one**

Sensors precision





Ultrasonic sensor

Fill level → value between 0 and 9

Fill level step represents a range of size bin_height/10

Error percentage of the fill level: max 10% of the total height

Load cell

Conversion formula:

(base_value - measured_value)/0.104

Error: ~2%

Accuracy of the system

Fill level from ultrasonic sensor	Total measurements	Detected anomalies	Undetected anomalies
0	2	0	0
1	3	0	0
2	5	0	0
3	4	0	0
4	7	0	0
5	6	1	0
6	3	0	0
7	3	1	0
8	4	0	1
9	3	0	0
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Total	40	2	1

Network

- Bandwidth: size of the payload is less than 10 bytes
- Latency: from the sending of the message to the update in the dashboard is less than 2 seconds
- Gateway infrastructure: must cover all the bins