Building an Automatic Hand Sanitizer Dispenser Using Arduino, Ultrasonic Sensor, and Servo

An **Automatic Hand Sanitizer Dispenser** uses an **ultrasonic sensor** to detect the presence of a hand and then activates a **servo motor** to dispense sanitizer automatically.

Components Needed:

- **Arduino Uno**
- **Ultrasonic Sensor (HC-SR04)**
- **Servo motor**
- **Bottle or container for sanitizer**
- **Jumper wires**
- **Breadboard**
- **Power supply** (for Arduino)

Circuit Connections:

1. **Ultrasonic Sensor:**
    - Connect the **VCC** of the **HC-SR04** to the **5V** pin on the Arduino.
    - Connect the **GND** of the ultrasonic sensor to the **GND** pin on the Arduino.
    - Connect the **Trig pin** of the sensor to **digital pin 9** on the Arduino.

- Connect the **Echo pin** of the sensor to **digital pin 10** on the Arduino.

2. **Servo Motor:**
    - Connect the **VCC** of the servo to the **5V** pin on the Arduino.
    - Connect the **GND** of the servo to the **GND** pin on the Arduino.
    - Connect the **Control pin** of the servo to **digital pin 11** on the Arduino.
3. **Sanitizer Container and Servo:**
    - Attach the servo motor to a mechanism that can dispense the sanitizer (like pressing a pump mechanism). The servo will rotate and trigger the pump when activated.

Working:

1. When you place your hand in front of the **ultrasonic sensor**, the sensor detects the distance. If the distance is below a certain threshold (indicating a hand is detected), it sends a signal to the Arduino.
2. The Arduino activates the **servo motor**, which triggers the sanitizer pump, dispensing a predefined amount of sanitizer.
3. The servo moves back to its original position once the sanitizer has been dispensed.