

IntelliBin

Introduction:

A smart bin to automatically segregate the waste on different bins with use of image processing.

Main Segregation:

- Organic
- Others (Glass, Metal, etc.)
- Paper
- Plastics

Features:

- Automatic opening of bin lid with the use of proximity sensors.
- Automatic waste segregation.

Use Cases:

- Throw the waste into IntelliBin which automatically segregates the waste for you in respective bins. Only the organic waste needs to be thrown into a separate opening.
- The LCD display attached in the IntelliBin will show the fill level of different bins.

Development Details:

Components Used: (Main Electronic Components)

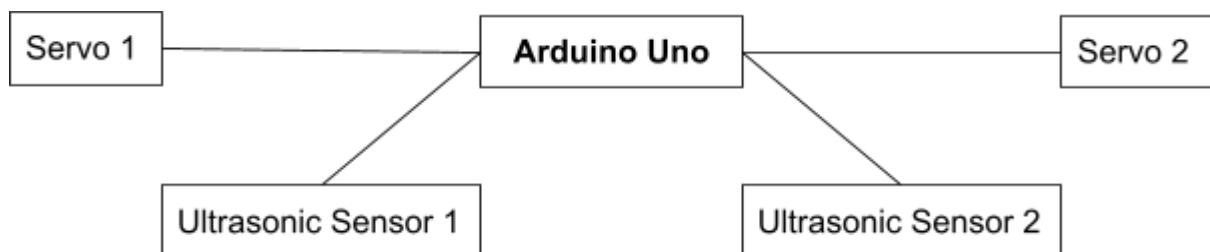
Components	Quantity	Links
Ultrasonic Sensor	4	Robu.in
Servo	2	Robu.in
LCD	1	Robu.in
Arduino Uno	1	Robu.in
RaspberryPi 4	1	Amazon.in
Stepper	2	Robu.in
HP Web Camera	1	Amazon
IR Sensor	1	Robu.in

Component Connections:

Three controlling units:

Control Unit: 1	Automatic opening of intellibin lids
Control Unit: 2	Image processing stage
Control Unit: 3	Moving the waste into respective bins

Control Unit: 1



Ultrasonic - 1

VCC	5V
GND	GND
TRIG PIN	GPIO-2
ECHO PIN	GPIO-3

Servo - 1

VCC	5V
GND	GND
PWM	GPIO-8

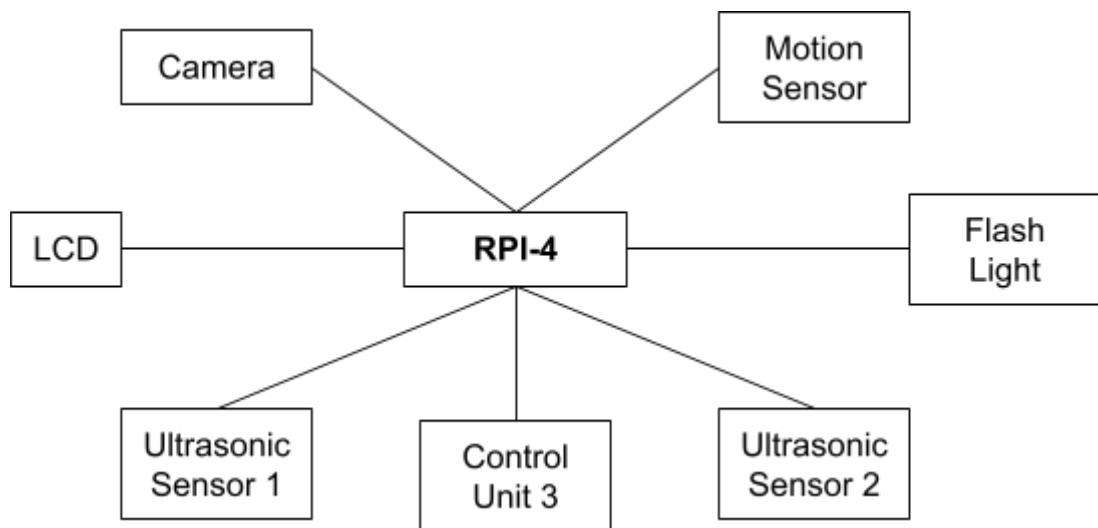
Ultrasonic - 2

VCC	5V
GND	GND
TRIG PIN	GPIO-5
ECHO PIN	GPIO-4

Servo - 1

VCC	5V
GND	GND
PWM	GPIO-10

Control Unit: 2



Camera and Control Unit 3

These peripherals are connected via the serial connector of RPI4.

LCD

VCC	5V on the Raspberry Pi.
GND	GND on the Raspberry Pi.
SDA	SDA pin on the Raspberry Pi (GPIO2).
SCL	SCL pin on the Raspberry Pi (GPIO3).

Motion Detection - IR Sensor

VCC	5V on the Raspberry Pi.
GND	GND on the Raspberry Pi.
OUT	GPIO-26

Flashlight Relay

Relay	GPIO-17
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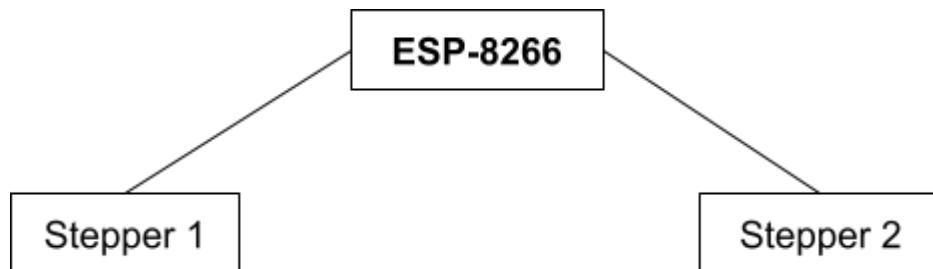
Ultrasonic for Fill level

VCC	5V on the Raspberry Pi.
GND	GND on the Raspberry Pi.
TRIG PIN	GPIO-23
ECHO PIN	GPIO-24 [5v => 3.3v] needs to step down.

Ultrasonic for Fill level for organic bin

VCC	5V on the Raspberry Pi.
GND	GND on the Raspberry Pi.
TRIG PIN	GPIO-25
ECHO PIN	GPIO-8 [5v => 3.3v] needs to step down.

Control Unit: 3



Stepper - 1 (Slider Stepper)

VCC	5V on the Raspberry Pi.
GND	GND on the Raspberry Pi.
STEP PIN	D6
DIR PIN	D7

Stepper - 2 (Rotational Stepper)

VCC	5V on the Raspberry Pi.
GND	GND on the Raspberry Pi.
STEP PIN	D4
DIR PIN	D5