Smart Trash Can

Name: Manciu Mihaela Group: 1222A

Introduction

This project aims to solve a few problems related to the garbage management in a public area. Managing our waste in a smarter manner is a pioneer of innovative smart city solutions.

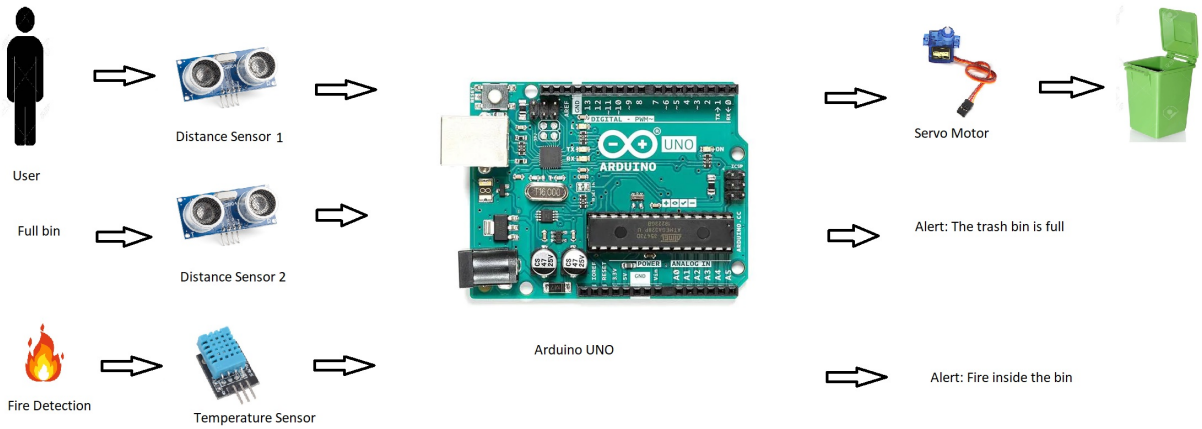
General Description

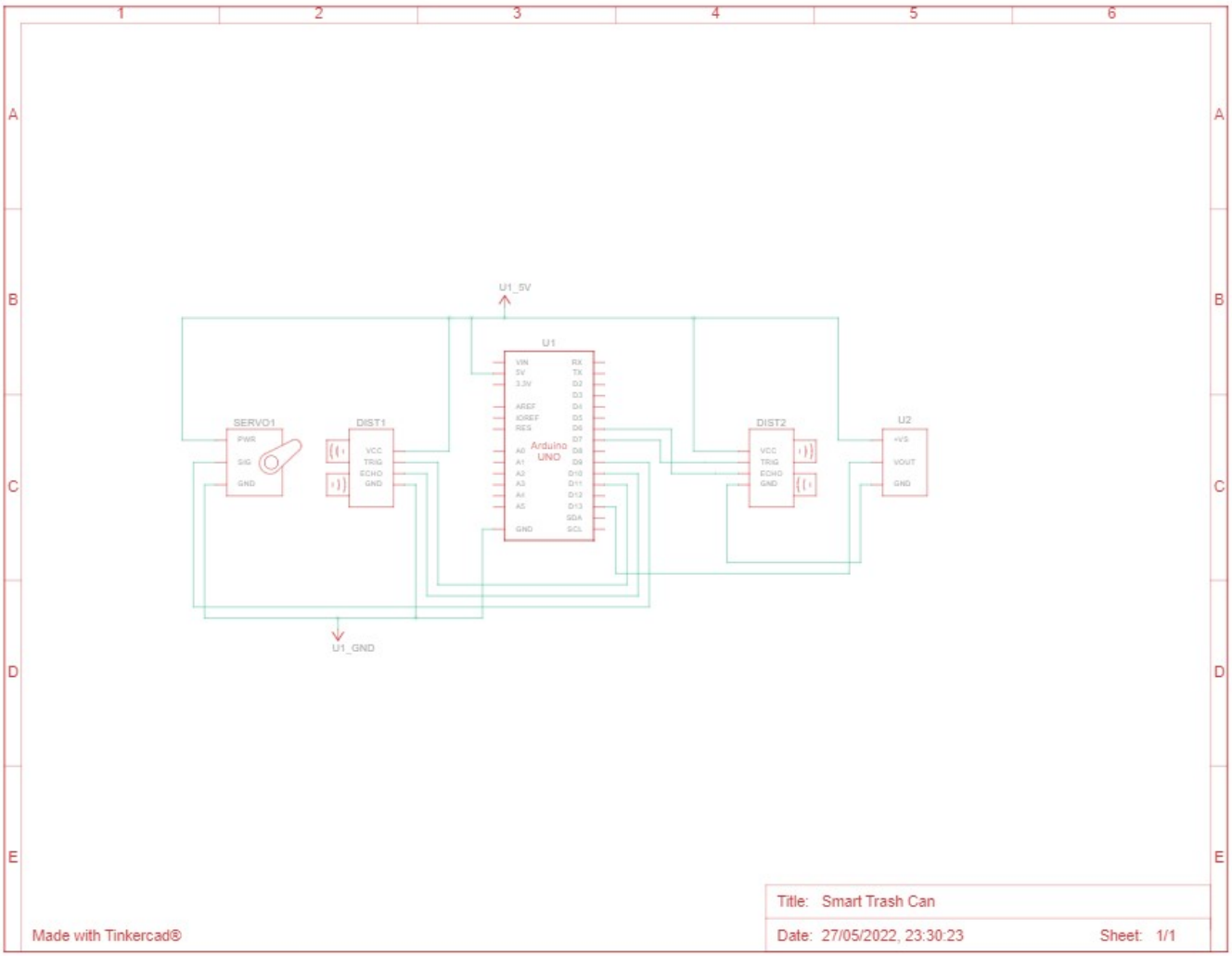
This automated trash can opens and closes its lid if it detects any rubbish in front of it. The sensor is located above the lid and, using a servomotor, the lid opens automatically. Under the lid there is another sensor that detects when the bin filled up and alerts the sanitation department to empty it before it is full. Additionally, if fire is detected inside the bin, the temperature sensor will send an immediate signal to notify those responsible for the bin.

Advantages:

- avoiding physical contact, no germs transmission
- reducing the need for collection visits
- alerting in case of fire

In the future a more effective solution would be to activate a compressor to put the fire out and to implement a compaction system to maximise bin capacity.





Hardware Design

List of components:

- Arduino UNO
- Ultrasonic Distance Sensor - HC-SR04 x2
- Servo motor (Tower Pro MG996R)
- Temperature sensor DHT11
- Jumper Wires
- Breadboard

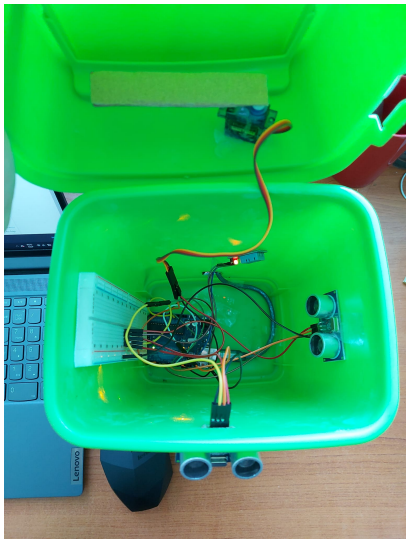
Software Design

Code Description:

1. libraries for servo motor and sensors are included
2. components' pins are declared
3. setup() function: data pin of the servo motor, INPUT pins(ECHO) and OUTPUT pins(TRIGGER) are configured
4. loop() function: firstly it verifies if there is any fire inside the trash can(if yes, sends a message), then checks if the trash can is full(if yes, sends a message) and then the servo motor opens the lid if the distance between hand and lid is less than 10 cm.

- Libraries: DHT sensor library, Servo
- Source Code: code_trash_can.txt

Demo: https://youtube.com/shorts/nSU-zeMt16w



Bibliography/Resources

—Hardware Resources— Arduino Data Sheet:
https://www.arduino.cc/en/uploads/Tutorial/595datasheet.pdf

Servo Motor Data Sheet: http://www.ee.ic.ac.uk/pcheung/teaching/DE1_EE/stores/sg90_datasheet.pdf

DHT11 Humidity & Temperature Sensor Data Sheet:
https://www.mouser.com/datasheet/2/758/DHT11-Technical-Data-Sheet-Translated-Version-1143054.pdf

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