



Smart Pill Dispenser System

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Abstract

The prevalence of medication non-adherence remains a significant challenge in healthcare, leading to adverse health outcomes and increased healthcare costs. To address this issue, we present a Smart Pill Dispenser System equipped with an ultrasonic sensor and a motorized pill release mechanism controlled by Arduino. The system aims to improve medication adherence by automating the pill dispensing process.

The Smart Pill Dispenser System consists of a compact device capable of storing multiple pills. The compartment is equipped with a motorized mechanism connected to a central control unit. The control unit incorporates an ultrasonic sensor, which continuously monitors the presence of a patient in front of the dispenser.

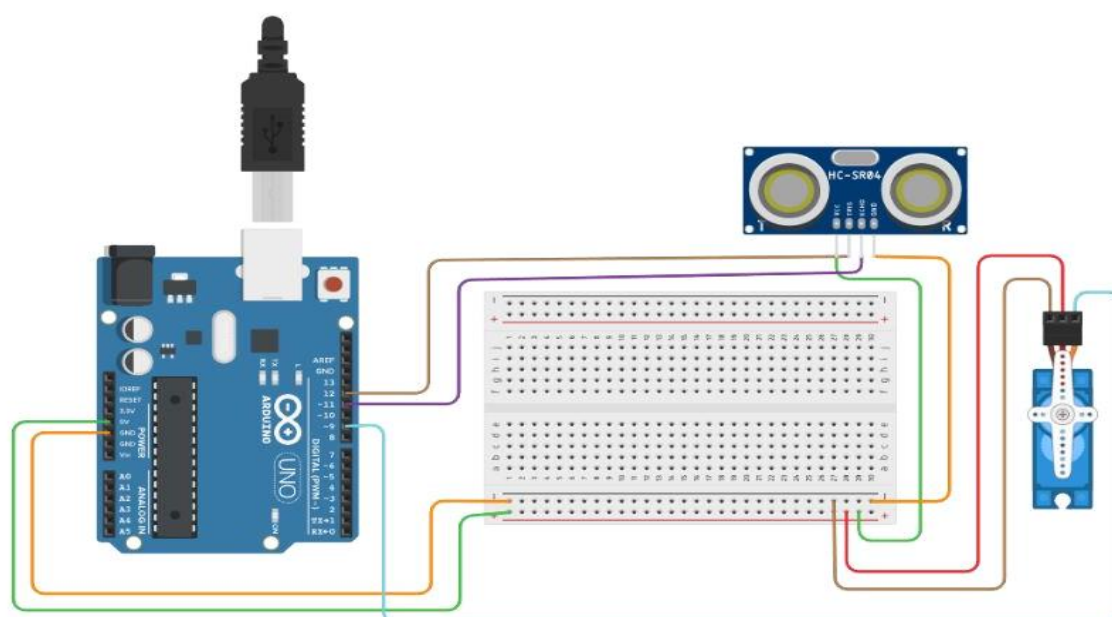
When the ultrasonic sensor detects a person in close proximity, it triggers the control unit to initiate the dispensing process. The motor rotates, activating the pill release mechanism and pushing the designated pill into a designated tray or container for easy retrieval by the patient

Introduction

The Smart Pill Dispensing System revolutionizes the way medication is managed by leveraging proximity-based sensing technology. By integrating an ultrasonic sensor, the system ensures that medication is dispensed only when the patient is within a predetermined range. This proximity-based operation not only enhances safety but also prevents unauthorized access to medication and reduces the likelihood of accidental dispensing.

Traditional manual pill dispensing methods often rely on the patient's memory and manual dexterity, leaving room for potential mistakes and unintentional non-adherence. The Smart Pill Dispensing System seeks to overcome these limitations by incorporating cutting-edge proximity sensing technology.

Circuit Diagram



Code

```
#include <Servo.h>

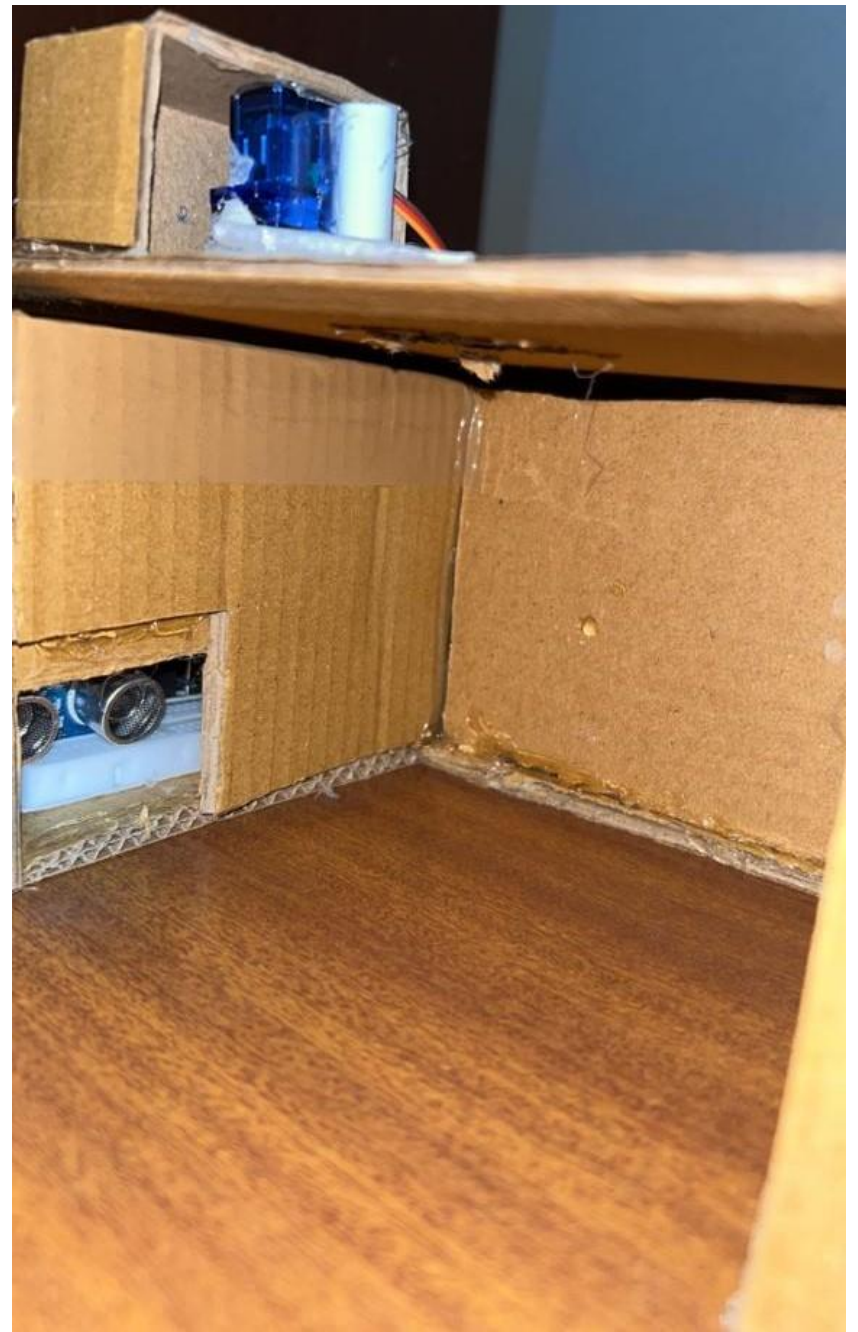
// constants won't change
const int TRIG_PIN = 12; // Arduino pin connected to Ultrasonic Sensor's TRIG pin
const int ECHO_PIN = 11; // Arduino pin connected to Ultrasonic Sensor's ECHO pin
const int SERVO_PIN = 9; // Arduino pin connected to Servo Motor's pin
const int DISTANCE_THRESHOLD = 9; // centimeters
Servo servo; // create servo object to control a servo
// variables will change:
float duration_us, distance_cm;

void setup() {
  Serial.begin(4800); // initialize serial port
  pinMode(TRIG_PIN, OUTPUT); // set arduino pin to output mode
  pinMode(ECHO_PIN, INPUT); // set arduino pin to input mode
  servo.attach(SERVO_PIN); // attaches the servo on pin 9 to the servo object
  servo.write(180);
}

void loop() {
  // generate 10-microsecond pulse to TRIG pin
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(100);
  digitalWrite(TRIG_PIN, LOW);
  // measure duration of pulse from ECHO pin
  duration_us = pulseIn(ECHO_PIN, HIGH);
  // calculate the distance
  distance_cm = 0.017 * duration_us;
  if(distance_cm < DISTANCE_THRESHOLD)
    servo.write(35);
  else
    servo.write(145);
  delay(500);
}
```

Images





Working Model

<https://youtu.be/34JS4LdwnS8>

Conclusion

The smart pill dispenser system provides an efficient and user-friendly solution for managing medication intake, promoting better health outcomes, and enhancing the overall quality of life for individuals who rely on regular medication regimens. The system is also affordable, making it a viable option for people who are looking for a way to improve their medication management. The proximity-based operation not only enhances safety but also prevents unauthorized access to medication and reduces the likelihood of accidental dispensing.

Furthermore, the system can be easily customized to accommodate various medication schedules and dosage requirements, making it suitable for a wide range of patients.